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ICETTSE 2K22



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SHREE L.R. TIWARI College Of Engineering

PROCÉÉ

International Conference on

Emerging Trends in Technology

Science & Education

4th & 5th January - 2022

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Preface

It brings me great pleasure to present the proceedings of the International Conference on 'Emerging Trends in Technology, Science and Education (ICETTSE-2022), which will be held at Shree L. R. Tiwari College of Engineering, Mira Road, on the 4th and 5th of January 2022. We hope you find it informative, exciting, and motivating.

In every direction, the twenty-first century has ushered in a new era. Various research works that have been done so far especially in the contemporary world, have given us the ability to harness the wealth of nature and convert it into useful products and services. As technology advances at a breakneck pace, it's becoming increasingly important for us to stay on top of developing trends, keep up with current discoveries, and take advantage of new ideas. This International Conference will provide as a clear display for evolving ideas and concepts, allowing for the most effective utilization of new trends while retaining quality, cost, and timely delivery. The goal of ICETTSE-2022 is to provide a forum for sharing the difficulties, challenges, possibilities, and findings of diverse research projects across a wide range of disciplines.

The response to the call for papers was overwhelmingly positive from all corners of the globe, particularly from United Kingdom, France, Australia, Qatar and Kazakhstan. We would like to extend our gratitude to all of the reviewers who assisted us in maintaining the high quality of the manuscripts included in the proceedings. We also like to express our gratitude to the members of the organizing team for their efforts.

We are now hopeful that the proceedings of ICETTSE-2022 would be published on both the online and offline platforms. We understand that authors want their papers to be as popular as possible. And we will do everything we can to assist them in their attempts.

Let us hope that all of the ICETTSE-2022 participants have a pleasant and productive time at the conference, and that our international guests enjoy their time publishing their work in this lovely month of January.

"Scientists dream about doing great things. Researchers do them"

Convener Co-convener ICETTSE-2022

About Rahul Education

Rahul Education, the parent organization covering five registered educational societies, is a reputed quality education provider. It comprises of 52 institutions, spread across Thane and Palghar districts of Maharashtra and Chandauli district of Uttar Pradesh.

Ever since the commencement of its first school in Bhayander in the year 1992, Rahul Education has diligently followed the path of delivering 360 degree quality education. Rahul Education is already providing education in all streams of Engineering, Polytechnic, Architecture, Design Studies, Law, Degree Courses - BMS, BMM, BA, B.Com., BAF, B.Sc (IT, Aviation, Hospitality Studies, Actuarial Sciences, Computer Science, and Data Science) M.Ed., B.Ed., D.T.Ed., E.C.C.Ed., Junior College (Arts, Commerce and Science), IGCSE, ICSE, CBSE, & SSC Curriculum. It is further expanding its horizons by venturing into the following educational milestones like Medical College, established Deemed University, and spreading Education to 100000 students by 2022-23.

As the year 2018 marks a quarter of a century since the Group's inception, the educational organization has decided to commemorate the occasion by establishing a Knowledge City in the state of Uttar Pradesh. The underlying goal behind such a step is to elevate the standard of education within the country and spread its benefits to all. This Knowledge City will be fully equipped with state of the art facilities and all modern equipment's to bring world class education to the people of Uttar Pradesh. This will also enable the group to fulfill the lifelong dream of its founder Shri Ramadhar J. Tiwari to have a thriving educational institution in his native place of Mahuar Kalan.

Rahul Education is proud of its 52000 students and their parents who boast about its commitment to provide quality education from Pre-school to Post Graduation.

Each individual at Rahul Education works with the single vision of providing education for all and achieving the mission of bringing progress through comprehensive quality education.

Rahul Education aims to establish itself as an exemplary leader in the education sector in India. Its logo, 'A Burning Torch' represents its desire and passion to spread the light of knowledge in the lives of the young generation that will take India forward on the path of progress and peace.

About SLRTCE



Shree L. R. Tiwari College of Engineering, established in the year 2010, is the first engineering college in Mira-Bhayander. Within the first year of its existence, it had already become one of the most sought-after engineering colleges in the extended western suburbs of Mumbai. This has been aptly demonstrated by the fact that a large majority of students admitted in the first batch were from beyond the local belt of Mira- Bhayander, some of them even from south and central Mumbai. A team of qualified, experienced and committed teachers appointed through a rigorous selection process, could quickly establish an enviable academic ambience with whole-hearted support from the Management which spared no stone unturned to create state-of-the-art infrastructure. However, there has been a constant endeavor at SLRTCE to further improve upon the performance on all fronts viz. teachers' training, student facilities, seminars and conferences as well as research. The institute has worked towards the formation of a fully fledged Placement Cell managed by reputed and experienced professionals. SLRTCE promises a bright future for its students in terms of success at the University examinations as well as worthy internships and final placements in the corporate sector at the appropriate time.

"Education is the passport to the future, for tomorrow belongs to those who prepare for it today." – Malcolm X

About SOEL



SOEL is abbreviated for School of Enrichment and Learning, is the research and development wing of Rahul Education. The primary objective of SOEL is to provide quality assurance, academic support and end to end solutions to all the schools and colleges encapsulated under Rahul Education in order to attain higher synergistic approaches to the educational pedagogy. It is a host to students on the campus to impart globally accepted quality education through strategic planning and its implementation.

SOEL was established in the year 2020, and since then has successfully provided support to colleges through establishing Value Added courses, accreditation (NAAC, NBA) support and data validation, FDPs in order to attain criterion objectives, affiliation (CBSE, ICSE, CAIE) and school accreditation (CIS, NABET, ISO) support and quite more.

As for future developments, SOEL shall be broadening its horizons by providing support not only to colleges under the banner of Rahul Education, but others as well. NATIONAL BOARD OF ACCREDITATION NBCC Place, East Tower, 4th Floor, Bhisham Pitamah Marg, Pragati Vihar, New Delhi-110 003 Tel: +91 11 2436 0620-22, 2436 0654 ; Telefax: +91 11 4308 4903 Website: www.nbaind.org



MESSAGE

"Strive for perfection in everything you do. Take the best that exists and make it better. When it does not exist, design it." Sir Henry Royce, English Engineer and Car Designer

I am indeed delighted to learn that Shree L. R. Tiwari College of Engineering is organizing an International Conference on "Emerging Trends in Technology Science and Education" (ICETTSE 2022) on January 4th and 5th, 2022.

The conference will hopefully provide an ideal forum to hold discussions and share newideas in the important area of research.

The inclusion and showcasing of the undergraduate engineering students is a very progressive step in the right direction and I am extremely happy about it.

I am convinced that the Conference will benefit multidisciplinary professionals, students, and researchers.

Shree L. R. Tiwari College of Engineering deserves heartfelt congratulations for their outstanding efforts.

I applaud the organizers on arranging this conference and wish them the best of luck in making it a huge success. I hope that the delegates and speakers will make an impactful contribution.

(Prof K K Aggarwal) Chairman, NBA



PROF. K.K. AGARWAL Chairperson of NBA & Former VC GGS Indraprastha Unversity

Hon'ble Chairman



Shri Lallan R. Tiwari Founder Chairman, Rahul Education

It is a pleasure to greet you at the International Conference on Emerging Trends in Technology, Science, and Education (ICETTSE-2022).

Those who trust in the potential of young minds - will have a bright future.

With the major goal of creating a venue for the exchange of practical experiences in all aspects of process engineering; as well as finding answers to the different issues that process engineers confront, this Conference will be not just an eye-opener but also a catalyst in the transformation of current trends.

Digital Transformation, Revolutionary Technology, Debottlenecking, Energy Efficiency and Sustainability, are just a few of the primary subjects that will be discussed during the conference's technical programme. The ICETTSE-2022 conference will provide an excellent opportunity for regional and international academics, technologists, and researchers, to discuss how to develop innovative ideas and practical solutions that will address the growing needs in multi-disciplinary domains.

By bringing together researchers and budding scientists from all around the world, we have created an international conference to inspire brilliance for the development of society. Attending an academic or professional conference provides possibilities to expand your network, and become more informed of current trends in your field of interest.

"Knowledge is useless until it is put into practice."

The participants have a great opportunity to showcase their innovative ideas and demonstrate their technical skills that can be useful to engineering and technology advancements. Best wishes to each participant and warmest greetings to the entire organizing team and distinguished guests.

I am looking forward to the success of this international conference.

Hon'ble Secretary



Shri Rahul L. Tiwari Secretary, Rahul Education

Welcome to the International Conference on Emerging Trends in Technology, Science, and Education (ICETTSE-2022), organized by Shree L. R. Tiwari College of Engineering, which is a remarkable milestone in the journey of the Institute's efforts towards the field of research. The Conference was conceptualized approximately a year ago, and it is an event of great importance that we all look forward to. I am confident that it will become the most prestigious professional conference dedicated to Emerging Trends in Technology over the few years.

Trending technologies is a household term today and represents the future of the multi- disciplinary domains and revolutionary nature of technology development. With flexible, pay-as-you-go services for information generation, delivery, consumption, and management, computer technologies are popular and provide resource sharing at various levels, including infrastructure, software application clouds (e.g., application as a service, modelling tools as a service, social network as a service), and business (e.g., business process and management as a service). Keeping in mind the expansive growth and infiltration of computer and information technology in all sectors, we aim to dive into long-term research and deep study, thus executing the 'unimaginable' and highlighting the 'useful', leaving out the unethical and unfeasible aspects of change. This, in turn, will help the current generation, get onto the right track and focus on emerging technological trends for global sustenance.

The commitment and involvement of many academic members, student committee members, and staff has been essential for the success of a large-scale and well-monitored international conference like this one. I offer my gratitude to the programme committee, which provided technical evaluations and discussions for the submitted papers, as well as the other committees, without whom this conference would not have been possible.

I wish the delegates and the organizers of the International Conference immense success in making this Conference both meaningful and memorable.

Hon'ble Jt. Secretary



Smt. Krishna R. Tiwari Jt. Secretary, Rahul Education

I am glad to know that Shree L. R. Tiwari College of Engineering has organized a two days International Conference on Emerging Trends in Technology, Science, and Education (ICETTSE-2022) in collaboration with School of Enrichment and Learning (SOEL), Rahul Education.

The world is continuously changing. Human behavior, knowledge, and digital technology are all fast-moving in lockstep with the rest of the world, necessitating improvement to counteract these shifts.

ICETTSE-2022 provides an overview of the latest research and cutting-edge technologies while also providing light on how to adjust to the new normal, with an emphasis on present concerns and future ambitions.

I feel that this event encourages high-level research and the globalization of high-quality research in general, making debates and presentations more internationally competitive and focusing attention on recent great achievements in the field of multidisciplinary domains.

Best wishes for the conference's success.

Principal



Dr. Umesh S. Bhadade I/C Principal of SLRTCE

"The great growling engine of change- TECHNOLOGY "- Alvin Toffler

A warm and happy greeting to everyone. We are very pleased to hold the International Conference on Emerging Trends in Technology, Science and Education on January 4th and 5th, 2022, and to present a collection of various technical papers in the proceedings.

Under the competent guidance of management, SLRTCE continues on its path to success with confidence. The keen and clear vision and accurate decision-making power of our management has benefited our college to stay competitive.

The SLRTCE campus is a camouflage of a wealth of knowledge, innovation and technology.

SLRTCE in itself is a niche full of opportunities for Aspiring engineers and researchers.

A forward-looking approach requires artificial intelligence, machine learning, data science, and robotics to keep pace with new technologies and to adapt and adjust to changing times to be on par with the world, the Conference events are aimed at researchers, practitioners, professionals, educators, students sharing experiences, innovative ideas, topics, current trends, and future directions in engineering and science and technology.

It includes a keynote address from Academicians and a paper presentation by research Scholars as well as industries.

In short, the conference promises to reach a new and unprecedented level of excellence.

The role of students in building a country cannot be overlooked. SLRTCE students are trained in every way to be successful engineers and good citizens. We would like to take this opportunity to wish all the students the best of luck.

We also congratulate HOD, staff, SLRTCE students, and participants from all over the world for their efforts in hosting and attending this conference and wish the conference all the success.





My best wishes for the International Conference on "Emerging Trends in Technology, Science & Education" organized By Shree L. R. Tiwari College of Engineering in collaboration with the School of Enrichment & Learning (SOEL), Rahul Group of Education on 4-5 January 2022.

Although the Covid-19 pandemic saw a downfall on the social and economic front, it has provided several opportunities to use advanced technologies and science to adapt to a new normal, including the way the educational institutions delivered their courses at all levels.

The conference is a timely and apt forum to discuss the emerging trends in Technology, Science & Education. I am sure the experiences shared during the conference will guide the teachers, students and professionals in leveraging the power of science and technology for societal benefits in the coming years. I congratulate Prof. Rahul Jiwane, the convener of this International Conference.

Dr Shirish Ravan

Head, United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) Beijing Office United Nations Office for Outer Space Affairs, Vienna Austria

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Dec 03rd, 2021

Dear Attendees,

We congratulate Shri L R Tiwari College of Engineering, in organizing and holding International Conference on Emerging Trends in Technology, Science & Education on 4th 4 5th January 2022.

I am honoured to be a part of the Technical Committee and it has been a thrilling experience working with the whole team. I am personally impressed with the Convener, Mr. Rahul Jiwane, for his untiring efforts in putting it all together. My association with Rahul goes for more than 30 years since we met for the first time at our alma-mater MNNIT, Allahabad. He as been always such an inspiration and it is always a great pleasure to collaborate with him.

The world has been going through a tumultuous time, and we are grateful for the opportunity to learn and share about the progress being made. In the spirit of science, technology, and education, we are all students for life; I am beyond thankful to be given this opportunity to participate and share such a valuable experience.

I would like to thank the organizers and management, and we sincerely wish prosperity and success for the conference and all attendees.

As the great Tirumalai Krishnamacharya said, "No one is wise by birth, for wisdom results from one's own efforts."

Join us as we further the eternal pursuit of learning and growth.

Best Wishes.

Rajeev Aggarwal Founder & President

Golden Ratio Software Services LLC

New Jersey, USA





It is an honor to be a part of the International Conference on Emerging Trends in Technology, Science, and Education (ICETTSE-2022) organized by Shree L.R. Tiwari College of Engineering (SLRTCE). This conference is launched with the aim to bring together government, academia from various disciplines and industry in a global forum to present new fundamental basic research, innovative technologies and build collaborations to solve critical needs and challenges of the digital world.

I am confident that the organizing team shall leave no stone unturned to address these allied issues and come up with solutions, recommendations to various stakeholders. I urge all participants to make the best use of the opportunity and explore digital advancements in the field of Blockchain, Internet of Things, Artificial Intelligence, Big Data, Health, Digital Environment, Energy Efficient Systems, and Digitization in Industries and Advanced Research in Science Technology and e-Learning.

I thank the management of the institution for its efforts to encourage the participation of young scientists, faculty members, researchers, students, industry professionals, business entrepreneurs, and government personnel.

The conference shall showcase the advancements in products and services by organizing a technical exhibition along with the conference. Finally, we thank every invitees for sharing best practices amongst the attendees, creating an ecosystem for technical collaborations amongst the stakeholders and resulting in improvement in the quality of research.

Mount

Pranav Ajeet NERURKAR

Post-doctoral fellow Institut De Recherche Dupuy De Lôme University of South Brittany Lorient 56100, France



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Dinesh Mahur, ITS General Manager

Message

It gives me immense pleasure to note that Shree L.R. Tiwari College of Engineering is organizing an international conference on "Emerging Trends in Technology, Science & Education" (ICETTSE-2022) on 4th – 5th January, 2022.

Organizing such an event at this point of time reinforces the objective of 'Atmanirbhar Bharat', 'Ideas, Achievements & Resolve' as part of Azadi Ka Amrit Mahotsav commemorating 75 years of India's Independence Celebrations.

I am sure that this occasion will provide an affable environment for the researchers, academicians, and professionals to freely exchange the views and ideas with each other. I convey my warm greetings and felicitations to the organizing committee & the participants. I extend my best wishes for the success of the conference.

Brahm

Dinesh Mahur



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Birendra Kumar BE (Civil), ME, CPEng, CMEngNZ, IntPE (NZ) Chartered Professional Engineer



MESSAGE

Dear Rahul

I am happy to know that Shri L.R. Tiwari College of Engineering in collaboration with the School of Enrichment & Learning (SOEL), Rahul Group of Education is organising an international conference on *Emerging Trends in Technology, Science & Education" on 4th & 5th January 2022.

While it is unfortunately not possible for me to join you in this conference, I am thrilled with the intention and the broad design of Emerging Trends in Technology, Science & Education. I consider that so many others at the conference including me- believe that a new evolutionary vision is taking shape and that young leaders may now be our most precious resource. I trust that this international conference – like so many of such previous gatherings – will resonate with the theme of Emerging Trends in Technology, Science & Education.

I congratulate you, Rahul Jiwane, for being the convener of this International Conference and for all your efforts in organising this conference. I wish all the grand success for the objectives of the conference including enriching experience to all participants and to the entire organising team.

Bonnates kums-

Birendra Kumar BE (Civil), ME, MIPENZ, CPEng, IntPE (NZ)



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MESSAGE

Dear Rahul,

Organizing a technological conference by an institution reflects its interest and awareness about trending fields in science and technology. And that's why I am happy to know that Shri L.R. Tiwari College of Engineering in collaboration with the School of Enrichment & Learning (SOEL), Rahul Group of Education is organizing an international conference on *Emerging Trends in Technology, Science & Education* on 4th & 5th January 2022.

I congratulate Rahul Jiwane, acting as a convener and his team for all the efforts being put for executing this conference. It's unfortunately not possible for me to attend this conference inperson due to unavoidable circumstances and international travel situation but I am sure that this conference's outcome will be productive and effective which will have good impact on minds of all attendees and presenters. Everyone will definitely learn something new and gets updated with new knowledge and experience.

I wish all the best for the conference – organizers, presenters and attendees to make it a successful event by exploring the emerging trends in science, education and technology.



Swaroop Pramod Thool BTech (Electronics), MS (Comp Engg) - University of Massachusetts (USA) Systems Software Engineer, Hewlett Packard Enterprise (HPE), USA



Dr. Deepak Waikar Managing Partner, EduEnergy

The pandemic situation has disrupted the traditional systems in an unprecedented way and adverse impact has been felt globally. The governments almost all over the world had and continue to resort to strict measures to minimize exposure and spreading of viruses using technology. Scientists have also developed vaccines, medicines, and devices for treatment and health care management. Entrepreneurs were there for supplying innovative products and services. Online and e-learning modes of education became almost common features due to advances in digital technology, the industriousness of innovators, adaptability of educators, support of administrators, and acceptability of parents and learners.

However, challenges continue to impact in one form or another. We were and are in the VUCA (Volatile, Unprecedented, Complex, Ambiguous) world. Industry 4.0, Global Climate Crisis, Rapid Urbanisation, Heavy Energy Consumption and Pollution, and related issues have affected and continue to affect every sphere of life on this planet and beyond.

Researchers, educators, policymakers, administrators, activists, and industries are making efforts to adapt and adopt innovative and pragmatic alternative approaches to address such critically vital problems.

New and renewable energy, clean technologies, automation, robotics, analytics, artificial intelligence, AR/VR/MR, Digital Twins, IoTs, smart sensors, and smart devices have made inroads in various sectors. It is envisaged that such emerging trends and human ingenuity provide optimism and hope that together we can address such challenges and enhance the quality of life.

The International Conference on Emerging Trends in Technology, Science, and Education (ICETTSE-2022) organised by the Shree L. R. Tiwari College of Engineering, Mumbai, India is very timely considering above mentioned critical issues and challenges.

Research papers, articles, case studies, and expert presentations at the ICETTSE-2022 are expected to provide innovative ideas and alternative solutions that can further enhance the deliberation, discussion, and collaborations.

Let me conclude by stating one of the compositions that summarises the shared vision for which top leaders of over 110 nations have pledged their support at the recently concluded COP-26 in Glasgow, UK.

Hearty congratulations to the Organising team of ICETTSE-2022. I would like to mention about the special efforts and follow-up of Professor Rahul Jiwane, Convener, and the invitation letter of Dr. Umesh Bhadale, I/C Principal of SLRTCE.

I look forward to interacting with the members of the organising team, advisory committee, experts, authors, delegates, and students virtually through this message and during the conference.

I wish you all "Happy 2022" and resounding success for the conference. Thank you, With best wishes,

Dr. Deepak Waikar, Managing Partner, EduEnergy, Singapore, Chair, IEEE Education Society Chapter, Singapore Email: dlwaikar@gmail.com WhatsApp/Telegram +65-98166847 https://www.linkedin.com/in/dr-deepak-waikar-640a6521/ https://eduvoice.in/sighting-project-based-learning-with-dr-deepak-l-waikar/ https://youtu.be/4jdmseqGCNY **Conference Chair**

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CHARACTERIZATION OF POLYPYRROLE FILLED POLYVINYL CHLORIDE THIN 927 - 932 **FILM COMPOSITES**

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ANALYSIS OF HANDWRITTEN CHARACTER RECOGNITION USING NEURAL NETWORK AND STATISTICAL METHOD

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ABSTRACT

Handwritten Character recognition is a critical area of research. In this paper pattern classification method for recognizing handwritten numerals in the database using Neural Network and Statistical method is presented. Matlab has been used as a programming Tool. The data file consists of 15,000 handwritten numerals labeled into ten classes from 0 to 9 each of size 30 X 30 pixels. 600 dimensional depictions of each numeral image is cumbersome, hence few features are extracted from the numerals that best represent numerals and give desirable accuracy. The present study is focused on two methods for pattern classification. One is neural networks and the other is statistical approach. But more concentration is on neural networks, the statistical method used here is just for comparison.

The most widely used Multilayer Perceptron network with one hidden layer is selected for classification in neural networks, whereas Bayesian theory is selected for Statistical methods. Six features are extracted from the primary data set by calculating the skewness, kurtosis, mean, standard deviation, variance, and entropy for the X and Y coordinates of every image. The vector of obtained patterns is divided into training dataset and testing dataset. First dataset is used to coach the classifier using a backpropagation training algorithm, whereas the second one to test the performance of the classifier. The results obtained from the neural network are then compared with the Bayesian classifier. It has been found that accuracy to classify the numerals is achieved more using neural networks as compared to statistical methods.

Keywords—Neural network, Multilayer perceptron network, Bayesian theory, Backpropagation Training algorithm.

I. INTRODUCTION

Writing, which has been the most natural mode of collecting, storing, and transmitting information through the centuries, now serves not only for the communication among humans, but also for the communication of humans and machines.

Since the advent of digital computers, machine simulation of human reading has become the subject of intensive research. A large number of references can be found at survey studies published on this topic. The reason for such was not only because of its challenge on simulation of human reading, but also, because it provides efficient applications e.g. for the automatic processing of bulk amount of papers i.e. transferring data into machines, such as bank cheques, commercial forms, government records, credit card imprints, and postal code reading. The ultimate success of neural networks depends on effectiveness in solving a variety of real-life classification or recognition problems.

Recent technical reports have demonstrated that neural networks can perform this task with the state of accuracy. Various people have written digits using a variety of different sizes, writing styles, instruments and with a widely varying accuracy. Most people write digits in such a way that it's very difficult to classify.

II. RELATED WORK

The field of Neural Networks has a history of some five decades but has found solid applications only in the past fifteen years and the field is still developing rapidly. Thus it is distinctly different from the fields of control systems or optimization where the terminology, basic mathematics, and design procedures have been firmly established and applied for many years. It is not to review the Neural Network as simply a summary of established procedures that are known to work well. Rather, it is a useful tool for Industry, Education, and Research, a tool that helps users find what works and what doesn't and will help develop and extend the field of Neural Networks.

Various methods for feature extraction and handwritten digit recognition were mentioned in the literature.

In [1], a pattern categorizing method for recognizing handwritten character digits in MATLAB is proposed. Designing a pattern identification system means establishing a mapping from measurement space into the space of potential labels. The basic operations in pattern identifications are feature unsheathing and categorizing. As proposed by the litterateur, the database consists of 15,000 handwritten digits labeled into 10 classes from 0 to

9, each of size 20 x 30 pixels. Each digit I considered as one sample in 600 dimensional features space and the data set is converted into a vector of patterns: array of features and array of labels (targets) for each feature sample.

Each digit is mapped to a more manageable low-dimensional feature space i.e. extract some numerical features from the images. Two numerical features are said to be extracted from the primary data set by calculating the skewness for x and y coordinates of each image. The vector of obtained patterns is split into training data set and the test data set. First data set is used to train the classifier whereas the second one to test the performance of the classifier.

In [2], the litterateur has extracted features from the image by adopting Fourier Transform as an appearance presentation scheme and derived 8 characteristic maps for describing different characteristics of co-occurrence relevance of image pixels in each channel of the color space. Then they calculate the first and second moments of these maps as a depiction of the natural color image pixel distribution, resulting in a 48-dimensional feature vector. The novel low-level feature is named color appearance moments (CTM), which can also be considered as a certain augmentation to color moments in 8 aspects through eight orthogonal templates. Their experiments show that this new feature can achieve good retrieval performance for Content Based Image Retrieval (CBIR). Primary issue in designing a CBIR system is to choose the most powerful image features to depict image contents.

Currently, the largely used features involve color features, such as color instants, color histogram, and appearance features, such as Gabor wavelet feature MR-SAR. As the color and appearance features capture different aspects of images, their combination may be useful. Therefore, some frontier works attempt to distinguish the color and appearance information of an image in one feature depiction. In this paper, they propose a novel low-level feature, named Color appearance moments, for representing image contents. It is able to integrate the color and appearance characteristics of an image in one Compact form. The primary image is operated with eight templates derived from LFT and eight characteristic maps are obtained each of which characterizes some information on certain aspects of the primary image. Let $\{I(x,y) \mid x=0....L-1, y=0....L-1, y=0....L-1\}$ denote the primary image. The eight-neighbourhood of pixels (x,y) are N₀, N₁, N₂, N₃, N₄, N₅, N₆, N₇ with anti-clockwise order. Assuming it is a periodic sequence with period of eight, we denote it as $I(x,y,n) = N_n$, n = 0 to 7. Intuitively, alike local parts of the appearance have alike series of I(x,y,n) and their Fourier transform to extract features for representing the local grey-tone spatial dependency. On the other hand, the local Fourier Transform is equivalent to eight unique templates operating on the image respectively.

In [3], the litterateurs have presented an approach for handwritten digit recognition using perceptron neural networks. A single layer perceptron has been selected and trained to recognize handwritten digits. Database is obtained from UCT machine learning repository which consists of 1,934 cases of numeric digits. Each training case is in digitized format of 0's and 1's at a resolution of 32 x 32. The perceptron is designed to accept 1024 input units $(32 \times 32) = 1024$ and 10 output units. Binary step function has been used as a perceptron activation function. For simplicity, default weights and bias (b) are set to 0 as well as learning rates (α) is set to 1. The network is then trained for the given dataset and a separate testing dataset. To get an unbiased estimate of the prediction error rate of the algorithm, ten-fold cross validation is done to evaluate the prediction error rate. Results are reported in terms of cross validated testing error rate. For the 32 x 32 map format the error rate is 9.98%, for the 8 X 8 block format, error rate is 11.07%. They have concluded that the algorithm runs best (in terms of lowest error rate). When setting threshold to zero and training directly on the primary bitmap format. Allowing non-zero threshold does not improve perceptron learning, nor does dimension reduction, although the later speeds up computation.

In [4], the litterateurs have proposed a new genetic learning algorithm to produce a nearby optimal feed forward neural network innovatively for the task of handwritten digit identification. Back propagation training algorithm is used. The major coverage of their paper is two-field. On one hand a systematic feature extraction method using orthogonal moments is presented, and the lofty robustness in appearance of noise and their use of universal information instead of neighborhood information of the image. The suggested approach explores the application of moment method to assess a set of candidate features and to pick an information subset to be supplied as input data for Neural Network classifier. On the other hand, they have identified that network technology has a significant impact on the speed and execution of back propagation trained networks.

In [5], the litterateur has explored the application of feed forward neural networks to the goal of written number recognition. Differently occurring forms of numerals are explained to classify the digits. Good survey of recent

adaptive system research results can be found according to the litterateur, where the performance of neural network techniques is contrasted to those of procedures such as Principal Component Analysis (PCA). Database is procured from the National Institute of Science and Technology. One concealed layer is used having function tan-sigmoid and output layer also having function tan-sigmoid. He comments that the numeral neurons allow the system to indefinite functions of larger complexity. The embryonic condition of the network also has a powerful influence on the training. The steepest fall algorithm is relatively sluggish and has a tendency to get in the domestic minima of the error surface (where the gradient is zero). Litterateur has implemented both the steepest fall backpropagation and a most urbane method called conjugate-gradient backpropagation.

In [6], a feed forward neural network with one concealed layer is used to understand handwritten digits. This problem is predominant in applications such as automatic zip code scanning on letters which is in present use by the United States postal service. A 5-fold cross validation testing is done to estimate the performance of a network. The input file is divided into 5 parts, each containing 100/5 = 20 instances. Out of 5 runs, 4 of the parts are used as training sets and the fifth part as test sets. Training is done for at least 200 epochs. After every 10 epochs, the sum of MSE on the training is computed. The training and evaluating steps are repeated after varying the number of concealed units in the network. The training plot and outcomes of 5-fold cross validation for each of these networks using the same training and evaluating sets are examined. A distinct graph has to be used for each network. The litterateur has identified what he considers to be the finest set of parameters (alpha, number of hidden units, number of iterations).

III. METHODOLOGY

The working of the proposed system useful for predicting handwritten digit recognition is as shown in fig 1. Following are the preprocessing steps applied.



Fig.1. Working of the proposed Model

i) digit along the x and y coordinates.

A. Feature Extraction:

It is the process of generating features to be used in the classification task. To accomplish the highest accuracy Feature extraction process should choose Optimal subset of features from the dataset. Hence feature extraction procedure consists of mapping of M – dimensional vectors of consideration Y = (y1, y2, ..., ym) into a new K – dimensional feature interpretation X = (x1, x2, ..., xk), K < M, which is more suitable for a given task. There are many algorithms for feature extraction. A few examples are:

- ii) Commonly used algorithm is to select the mass '1' for dark pixels and mass '0' for light pixels which is referred to as Variance of digit along the x and y coordinates.
- iii) Another algorithm is to subdivide the digit image into several equal quadrants (2,4,8, etc.) and count dark pixels in each quadrant which is referred to as (Skewness and Kurtosis) Giant order moments for the x and y coordinates
- iv) Next algorithm is to imagine any pair extracted if greater than 2, as a 2-D scatter plot using different classes. We can apply the scatter command. examine the separability of different classes in the dataset. Think hard if the extracted features are never changing to any kind of transformations (e.g. translation, rotation, scale).
- v) We can also evaluate the skewness for x and y coordinates of individual image by extracting two numerical features from the primary data set. These can be the features used for further classification.
- vi) In the rest of data, divide the vector of obtained patterns into a training data set and the test data set. We can use the first dataset to teach the classifier and the second one to examine the performance of the classifier.

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A. Image Processing:

Four steps involved in extracting the features are

- 1) Draw the digit with the help of a mouse or read it from the database.
- 2) Convert it into binary image only when the digit is drawn with the help of a mouse.
- 3) Crop image.
- 4) Resize image.

IMAGE CROPPING: Creating a new image from a part of the primary image is known as image cropping. To extract a rectangular portion of image, 'imcrop' function accepts two primary arguments.

- i) Image to be cropped.
- ii) Coordinates of a rectangle that define the crop area.

The 'imcrop' function displays the image in a figure window and waits to draw the cropping rectangle on the image. Program then calls 'inshow' to view the crop image.

RESIZING IMAGE: The image in the database of size 20 x 30 matrix. To extract the features more accurately, the image is resized by four times i.e. 80 into 120 matrix. Features are extracted from the digit image in the following manner.

If $\{I(x,y)/x=0....L-1, y=0....M-1)\}$ denote the primary image, the 8 neighbourhoods of pixel (x,y) are N_0 , N_1 , N_2 , N_3 , N_4 , N_5 , N_6 , N_7 .

f(x-1, y-1)	f(x-1, y)	f(x-1, y+1)
f(x, y-1)	f (x , y)	f(x, y+1)
f(x+1, y-1)	f(x + 1 , y)	f(x+1, y+1)

Table 1: Positive Review Table

Supposing it a periodic sequence with a period of eight, we denote it as follows.

 $I(x,y,n) = N_n \quad 0 \le n \le 7$

If we consider any pixel, it has 8 neighbours. e.g., pixel

f(x,y) has its 8 neighbours as shown in the Fig.2.

IV. RESULT AND ANALYSIS

Reliability of the neural network pattern recognition system is calculated by testing 930/2 i.e. 465 of input vectors with changing proportions of noise. Testing the application on the neural network is a foremost step to help ensure that the digit recognition is done properly.

A. Validation:

In simple validations we unknowingly split the set of labeled training specimens into two parts: one is used as the traditional set for fine tuning model parameters in the classifier. The other set is the validation set used to approximate the generalization error. Since our final goal is low generalization error, we train the classifier until we reach a lowest of this validation error. In general, validation is 100%, if the training data presented for training is completely representative of the feature of the data presented. But this is not the case because data is gathered using noisy measurements and training data cannot be prototypical of all the features that will be presented. An easy generalization of the above method is m-fold cross-validation. Here almost 500 digits are utilized for validation.

B. Accuracy:

One thousand noisy digits are selected from the database for testing. Neural network is trained for over 7000 digits. Learning rate selected is 0.3. The network was trained only for one thousand digits initially. Then the validation was performed on a few digits and accuracy checked. The network was not giving proper accuracy, hence it was trained further. The network was trained till the error rate for recognizing digits is 0.001 and the convergence rate is 0.7. Convergence rate means the weights do not change significantly (or change by a very small value) even if trained for longer time and the network is said to converge to a stable state. Testing set of

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100 digits is divided into 10 groups, each of 100 digits. In each group of these hundred digits total number of each numeral is counted, for example in range 0-100 the number of one's and is 12 or in the range 501-600 the total number of two's is 10 etc. After this the digits are tested for correct classification using both Neural Network and Statistical Method. Accuracy by both methods is then calculated. Bar graph for comparing the accuracy for each numeral in the range 0-1000 are then plotted. Average percentage of accuracy of each numeral is then calculated. Ultimately a graph for comparing the accuracy of both the methods is plotted using plot function.

The digit selection, feature extraction, training, testing, validation, performance, regression and accuracy plots are shown in the following figures 2-4 and tables 2-3.

Range of Digits	Total No.	Classificatio	Percentage of	Statisti cal Mathad	Percentage of
Digits	or Ones		Accuracy	Methou	Acculacy
1-100	8	6	75	8	100
101-200	6	5	83	5	83
201-300	9	9	100	8	89
301-400	12	10	83	8	67
401-500	13	10	77	8	62
501-600	10	8	80	7	70
601-700	14	10	71	8	57
701-800	12	10	83	8	67
801-900	7	7	100	7	100
901-1000	11	10	91	9	82





	Fig	2.	Comparison	of A	Accuracy	of	Neural	Network	and	Statistical	Method	l for	Numeric	One
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Range of Digits	Total No. of	Classification	Percent age of	Statisti cal	Percentage of
	Nine	by NN	Accuracy	Method	Accu racy
1-100	15	10	67	12	80
101-200	8	8	100	7	88
201-300	9	7	78	9	100
301-400	14	11	79	12	86
401-500	6	6	100	6	100
501-600	15	12	80	10	67
601-700	6	6	100	5	83
701-800	5	5	100	4	80
801-900	10	9	90	8	80
901-1000	8	7	88	5	63

Table 3: Accuracy of Classification for Numerical Nine



Fig 3. Comparison of Accuracy of Neural Network and Statistical Method for Numeric Nine.



Fig 4. Plot Showing the Training State



Fig 5. Performance Plot of Mean Square Error for Training, Testing, and Validation.



Fig 6. Regression Plot for Training, Testing and Validation.

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V. CONCLUSION

In this paper, Neural Network has been successfully used to solve the problem of handwritten digit identification. The most popularly used multi-layer perceptron backpropagation algorithm has been practically endeavored. The network is instructed using the backpropagation algorithm up to the error rate for identifying digits is 0.01 and the convergence rate is 0.7. Three attributes were withdrawn initially i.e. skewness, trained mean and standard deviation, but the results were not so accurate, hence features were increased from three to six i.e. kurtosis, variance and entropy. The data file of 15,000 digits was developed out of which 7,000 are used for training, 1,000 are used for validation and remaining are used for testing.

If more accuracy is required, the network can be trained for a prolonged time or retrained with additional neurons in its concealed layer. The number of hidden layers can also be changed. Finally, handwritten digit recognition has also been done using statistical methods, Bayesian decision theory is selected for this purpose. Graphs are plotted for accuracy of each numeral (0 to 9) for neural network as well as statistical method and it is found that accuracy of each numeral is different. Finally, the graph is plotted for comparison of neural networks and statistical methods. The project is more focused on neural networks, a statistical method is used here for comparison and it has been found that accuracy of neural network is better than statistical method.

In future, the proposed system can be designed for character A to Z recognition, face recognition, and also signature verification on cheques.

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MISSION ANALYSIS OF A 6U NANOSATELLITE FOR EARTH REMOTE SENSING IN KAZAKHSTAN

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ABSTRACT

In this paper, a 6u satellite aimed to prove new technologies developed by Kazakhstan students and young engineers is presented. Obtaining the flight heritage and proof of the technologies will play an essential role for Kazakhstan Universities training the specialists in satellite technologies – as the bachelor and master students will take knowledge with a beneficial practice on developing and launching a satellite. As the satellite will be a product of cooperative work of several universities it is as well a challenge for lead engineers who will work in an environment of semiprofessionals with different levels of knowledge and skills. Besides the educational role, the project has a benefit in obtaining local key technologies for creating low-orbit spacecraft to eliminate import dependence and enter foreign markets. Obtaining own technologies will enhance Kazakhstan to take a leading role in space technologies in Central Asia.

Keywords—6U Nanosatellite, Mission statement, diffraction limit imager, IoT payload.

I. INTRODUCTION

Kazakhstan aims to develop its sector of space technologies. For that, the native engineers were trained to design, build, test and operate satellites in the leading European space companies, the Assembling, Integration and test complex equipped with the latest machines was built, several satellites were launched in the last decade: for communication (KazSat-2. -3), ERS (KazEOSat-1, -2), Science and technology (KazSTSat), student cubesats (al- Farabi). The departments were founded in Universities, where specialists in space technologies are trained. The weak point of such training is that in lack of real space projects, mostly students obtain only academic knowledge.

The paper describes an idea to develop a fully functional nanosatellite in cooperation with universities. The program will be led by Nazarbayev University, and other participant Universities will contribute with developed payloads, subsystems or human resources. The space company Ghalam who is operator of Kazakhstan assembly and test facilities will provide consulting services and assembling and test services. The in-orbit operation will be held by Nazarbayev University with support of Ghalam in the initial phase. The satellite system will consist of two parts: space segment represented by the satellite and ground segment.

The satellite will consist of two parts - a payload(s) and a platform. The 6U size of the satellite allows it to combine two payloads – optical and Internet-of-Things (IoT) payloads. At the same time, the IoT payload can play the role of S- and X- band transmitter. During the project, Kazakhstan engineers and students will implement IoT (Internet of Things) radio technology and demonstrate low-cost IoT architecture for ground to space communications.

There are two approaches to build an optical payload: one to buy an off-the-shelf camera with the resolution and spectral bands chosen in a way that the satellite can enter some existing or prospective constellation. The resolution should be higher than that of satellite images possible to download for free.

Another approach is to build a design and create a payload to prove the technology. One of the ways is to use (and enhance) the development of Ghalam on Beyond Diffraction Limit imager. The current version used in KazSTSat provides

8.5 m resolution and 10km swath in panchromatic spectral band. As the mission is technological, it is more preferred to use and enhance BDL imager.

The subsystems of the platform can be technological as well. One of the ideas is to use the ideas of NU on light and hard material for structure. Under supervision of Ghalam specialists it is possible to create some or all of the following technologies: communication subsystem, power subsystem, onboard control subsystem, satellite control software, flight dynamics software.

The ground system will consist of a ground antenna station for receiving and transmitting data, Satellite Operation Center (SOC) and Data Processing Center (DPC). It is possible that NU creates S-X- bands antenna station and locate the antenna at NU territory. But the more practical approach is to rent capabilities of X- and

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S- band antennas. If for X- band it is preferable to rent passes of the station situated in the polar area, for S-band it is possible to rent passes of S- band antenna station of Ghalam LLP. SOC and DPC are proposed to be housed at NU.

As well, the ground station will include user terminals based on IoT standards.

II. METHODS

A. Composition of the Satellite and R&D

Ghalam activities are also supported by the Engineering Design Office located in the same building. Having 25 highly qualified space engineers with an experience of successful design, build and launch microsat called KazSTSAT and provided close support for a nanosatellite called KazSciSat. Both have been launched on 3rd Dec 2018. Both work nominally on-orbit.

The Engineering Design Office has developed and now is flight testing in-house space key technologies to control and support space service fully independent.

1. On-board computer:

The development and on-ground tests of the On-board computer based on Zynq ARMv9 architecture were completed in 2017 and now OBCARM having on-going on-orbit tests so far successful. The QNX based Operating System has been partially completed and now under the process of further development.

2. Satellite Control Complex together with an Software Defined Radio based antenna station. Satellite control complex is fully virtualized. SDR based ground station developments are to be used to create space qualified SDR transceiver RF subsystem.

3. Power subsystem:

The Battery charge module is now tested as an engineering model while the Power Distribution Module is now in a detailed design phase.

B. Technical implementation

The proposal is about creating a nanosatellite using as many space qualified equipment as possible that developed in Kazakhstan. Universality of the nanosatellite platform to carry several types of payload will be supported by a custom developed platform in form factor 6U but presumably we are going to save CubeSat standard mechanical interfaces while structure is going to be redesigned and enforced.

The mechanical structure material is proposed to be PEEK as very promising for future missions and mass saving composite. NU mechanical department research outputs (PEEK together with graphene nanotubes) will be used for better thermal control, mechanical loads dumping and enforced structure. The structure elements are going to be 3D printed.

Uplink and downlink connection with the ground segment will be provided by an S-band transceiver presumably developed using SDR technology so that to control the forward speed (used for telemetry and payload data download) and power consumption of the unit.

An on-board computer and power subsystem can be provided by Ghalam. AOCS subsystem is going to be procured from a space proven nanosatellite company. We are going to use only quality proven space components and modules. Robotics Process Automation processes implementation for thorough functional unit, subsystem and system testing.

C. University 6U CubeSat

Spacecraft structure mechanically supports all its subsystems, connects it to the launch vehicle and also facilitates its separation while in space. The structure also bears the vibrations and extreme thermal loading. A primary structure shall hold main subsystems whereas a secondary structure shall be constructed to support light weight components such as propellant lines, wirings etc. Design of the structure shall be an iterative process starting from the analysis of its operating environment, overall packaging, material selection, failure mode testing, and possible reinforcement considering possible weight saving. Types of structures for the spacecraft include assemblies for skin panel, pressure vessels, boxes for various equipment, ring frames and trusses, brackets etc. Successful nanosatellite design must begin from payload selection, since payloads determine the requirements of all other subsystems. As a first nanosatellite project, the choice of payload still has an outsized impact on power considerations, attitude control and communications bandwidth requirements, etc.

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The space segment system design will include determining the orbital parameters of the satellites as well as conceptual design of the satellites' systems.





The ground segment system design shall include conceptual design of telemetry station, telecommand station(s) and user terminals. User terminals will be designed based on IoT standards.

Owing to the dynamics of the guidance and navigation subsystems it used to be a ground-operations activity in past. Nevertheless, with the advent of GPS and advanced portable computing, it is possible to achieve autonomous navigation in real time. Orbit maintenance and control can also be done autonomously. While navigation helps in determining Satellite's orbit, the orbit control is carried out under guidance subtask and the attitude control is governed by the control subsystem design. During orbit control (guidance) the orbital elements are maintained and the Satellite is kept within predefined box. Various tasks of GNC are shown in Figure 3. The ephemeris for Satellite (position and velocity trajectories) can be estimated in real time and used together with the tracking data available from the ground control station for definitive orbit determination. The same can also be used to process payload data for the mission.

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Most recently an auto-tuning PID controller is proposed for satellite attitude control system [1]. In another similar research a coordinated control method of double actuators using flywheel and solid propellant micro thruster (SPM) array is proposed using sliding mode controller [2]. Micro-reaction wheel using COTS can be designed and controlled (considering vibration, environment, and other effects) for attitude control and its accuracy can be improved by controlling the speed of micro-reaction wheel [3, 4]. Fault diagnosis of a nanosatellite attitude control system is important and is discussed using meta-heuristics [5]. Design of satellite attitude determination and control system (ADCS) considering satellite survivability is discussed in [6] suggesting that in the wake of possible failure of sensors and actuators, alternatives be planned ahead. are being studied owing to their better thrust coefficient [10]. Newer research directions are being discussed for the development of thrusters for nanosatellites by trading off between costs and effectiveness [11]. In one of the recent research, Field Emission Electric Propulsion (FEEP) system is proposed for orbit and two axis attitude control of a 1U nanosatellite [12].

During the proposed project, a micro-propulsion system shall be chosen after carefully studying the existing systems such as cold gas propulsion (CGP) system; liquid propulsion (LP) system; solid rocket propulsion (SRP); resistojet propulsion; RF ion thrusters; hall effect propulsion; electrospray thrusters; pulsed plasma thrusters, solar sails (infinite specific impulse) etc. Apart from the existing ones Plasmonic Force Space Propulsion (PFSP) shall also be explored during this project. The objective, however, shall be to maximize the performance of propulsion while minimizing design restrictions coming from the propulsion system in terms of power, mass, and volume. Untested propulsion system, however, shall not be relied upon for mission.

D. Beyond Diffraction Limit (BDL) imager

The modern technologies in optical payloads for Earth remote sensing satellites allow to achieve the sub-meter resolution. As resolution of the optical system is limited by diffraction, the better resolution demands the longer focal distance and bigger aperture, thus the bigger optical payload.



Figure 3: Various functions of Guidance, Navigation and Control

In the proposed project emphasis shall be given to an autonomous guidance and navigation system so as to reduce mission cost and risks involved. Further, orbit and attitude maintenance normally use similar sensors and actuators for sensing and control and therefore are strongly interconnected. However, sensors and actuators employed for attitude control during orbit maneuvers will be producing disturbance torques during the spacecraft's operating life. It is proposed, therefore that the attitude determination and control will be a part of the spacecraft bus while the orbit determination and control will be carried out at the ground control station. This will be done keeping our objective of minimizing cost, weight, and risk for the mission.

Propulsion module on a Satellite predominantly has two functions. After reaching in the low-Earth-orbit on a launch vehicle, satellite is transferred to intended orbits to carry out mission operations. Thereafter the propulsion is required to provide thrust for attitude control and orbit modifications. For launch-to-orbit needs of the nanosatellites, chemical rocket propulsion and in particular laser ablation propulsion launch system are being researched [7, 8]. Rapid development of nanosatellites' has put forward new demands for electrical systems and recently iodine is also used due to its low price and storage convenience [9]. IFM Nano Thruster

At the same time, the tendency in satellite technologies is to miniaturize the size and mass of the satellites. Ghalam LLP on its satellite KazSTSat demonstrates the techniques to get resolution better than allowed by diffraction, so called beyond diffraction limit imager (BDLI). Using the post-processing methods such as deconvolution, Ghalam specialists achieved the resolution of final image up to 3m using the optical system with aperture of only 27mm. Another achievement was to use the COTS CMOS detector and to strengthen it to tolerate the mechanical and thermal loads that satellite sustains.

The development of technologies in high resolution optical payloads of satellites allows to distinguish more and more smaller objects on the earth surface. However, there is a natural drawback – due to the diffraction phenomena, the higher resolution means the bigger optical payloads [13]. But the tendency in the satellite

development is to miniaturize the satellites with no harm to the quality of the service. That's why attempts were made to obtain good resolution at small enough size of the payloads by combining the technologies of optical design and post-processing methods [14]. Some approaches in achieving beyond diffraction limit resolution were described in [15].

In the described work, the optical system was designed which provides the image of quality higher than allowed by diffraction limit. The proof of the technology will allow to obtain high resolution images from small-size satellites, and in this way, decrease the cost of high-resolution ERS satellites. In our approach, the small-size optical payload, produced at the standard optical manufacturing facilities, the strengthened COTS CMOS-camera, provides resolution of 9-10 from the orbit of 585km altitude and then by applying the new methods in post-processing allow to achieve resolution of 3-4 m.

Beyond diffraction limit imager (BDLI) is a compact optical system with a small effective aperture providing a low but defined optical MTF. It is intended to provide a proof of principle for resolution enhancement technology developed in Kazakhstan company Ghalam. The main goal of the experimental operations of the BDLI payload is development and tests of BDL image processing methods. Below is a description of planned and currently performed activities. The available space and focal length indicated a catadioptric design and the Maksutov configuration was adopted because of use of spherical surfaces. The optical payload was developed, tested and integrated to the satellite KazSTSat, which was launched in December 2018 and currently functioning.

BDLI proved its concept and all the plans were achieved. It is now 35 months as the payload functions in-orbit. The mission of BDLI is controlled and operated from the Satellite Opreation Center by the specialists of Ghalam company in Nur-Sultan city, Kazakhstan. Alongside with the standard acquisitions, certain work is being done to calibrate the payload imaging.

The use of BDL imaging payload will give chance to enhance even more the resolution obtained by post-processing methods and gives a rise to creating compact size high resolution payloads.

E. IoT payload

The modern technologies enabling continuous global connectivity for Internet of Things (IoT) under the 5G architecture is being considered for the proposed mission.

The implementation of IoT shall be in the form of a device that can receive, store and forward the. If we think about Earth observation, it would be the camera in charge of capturing the images. And if we were talking about science, it could be a micro-laboratory to do studies outside the Earth with certain technological or biological materials. The options are vast. Each project has its own characteristics, and it is possible to find mixed units with several payloads that coexist in the same nanosat.

For this function, in Nazarbayev University we will have TOTEM, an SDR (Software Defined Radio) platform whose possible configurations include solutions that are already developed and ready to launch for IoT/M2M, ADS-B and Signals Intelligence.

TOTEM would be the payload in our IoT project, although it would be possible to incorporate other solutions developed specifically by the customer to fulfil its functions, which consist of receiving, storing and forwarding data. It would therefore be responsible for the communication of the satellite and the IoT service itself.

When the CubeSat is already in orbit some kind of reconfiguration may be required for many reasons. For example, an update of the current communication protocol, a modification in the frequency bands (UHF, S and L are the most common) or a change in the speed of data transfer. In the case of TOTEM, as it is a configurable tool, these adjustments could be made in orbit. sustains.

F. Collaboration Between Universities

Nazarbayev University has good potential to start development of nanoscale missions using:

First, a wide range of professors ' and students ' competencies: thermal and mechanical engineering, electrical and power engineering, software and hardware development.

Second, technopark NURIS production facilities to create mechanical and electrical parts of the satellite.

At same time Ghalam LLP is capable to provide technical consultations for the development, building and testing activities for the nanosat, access to a fully autonomous Satellites Assembly and Integration Test Center (AITC) in Astana, services of testing a spacecraft from mass 3kg (nanoscale Low Earth Orbit sat) to mass of 6tn

(Geostationary Orbit Satellite), preparation for the launch and the ground station to communicate with the satellite on orbit.

AITC center has trained personnel to work with and maintain testing equipment. AITC also includes high-end metal parts production and automated electronics assembly and testing equipment.

Possible cooperation scheme is based on the attraction of several payloads provided by Universities with Space Engineering Departments taking into account available size and on-board energy. The local universities pay interest to the project and propose to enter with their own modules, such as 1u gravimetry interferometer and 0.25U electronic module.

III. CONCLUSIONS

Nazarbayev University has enough capabilities and resources to create an independent, secure, fully in-house configurable, nanoscale, universal platform able to carry several different kinds of payload for Kazakhstan future industrial and educational missions. It is envisaged that in long terms the proposed project will also result in creation of a national scientific school for the development of space technology besides the creation of new promising technologies and the launch of the first Kazakhstan nanosatellite. As a result of the Program implementation, innovative technologies for creating nano and microsatellites will be developed, which will create the basis for testing new space technologies with a small financing budget. The low cost of the developed nanosatellites can attract private business to develop their own technologies in space, which will provide the economic benefit from the implementation of the Program.

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WIRELESS CHARGING TECHNIQUES FOR ELECTRICAL VEHICLE APPLICATIONS

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ABSTRACT

There has been a shift in the focus of research in Electrical Vehicle (EV) charging technology to dynamic wireless charging in an automated mode. Wireless Power Transfer (WPT) technology plays a crucial role overcome bulky battery weight problems in the EV. Inductive coupled wireless transfer technology requires less maintenance. A conceptual overview of types of charging stations and wireless power transfer (WPT) technologies is described in this article. The usefulness of the concept of dynamic wireless charging is highlighted. Some of the challenges and opportunities in the area of dynamic wireless charging are also outlined.

Keywords: Dynamic wireless Charging, Charging Stations, Wireless Power Transfer Technology

1. INTRODUCTION

Current fossil energy-based transportation hascontributed to higher greenhouse emissions, globally [1]. In 2017, transportation systems consumed more than 60% of oil worldwide necessitating other energy alternatives [2]. Electrical Vehicles (EVs) seem to be the primary steppingstone in incorporatingalternative energy resources [3].

As such EVs need to be developed in terms of the performance range. Petrol- and diesel- powered vehicles emit harmful gases that canhave an adverse impact on the health and welfare of the people. Prices of petrol and diesel continue to be volatile and usually in the high range.

One of the affordable ways of transportation could be the use of electricity. That can reduce the operation cost of electric vehicles and it can add value by minimising pollution. But there are a few challenges with electric vehicles. In asingle charge, EVs can cover less range compared to petrol- and diesel-powered vehicles. The time required for charging EVs isalso a major concern. The weight of EVs increases because of stacking of batteries. Toovercome these problems scientists and practitioners have moved from static charging of EV to Semi Quasi and Dynamic wireless charging. This is feasible because of innovations in the field of Wireless Power Transfer (WPT). Now, it is possible to charge EV while moving on the road.

Charging the car effectively is a challenge because of a variety of models on the road [4][5]. Charging EV by cable wire plugging is dangerous. Sometimes there is the possibility of sparking. To eliminate the sparking, wireless charging has been proposed. That also opened a new possibility of dynamically charging EV while driving.

Dynamic Wireless Charging has the potential to reduce the cost of onboard batteries, charging time, and range anxiety among the owners of electric vehicles. The technical challenges like increased distance, slow power transfer efficiency, and limited power density affected the development of the WPT technology considerably.

The concept of wireless charging of electric vehicles, the types of charging, types of dynamic wireless power transfer methods, dynamic wireless charging power, and opportunities and challenges in the EV sector are highlighted and outlined in the article.

2. Types of Charging stations:

The first type is a fixed charging station. It is also called a stationary or Static Charging system. As the name suggests it is not moving and it appears like a fixed charging station with a plug facility. Such kinds of static stations are one or more in numbers at a certain building. This station power is supplied from theelectricity grid and local energy generators [6]. Later these fixed stations are categorized into private and public charging stations. There are private workplaces including parking lots for company employees [7,8] where private charging stations are installed whereas otherscan use charging facilities at home.

However, there are two main concerns; charging space and time required for chargingEVs that create the need for public charging stations [9].

The second method of EV charging is semi quasi dynamic charging of mobile charging. It has been further classified as portable charging, truck mobile charging, and vehicle tovehicle charging. It has several outlets, and these services are encashed as per the needs of EV owners [10].

The third method is called contactless charging which is then classified into two types first is battery swapping and the second is dynamic wireless charging. As its name suggests it does not require any contact between chargerand EV.

As we know charging time is a major concern because of battery swapping EV gets fully charged in minutes rather than hours [10].

Other dynamic wireless charging in which EV gets charged while on move through coils under the road. This happens because of magnetic connection phenomena betweenreceiver coils present in EV and transmitter coils present under road [11,12]. Figure 1 illustrates a block schematic of types of wireless charging stations.



Fig 1: Types of Wireless Charging Station

3. Types of Wireless Power TransferTechnology:

EV battery chargers are of two types based on the placement of the converter on them. These are off and onboard chargers [13]. In the charging station, these off-board converters are placed whereas onboard converters are inside the EV [14] [15][16][17]. Plug-in cables are used in offboard chargers, which are very dangerous in snow and rainfall-type climatic conditions [18][19][20]. To avoid this limitation Wireless Power Transfer technique is used for the EV battery charging [21][22][23][24][25]. In this technique of Ground to vehicle primary coil is present under the road and whereas the secondary is under the vehicle [55][56][57]. Based on the method of EV battery charging, there are two names of batteries. Static methods of charging batteries are called Battery Electric Vehicle (BEV) and dynamicallycharged as an online electrical vehicle (OLEV)[26][27][28][29]. Small battery size is present inOLEV compared to BEV, additionally, small size increases efficiency [30][31][32].

Microwave Power Transfer (MPT) is a harmfultechnique because radiation gets emitted whileenergy transfer of high frequency [33]. In Inductive Power Transfer Techniques (IPT) techniques power transfer efficiency decreases as the air gap increases between secondary and primary coil. Whereas the ICPTcan work with more air gaps [34]. Over other power transfer techniques, ICPT is preferred [35] [36].

Basically, the wireless transfer technology is divided into Far-field and Near-Field as shown in Figure 2. The Near-field techniques are coupled techniques and the Far-field techniques are radiative ones. Nearby fields can, further, be classified as Inductive CoupledPower Transfer (ICPT), Inductive Power Transfer (IPT), Capacitive Power Transfer (CPT), and Resonant Inductive power transfer (RIPT). Additionally, Far Field has two types - one is Microwave Power Transfer (MPT) and the second is Optical Laser power transfer.

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Coupled Power ansle (ICPT) Inductive Powe Transfe Transfer (IPT) Near Field Power Pose (OPT) inductive

Fig 2: Types of Wireless Power TransferTechnology

Vehicle power exchange happens in two wayseither by Grid to the vehicle (G to V) and vehicle to grid (V to G) [37][38]. EV batteries get power transferred from the grid for (G to V) and for (V to G) get transferred from EV batteryto grid.

4. **Dynamic Wireless Charging System**

In this Ground to vehicle (G2V) wireless powertransmission 50 to 60 Hz main supply from thegrid is to be fed to ground assembly. In which the first rectifier converts AC to DC and to make a smooth DC method of Power factor correction (PFC) has to be applied. Further Inverter with high frequency converts DC to AC with high frequency [39] [40][41]. This Dc is then used to transfer the power by powering the primary coil of the ground assembly side (Figure 3). Receiving pad converts high frequency AC into DC which is rectified and filtered to have ripple free DC current. This DCis then fed to Lithium-Ion Battery.

Impedance plays a very important role in maximum power transfer. There should be matching of impedances of source and load. The primary and secondary side of Inverter switching frequency is dependent on both sidecoil and compensation network frequency of resonance (normally used is 20 -100 kHz) [42].



This wireless power transfer is of single phase and three-phase types [43] [44][45]. Primary Compensation network is useful for smooth switching of converters as well for cancelling out Reactive power and components of powersupply and coil respectively. Opportunities in wireless charging of electrical vehicle:

In this new field of wireless charging of electric vehicles, there are numerous challenges and opportunities as depicted in Figure 4. One of the main problems is with the lithium-ion battery life cycle assessment. To detect the life of a lithium-ion battery, there is a need to study the driving and charging patterns of every EV used. Based on EV online data about lithium- ion batteries advice can be given to owners and drivers on how to increase the



life of lithium-ion batteries. Other areas include the health and safety of both vehicle and driver. Furthermore, there is again research required in the ultra-fast charging of lithium batteries within 10 to 15 minutes to 250 kW. There is a scope for research in the vehicle-to-vehicle and ground-to-vehicle charging technologies. This technology might be very helpful for customers and grid providers. How to reduce material costs so that such technology can be transferred to a mass scale is another area forinnovation and research. Furthermore, the other area of research includes automatic coordination between roads and vehicles. In this kind of automation, it is possible to communicate between vehicles and roads. Research is required in the area of sharing and distribution of grid power.



Fig 4: Opportunities and Challenges

The peak time of charging puts a considerableburden on the power distribution of the grid. Toavoid that there is the scope of research in thearea of algorithm development and estimation for the distribution of charge. Power transfer and receiver magnetic material pad design can also be researched with emphasis on the material composition of the pad. Cybersecurity and smart power metering need to be evaluated for enhancing reliability and availability.

5. CONCLUSIONS

It can be observed that how EV technology has evolved from the time it was conceptualised to dynamic wireless charging methodologies. It can be inferred that inductively coupled charging is one of the most preferred wireless power transfer technologies. How electricity gets transferred from the ground station to the car receiver side has been explained through conceptual block diagrams. Some challenges and opportunities have been outlined. It is envisaged that the comprehensive review of developments in wireless charging for EVs will be useful to researchers.

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A COMPARATIVE STUDY ON BLOCKCHAIN BASED E-VOTING SYSTEMS

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ABSTRACT

Increasing digital technology in the present helped many people's lives, especially in the post-covid era. Unlike the usual electoral system, there are many conventional uses of EVMs in its implementation. The aspects of security and transparency are very vulnerable in still widespread elections with the traditional systems (offline). General elections still use a centralized system, there is one central authority that manages it. Some of the problems that can occur in traditional electoral systems is that with an organization that has full control over the database and system, it is possible to tamper with the database of considerable opportunities. Many cases have come up in the past regarding the tampering, hacking, of EVMs and sometimes, misplacement and thefts of EVMs. Blockchain technology is one of the solutions, because it embraces a decentralized system and the entire database is owned by many users (a.k.a nodes). Blockchain itself has been used in the Bitcoin system known as the decentralized Bank system. By adopting blockchain in the distribution of databases on E-voting systems can reduce one of the cheating sources of database manipulation. Also, The fact that EVMs can be tampered, can't be ignored. Adopting blockchain for

E-voting systems can help us avoid crowding at the polling booths, which we need to take care of the most in this post-covid era. It will also help reduce violence and riots, like we've seen during Bengal 2021 elections. It will also reduce the time and effort required in the traditional system of voting, while giving us a higher percentage of transparency and security.

There is no doubt that the revolutionary concept of the blockchain, which is the underlying technology behind the famous cryptocurrency Bitcoin and its successors, is triggering the start of a new era in the Internet and the online services.other trending, yet critical, topic related to the online services. The blockchain with the smart contracts can emerge as a good candidate to use in developments of safer, cheaper, more secure, more transparent, and easier-to-use E-voting systems.

Keywords — blockchain; ethereum; smart-contracts, E-voting.

INTRODUCTION

Blockchain technology which has become a trending topic after the entrance and widespread acceptance of cryptocurrency. Earlier, Blockchain was only used for monetary transactions and trade, but reports have started to suggest that it can be used in many more areas and be more efficient than systems that are currently in use, because there is a high degree of transparency in this system [3]. Like in Bitcoin, since the wallets are in a distributed structure, the total amount of coins and instant transaction volume in the world can be tracked every moment in real time. No central authority is required here to approve or complete the operations since this is a Peer to peer-based system [15]. Because of that, not only the monetary transactions but also all kinds of structural information can be kept in this distributed chain, also known as Distributed Ledger System (DLS), and with the use of some cryptological and encryption methods, the system can be maintained securely. A lot of information can be stored with the help of this system with relevant modifications . Ethereum coin (a.k.a. Ether), another cryptocurrency with multipurpose development environments, unlike bitcoin which was built around just one application, which was introduced a few years after Bitcoin, characterizes the blockchain in a real sense, revealing that this technology can produce software that can hold information that is structured as explained above. The software programs enforced by smart contracts are written into the blockchain and are immutable. They cannot be (illegally) removed nor manipulated or be tampered with once written. Hence, they can work properly, autonomously, securely and transparently forever, without any external stimuli. As already mentioned, with its unique distributed and secure concept, the blockchain technology may be a solution to many issues other than digital trade, like E-voting [5,12]. E-voting is being studied extensively, and many implementations are tested and even implemented for a while. However, very few E-voting systems are reliable enough and are still in use. Of course, there are many successful systems of online polls and questionnaires, yet we cannot say the same for online elections for governments and businesses. That's primarily because official elections are an essential part of the democracy and democratic administrations, which are the most preferred administrative methodology in the modern world. Moreover, what is most valued in democratic societies is an electoral process that provides transparency, privacy, security and more freedom to the voter.

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LITERATURE REVIEW

Investigating Performance Constraints for Blockchain Based Secure E-Voting System

Authors Kashif Mehboob Khan, Junaid Arshad, and Muhammad Mubashir Khan have discussed the applications of blockchain in various fields like supply chain management, gaming, healthcare, real estate and finance [1]. Electronic or E-voting is one of the emerging applications of blockchain where authors have proposed to push blockchain capabilities to it's extreme limits to achieve integrity, anonymity and non-repudiation which are critical for a voting application. Current research work done into scalability and performance of blockchain is focused on Bitcoin with the primary aim to achieve par performance capabilities as of existing online payment systems such as VISA. However, there exists a gap in research works done with respect to investigating performance constraints for wider application domains. In this paper, authors have profound role in achieving scalable solutions using blockchain [1]. Specifically, authors have investigated the role of block generation rate, block size, transaction processing rate and transaction size with respect to scalability of blockchain based solutions. Their experimentation results highlight a trade-off between these parameters and identify avenues to explore for further research.

Peace engineering: The contribution of blockchain systems to the E-voting process

Authors P. Baudier, et al. have discussed how due to the COVID-19 crisis, remote elections (E-voting) have become a trending topic for maintaining the decorum of the democratic practices and, consequently, social peace. The purpose of this study was to investigate, using a practical approach, whether blockchain technology can be considered as a solution and can it contribute to peace engineering in the context of elections [2]. According to their conclusions, this technology could contribute to developing a peaceful society, offering social and political peace, equality, justice, and integrity. Thus, when it is used to protect E-voting, and, therefore, to protect democracy, blockchain becomes a perfect example of a peace engineering tool. Therefore, the use of blockchain-based solutions in E-voting, holds great promise for researchers and managers. Based on the present study, both theory and practice can use the lessons learned.

According to researchers, existing papers on E-voting do not talk about user acceptance of blockchain solutions. Thus, their purpose was not intended to deal with the technical aspects of blockchain but to analyze the views of experts at a leyman level to identify potential motivations or barriers for acceptance of such a technology [2].

E-Voting with Blockchain: An E-Voting Protocol with Decentralisation and Voter Privacy

E-voting, as discussed in this paper by the authors, is a potential solution to the lack of interest in voting amongst the younger generation. For E-voting to become more open, transparent, secure and independently auditable, a potential solution would be To implement it on blockchain technology. This paper talks about the potential of blockchain technology and its usefulness in the E-voting scheme [3]. The paper proposes an E-voting scheme, which is then executed. The implementation and related performance measurements are discussed in this paper along with the challenges presented by the blockchain platform to develop a complex application like E-voting. This paper highlights some shortcomings and presents two potential paths forward to improve the underlying asset (blockchain technology) to support E-voting and other similar applications. Blockchain technology has a lot of potential; however, in its current state it might not reach its full capacity. There needs to be a concentrated effort in the core blockchain technology research to improve it's features and support for complex applications that can execute within the blockchain network.

E-Voting Systems using Blockchain: An Exploratory

LITERATURE SURVEY

To solve the problem of conventional (offline) voting systems, E-voting systems using blockchain is a promising solution with a lot of potential. Blockchain systems take care of security, reliability, decentralized storage and anonymity. As a result, designing and executing E-voting systems using blockchain ensures verifiability, dependability, reliability, consistency, auditability, anonymity, transparency, scalability, eligibility, authentication at public and individual level and fairness through principles of consensus, cryptography, digital signatures, and various blockchain mechanisms[4]. The ideal implementation in terms of making the E-voting system faster, lighter and scalable is the Hyperledger Sawtooth framework, due to its capability of parallel processing of transactions. Further work can be performed into usage of frameworks like Hyperledger Sawtooth in designing and executing realistic, robust and practical E-voting systems which can be scaled into large-scale voting scenarios [4]. This research presents and not only encourages usage of blockchain technology in practical voting processes, but also demonstrates the plausibility of using blockchain to develop secure and reliable systems in multiple domains like finance, supply chain, trade and so on.

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A Comparative Analysis on E-Voting System Using Blockchain

In this paper, authors have done an empirical review to understand issues faced by a voting system. All the related papers have been taken into consideration and have been studied. After reading this paper, one will be able to understand various methodologies used in voting. There will always remain a question of authentication of the user and will require some sort of biometric device or unique authentication scheme [5]. We can determine the same about Blockchain based systems as a better alternative but our goal always remains in making secure and reliable systems irrespective of platform and giving the voting system more transparency and error-free. The E-Voting topic is still a hot debate both politically as well as at individual level. Hence they concluded that it will require mutual understanding among people and strong foundation rules so that it will not be misused.

g. Secure large-scale E-voting system based on blockchain contract using a hybrid consensus model combined with harding.

Studies done by authors Rajesh Kumar et. al indicated that E-voting systems based on blockchain are being designed and developed as the next generation of modern E-voting systems to make complete use of the immutable feature of blockchains. However, the classical blockchain consensus protocol, that is, Proof-of-Work (PoW), as implemented in Bitcoin, significantly makes use of large amounts of energy and compromises system scalability, efficiency, and latency.

In this paper, the authors proposed a hybrid consensus model (PSC-Bchain) in which Proof of Credibility (PoC) works in coordination with Proof of Stake (PoS) [6]. This leads to the creation of a secure hybrid blockchain, which ensures integral security when applied to the E-voting system. Authors also combined the mechanism of sharding with the proposed PSC-Bchain model to maximise the security and enhance the scalability and performance of the blockchain-based E-voting system. Also, authors compared attack execution on both the systems, classical blockchain and proposed hybrid blockchain, and also presented an attack analysis and security analysis. Finally, although the latency of the proposed approach (27 seconds) is significantly more than that of PoS (10 seconds) and less than that of PoW (63 seconds), the experimental results concluded that, when the network size increases to 1000 nodes, the proposed PSC-Bchain model with sharding has higher output (60 Tps) than PoW (5 Tps) and PoS (25 Tps) [6]. These results confirm that the authors' proposed PSC-Bchain with sharding is secure and highly scalable. In terms of future scope, we would need to ensure coercion resistance and receipt freeness by making use of a randomizer token, that is, a tamper-resistant source of randomness that acts as a black box for the system, to construct the ballot for the user.

e. Covid-19: Implementation E-voting Blockchain Concept

Authors in this paper have addressed the fact how the Covid-19 pandemic situation has delayed the conduction of elections and the extension of office tenure in the present. Increasingly sophisticated technology must be used to address these problems [7]. So this study discusses the need and use of blockchain-based E-voting for digitizing voting. The hope with this E-voting system is to reduce the interaction of people in election activities without having to be present in the voting booth and thus maintain social distancing. The use of blockchain technology with strong encryption algorithms makes a secure chain of blocks so that the results of votes made by the public are authenticated, secure, and transparent with a resistance to manipulation. Using ballot, which has a function as proof validity of a vote that has been chosen by the voter/community against the candidates. Then the multi-chain function is useful in order to store large amounts of E-voting databases. New information and previous information are stored to produce new blocks. The system will continue to analyse the incoming blocks and continue to renew the chain when new blocks arrive, so there is no redundant data or collisions between incoming data [7]. Stored data is transparent in nature and can be accessed by the public, with guaranteed privacy for the voting rights owner. System Usability Scale (SUS) Score Analysis results show the number 90.5. This infers that the blockchain E-voting system can be satisfactorily used to vote in terms of security when the covid-19 pandemic, the efficiency of time and place of voting, and can be declared effective. It can prevent the spread of the virus at a low cost by high system security and accuracy of the collected voice information because it cannot be manipulated. Suggestions for future research is to further develop and refine the program with the E-voting application in the form of mobile applications with phone number authentication connected by blockchain technology.

h. Crypto-voting, a Blockchain based E-Voting System

This paper describes the research proposal to design and implement a new E-voting system concept. This system is called Crypto-voting and it is based on permissioned blockchain technology. The elements of innovation, compared to the state of the art, consist in the approach, in the technology and in the use of tools such as Smart Contracts and smart ledgers. The proposal talks about the potential of the sidechain technology.

Authors described how it is possible to implement a Crypto-voting system using two seperate blockchains [8]. The first records voters and voting procedures, the second counts the number of votes and provides voting results. This approach focuses on the importance of anonymization of the network consensus nodes. Smart contracts will be used for managing voting procedures and results. This system increases the efficiency in the validation phase and of the assignment of the candidate's vote.

In addition, this proposed technology also talks about aspects not currently treated, such as a safe timing of voting abroad, the automatic management of electoral lists, integration of the identification process with that of voting secrecy advanced, and automated and reliable mechanisms to guarantee the security of voting [8]. This research will also focus on architectural issues. For instance, the use of cloud systems to implement the virtual voting booth leads to the integration of cybersecurity and privacy tools to protect the blockchain in the Cloud system. The Crypto-voting system could be unique in the technological European landscape and in the E-voting market. The system could offer to their own users services that are really customizable according to the requirements, integrable and reliable enough at the same time. The nature of this research proposal is itself directed towards the wide circulation of results in the research community and in the e-government sectors. Considering the vastness of the proposal, research results could interest several research institutions, which can enrich results by means of an audience of experts more articulated than that of the proponents. In the same way, it is essential for the public involvement in order to verify if the ambition related to the project could effectively find an application feedback.

i. Digital Voting: A Blockchain-based E-Voting System using Biohash and Smart Contract

In this paper, the authors have discussed how many countries are facing significant difficulties in protecting the security of a voting framework. To ensure the participation and legitimacy of the voter, the integrity and authenticity of the vote data and the counting of votes without manipulation, a blockchain based voting system using smart contracts and smart ledgers has been proposed [9]. This mechanism where the SC does the authentication process of voters and plays an important role in selecting a Miner in the Blockchain to reduce the computational cost. It also counts the number of votes immediately which reduces the time consumption of the complete election process. This mechanism provides the environment to the citizens to cast their vote using mobile phones and desktops/PCs from anywhere. This will help to improve the participation of voters in order to achieve any country's democracy. This research work intends to build an encryption technique in the coming time to boost the system 's security.

Blockchain Based E-Voting Recording System Design

Based on the design and the results of research conducted by the authors, it can be concluded that the system has successful functionality of recording the E-voting system based on Blockchain technology. The blockchain permission protocol used is a distributed record-keeping system operated by known entities, in other words having the source to identify nodes that can control and update data together in achieving the participants' trust goals. The known entity in this system is the node that has been registered before the process runs, with the public key on each node owned by all the nodes in the system. Any data that has been broadcasted by the node that gets a turn is always verified and updated to its data by the recipient [10]. The verification system performed by all receiving nodes is used to identify if there are previous hashes and / or public keys that are not registered in the database. Nodes that experience interference can perform manual data or system broadcast can be repeated to update data when the process has reached the last turn node. Each previous hash value that is used by the block in the system has proven the same as the hash value on the calculation results using the data in the previous block. Each hash in the previous block has been included in the calculation of hash values by the block that gets a turn on the system, making anyone who wants to change the data in the database will have a hard time because if one data is changed it must make changes to data on other blocks [10]. In non-functional tests it was found that the system that is implemented using Python programming language is able to handle the whole process of recording the E-voting system with the average time required for each node to create a block is 0.24 seconds and the average capacity required to store Data of 216.04 Bytes for each block.

Blockchain-Based E-Voting System

In this paper, authors have introduced a blockchain-based electronic voting system that utilizes smart contracts to enable secure and cost-efficient elections while guaranteeing voters privacy. They have shown how blockchain technology offers a new possibility to overcome the limitations and adoption barriers of E-voting systems which ensures the election security and integrity and lays the foundation for transparency. Using an Ethereum private blockchain, it is possible to send hundreds of transactions per second into the blockchain, exploit every way of the smart contract to ease the load on the blockchain [11]. For countries of greater size, like India, some additional measures would be needed to support greater output of transactions per second.

This paper discusses the use of blockchain as a service to implement an electronic voting (E-voting) system. This paper makes the following original contributions: First, propose a blockchain-based E-voting system that uses "permissioned blockchain", and second, review existing blockchain frameworks suited for constructing blockchain-based E-voting systems [11].

Decentralized E-Voting Systems Based on the Blockchain Technology

The E-voting systems proposed in this paper meets the following security requirements: Voter verification, protecting voter's identity, non-repeatable, ballot eligibility and ballot verifiability. This system takes advantage of the transparency of smart contracts to allow all voters to participate in both the recording and verification of ballots [12]. This enhances the voters' confidence and reduces the waste of election resources. This research combines the advantages and properties of blockchain and secret sharing scheme, Paillier's homomorphic encryption and oblivious transfer to construct a decentralized E-voting system.

Blockchain-Enabled E-Voting

Blockchain technology is currently in a very initial state. There haven't been enough distributed-ledgertechnologies and blockchain-based applications to sufficiently evaluate whether this technology is better than voting systems. No complete implementation of BEV (Blockchain Enabled E-voting) for a national election has been done yet. However, authors argue that BEV has a future in elections and might transform the traditional voting systems. Political violence related to elections has been common in Africa and other developing countries like India [13]. BEV can guarantee security and transparency and reduce electoral violence. It can also produce more mathematically and statistically accurate election results. Because BEV doesn't require management from a central organisation, voting related costs and efforts will decrease. Finally, BEV should reduce the usage of paper in the elections and increase voter participation.

Traditional voting focuses on the authority of the state. BEV emphasizes voter transparency. The BEV process is transparent, decentralized, and secure. BEV might not perform to the expectations in a society whose culture and values exhibit low compatibility with these values. Also, blockchains require a large amount of energy to perform authentication and validation, and they're slow. So, using them for national E-voting might not be practical today, but authors believe that BEV will be implemented in the near future to conduct a nationwide election [13]. Finally, BEV will shift power away from central actors such as electoral authorities and government agencies like EC. Thus, the technology is likely to face resistance from political leaders who try to manipulate the elections to have the results to be in their favour benefit from the status quo.

E-Voting on Blockchain using Solidity Language

Blockchain E-voting systems help to avoid or minimize fraud during the political/organizational election. The system developed by the authors has successfully developed and complies with the objectives stated by the authors, however, some improvements can be taken into consideration in the future for a better system; in terms of practicality and user friendly. With blockchain technology, it looks that the future is bright and promising [14]. The analysis result and system design has been stated in the result section of the paper, which shows that most of the respondents very much agreed with the proposed system; 53.3% and above. Moreover, there are many advantages of the E-voting system using blockchain technology, including user-friendliness, ease of use by the administrator and by other stakeholders, election authority, and voters due to the easy to use interface of the E-voting system. Thus, this system is able to detect the fraud that happens with an accuracy of 86.7%. As a conclusion, the questionnaire successfully proved that E-voting using the blockchain is very much transparent and secure for the voter to cast the vote.

Securing E-voting based on blockchain in P2P network

Authors have proposed a blockchain-based E-voting scheme, which meets all the essential requirements of the E-voting process, be it political or organisational. All votes in the blockchain are encrypted and cryptographically linked block by block. The block with a higher value of signature is selected over others when they have the same timestamp [15]. The voter can vote in accordance with the list of candidates given on the voting page or vote for any other person he/her prefers. Generally, the vote is public and available to all, thus the information of vote is not encrypted. The blockchain-based E-voting system can be applied to a variety of voting conditions and other applications too. Although blockchain is a secure technology, it uses ECC public key cryptography, which is highly vulnerable to quantum computer attacks. Thus, blockchain with countermeasures to quantum computer attacks is a future research topic in this area.

In this research, To authenticate and verify the scheme, a blockchain-based e- voting system for multiple candidates has been designed and then implemented on Linux platforms. The system involves concepts of electronic voting theory, cryptography, and software engineering theory [15]. The implementation result shows

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that it is a practical, reliable, scalable and secure E-voting system, which solves the question of forgery of votes. This blockchain-based system can be applied to a variety of voting applications directly.

Towards Secure E-Voting Using Ethereum Blockchain

By building their own proposed smart contract, authors have succeeded in moving E-voting to the blockchain platform and they have addressed some of the fundamental issues that legacy E-voting systems face, by using the power of the Ethereum network and the blockchain structure. As a result of these trials, the concept of blockchain and the security methodology which it uses, which are known as immutable hash chains, has become adaptable to polls and elections. This achievement may even make the way for other blockchain applications that have impact on every aspect of a common man [16]. At this point, Ethereum and the smart contracts, which made one of the most revolutionary breakthroughs since the blockchain itself, courtesy its adaptability to multiple applications, helped to overturn the limited perception of blockchain as a cryptocurrency (coin), and turned it into a technology with multiple applications, for many Internet-related issues of the modern world, which may enable the global use of blockchain.

E-voting is still a very debatable topic within both political and scientific circles. Despite the existence of a few very good E-voting systems, most of which are still in use; many more attempts have either failed to provide the security and privacy features of a traditional election or have usability and scalability issues which need to be addressed [16]. On the other hand, blockchain-based E-voting solutions, including the one that authors have implemented using the smart contracts and the Ethereum network, address (or may address with relevant modifications) almost all of the security concerns, like privacy of voters, integrity, verification and non-repudiation of votes, and transparency of counting. Although, there are still some properties that cannot be addressed solely using the blockchain, for example authentication of voters (on the personal level, not on the account level) requires additional mechanisms to be integrated, such as use of biometric features .

CONCLUSION

Since the Inception of blockchain technology, many efforts have been made to implement blockchain and solve real world problems. In this process, many applications of blockchain have emerged, one of which being, E-voting. For E-voting to become more open, transparent, and independently auditable, a potential solution would be to implement it on blockchain technology. After taking into consideration all the relevant papers and studying them thoroughly, we have discussed the potential of the blockchain technology and its usefulness in the E-voting scheme. We proposed an E-voting scheme, which will be then implemented. The implementation and related performance measurements are given above along with the challenges presented by the blockchain platform to develop a complex application like E-voting. Blockchain technology has a lot of potential; however, in its current state it might not reach its full potential. There needs to be a concerted effort in the core blockchain technology research to improve its features and support for complex applications that can execute within the blockchain network. We have shown how blockchain technology offers a new possibility to overcome the limitations and adoption barriers of electronic voting systems which ensures the election security and integrity and lays the ground for transparency.

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ONLINE VOTING SYSTEM USING BLOCKCHAIN

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ABSTRACT

Democracy is important for any nation to make sure every household takes part in the election process, no matter how small it is, we need an online voting system. In this paper, we review existing voting systems and propose an online election system using the MERN stack (MongoDB, ExpressJS, ReactJS and NodeJS), so that the website is user-friendly, fast and efficient, with Ethereum Blockchain, so that data is immutable and cannot be changed.

Keywords-Elections, Blockchain, MERN

I. INTRODUCTION

Elections are significant and vital for any democracy whether it is conducting an election to elect ministers, in school to select monitor or council members, in society to elect society members, in offices to appoint CEO of the company or to vote regarding decisions made in the company, or to elect union leaders. In addition, voting in person or going to polling booths has certain disadvantages as well. In case of calamities like natural disasters, for examples earthquakes which can cause significant damage to infrastructure, or pandemics like the current covid which can prevent people from going out or if a person is disabled and unable to travel then it can cause hindrance to people and demotivate in taking part of the democratic process.

Further, setting up many polling booths or polling centers can be expensive for a country especially in bigger and populated countries like India. Also, if there are not enough voting booths, the user will have to stand in a long queue. To avoid this, we will be building an online voting system platform using the Blockchain technology which will provide a reliable and secured platform for elections. In addition, it will also make the voting process easier for the users. Using the system, it will be easier to set up multiple polling booths in schools or colleges as all that will be needed is a computer with an internet connection and a web browser.

Blockchain is a shared, decentralized and immutable ledger. It means that data in the blockchain cannot be changed, that is, the votes once registered in the blockchain cannot be changed. The blocks are connected to each other using reference, hence, it makes the system very secure for elections. By decentralized system, it means that the copy of data is available to every user in the system. So the vote cannot be altered as it will be rejected by the rest of the users.

Thus, these features of blockchain help us make a reliable and secured platform for elections making sure the integrity of democracy is not compromised.

II. LITERATURE REVIEW

A. Survey of Existing System

Referen ce paper	Authors	Technologies used	Observation and Result
[1]	Albin Benny, Aparna Ashok Kumar, Abdul Basit, Betina Cherian and Amol Kharat	Solidity, HTML, Bootstrap, Windows 7, MySQL, 3.5 Ghz Intel, 1TB HDD, 8GB RAM	A blockchain based electronic voting system that utilizes smart contracts to enable secure and cost efficient election while guaranteeing voter privacy.
[2]	Fridrik Hjalmarsson, Gunnlaugur K. Hreidarsson	Exonum, Quorum, Go- Ethereum	Using an Ethereum private blockchain, it is possible to send hundreds of transactions per second onto the blockchain, utilizing every aspect of the smart contract to ease the load on the blockchain.

TABLE 1.

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[3]	Prof. Pallavi Shejwal1 , Aditya Gaikwad2 , Mayur Jadhav3 , Nikhil Nanaware4 , Noormohammed Shikalgar5	Open BlockChain, Closed Block Chain, Cryptography, Merkle Tree	The proposed system is designed to provide secure data and a trustworthy E-voting amongst the people of the democracy.
[4]	Shalini Shukla, Shashank D O, Thasmiya A N, Dr. Mamatha H R	MongoDB, NodeJS Server, Blockchain DB	With the ethereum blockchain, any group can sort out a fee, secure electronic voting.
[5]	Rumeysa Bulut, Alperen Kantarci, Safa Kesin, Serif Bahtiyar	Ethereum Blockchain, Exonum, Quorum and Geth Framework	The proposed system will create one of the most prominent alternatives to traditional voting in terms of security, consistency and speed. Also even in extreme cases during the election day, elections can be completed safely.
[6]	Kashif Mehboob Khan, Junaid Arshad, Muhammad Mubashir Khan	Java EE, Glassfish server, MySQL, MS Excel, Multichain	With the exceptional growth of blockchain technology, a number of initiatives have been made to leverage benefits of blockchain such as cryptographic foundations and transparency to achieve an effective solution to e-voting in a feasible way.
[7]	Andrew Barnes, Christopher Brake, Thomas Perry	Blockchain, Web technology	Using two distinct blockchain, one containing information which the user still has to vote on and the other containing the content of the vote, the paper proposes a system which integrates with the current voting system instead of replacing.
[8]	Fridrik Hjalmarsson, Gunnlaugur K, Hreidarsson, Mohammad Hamdaqa, Gisli Hjalmtysson	Exonum, Quorum, Geth smart contracts	This paper evaluates three blockchain frameworks for voting systems.
[9]	Ruhi Tas, Ömer Özgür Tanrıöver	Ethereum Blockchain	Reviews literature on voting based blockchain systems and identifies the gap present in the current e-voting system.
[10]	Ong Kang Yi, Debashish Das	Blockchain, XP methodology,	A blockchain based voting system is proposed based on surveys taken. The

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web3.js. reactJS, docker, ganache, python	system utilizes smart contracts, api services and email providers.
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B. Problems with Present system

- 1. The present literature as well as systems do not provide a mainstream minimalistic design which can be user friendly for all candidates and admins.
- 2. The systems available do not provide a multipurpose platform which can be easily modified according to the needs of different election and voting scenarios.
- 3. Existing protocols are fixed and not easily scalable for higher level technical and functional requirements.
- 4. Typical functioning in general is limited to desktop usage and is not extended to mobile and other portable devices.
- 5. Multiple elections cannot be executed simultaneously from one node.

III. PROPOSED SYSTEM

C. Architecture



Fig. 1 Architecture diagram

This is the basic architecture of our project. The user logins the system. The credentials are checked through the MongoDB database where data is stored in user models. If the credential is right, we check if the user is verified or not, if not, the user is sent a verification email using NodeJS. Without verification, the user will have no access to routes. Once the voter is verified, he or she can look at the candidates in the election and vote once for a candidate, which is managed by blockchain.

For the registration phase, the admin will create all the accounts of the user using script and mail them the username and password. The user will then be able to login in the system but will not be able to access as they have not verified their accounts. They need to verify their accounts through their email and update their password to start using their accounts.

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Fig. 2 Activity Diagram

We have the activity diagram here. As we can see, the user access role is checked after logging into the system and depending on that functionality will be available to the user. We have manage-election, manage-candidates, manage-profile and manage-voting functionalities which can only be accessed if the user is an admin.

A. Behavioral UML Diagrams



Fig. 3 Use Case Diagram

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We have the use case diagram here. We have actors, users, candidates and admin. The admin has access to many functionalities like managing data, user's username and email, register voters account, start an election, view the votes, manage the election, add or remove candidates and generate final vote count. The user on the other hand can only login in the system, view votes and vote for the candidates. Candidates can only vote in the election and view the final vote report.



B. Relationship between entities



We have the admin entity with admin id as primary key. The admin starts the election which has its own description and primary id. Then we have a candidate entity which is managed by admin. The candidate has its primary key, name, description and image. The voter, who is managed by an admin, looks at different candidates and votes for them. The voter has email, username, password, and id which is the primary key.

C. Class Diagram



Fig.5 Class Diagram

We have the structural uml diagram here. We have the candidate class, voter class, admin class and election class. The figure above demonstrates the data stored in these classes and function performed by each class.

D. Functional Requirements



Fig.6 Functional Requirements

The image above demonstrates the functional requirements of our system. We have voters which can login, verify accounts, vote and look at candidates, admins which can make user's account, add candidates, manage candidates and generate final vote report, and election where admin can start or end election

IV IMPLEMENTATION

In this section we give user interface images which our project will have.

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Blockchain Voting System	n	Back to Home	Contanct Admin
	Login Sign in to your account Sign in to your account Voter ID Password Password Lobult Horgot my password, Click here to reset		

Fig 7. Login Page



Fig 8. Voting Page

0	Info								
~		Nam	e -	Age	Team	Ranic			Voter
1		٩	Albert Flores	23	Marketing Coordinator	\$			32
T		۲	Devon Lane	22	Wab Designer	2:			24
ŝ	Result	8	Comeron Williamson	23	Marketing Goordinator	3			22
	Analysis	٢	Savannah Nguyen	19	Web Develper	4			16
		(B)	Jerome Bell	21	Content Lead	5			15
30	Feedback		Dianne Russell	20	Managers.	6			12
60		-							
						E	1	of	3

Fig 9. Result Page
V. CONCLUSION

In conclusion, we have review papers and presented a robust application system for the purpose of secure voting. The technologies of blockchains and web applications used are synchronous and provide a minimal user friendly experience.

Our project can be further enhanced and improved in the future according to the new necessities of the consumers. Till then, the presented system is bound to provide a comfortable multifaceted functioning and would revolutionize the prospects of existing needs.

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REALITY CHECK ON COUNTERFEIT NEWS

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ABSTRACT

Global social networks (Facebook, Instagram, WhatsApp, Twitter, YouTube, etc.) have played a crucial role in exponentially expanding the flow of information to humans for the first time in human history. Social media allows consumers to create and share more information than ever before, some of which are misrepresentative and irrelevant to the real world. Misinformation and disinformation can be categorized automatically by an algorithm, but this can be a challenging process. Oftentimes, even an expert in a given field has to consider multiple factors before claiming that an article is truthful. But on the contrary, social media platforms and other online platforms are repeating the same claims without proving their true nature. An astronomical number of people who utilize those platforms have faulty information about virtually every subject. People not being vigilant of that consequential information and being manipulated by fake news is perilous. In this work, we propose to use the Machine Learning Naïve Bayes algorithm for the automated classification of news articles with Python. In our study, we examined different textual properties that can be habituated to detect fake and legitimate content.

Keywords—Social Media, Machine Learning, Naive Bayes Classifier

INTRODUCTION

The emergence of the World Wide Web and the expeditious adoption of social media platforms (such as Snapchat, WhatsApp, Instagram, Facebook, YouTube, and Twitter) obdurate the way for information dispersal that has never been witnessed in human history or the past [1]. In this current situation, fake news has quickly become a social problem, being used to spread misinformation or rumoured information to change people's behaviour [2]. In this time of technology where people are busy with their work and other things, they use social media to communicate with each other. Social media has been growing rapidly for the last few years [3]. Faux news includes articles that are disconnected from original sources and can be misleading, particularly when they are presented without their original sources. False news describes the likelihood of an exact article, report, etc being false and misleading. Textual content analytics can increase human competencies to know lies and creates awareness among the users to check the facts [4].

Besides all this, news outlets (like newspapers, television companies, or other mass media which publish news stories) benefitted from the extensive use of social media platforms globally by providing updated news in realtime to their followers. The forms of mass media such as news media evolved from newspapers, journals, newsletters, and magazines to a digital form such as online news platforms, blogs, social media feeds, and other digital media formats [5]. It is so effortless to know about the latest news and things happening around. So, everything is at your fingertips and it saves time for consumers. If we talk about social platforms like Facebook then its referrals account is responsible for 70% of traffic to news websites [6]. In this current scenario, these social media platforms are being used extensively and they are extremely powerful and useful for their ability to allow users to discuss their ideas and give their perspective on different social and technical topics and debate over issues such as democracy, education, poverty, malnutrition, health, etc. On the contrary, such platforms are also used with a negative perspective by certain people and organizations commonly for popularity and monetary gain and in other cases for creating biased opinions or manipulating the mindsets of people and spreading blandness or idiocy [7]. This particular phenomenon is generally known as fake news. If we take cases from the last decade, we will find that there is an extensive increase in the spread of fake news, most prominently observed in the US elections in 2016 [8]. It happened in India also if we take the case when several Twitter and Facebook users claimed that it is the black day for India as the Khalistani flag was raised at Red Fort. India Today Anti Fake News War Room (AFWA) investigated several tweets and Facebook posts claiming that the Khalistani flag was raised at Red Fort. However, it turned out it was the Nishan Sahib, a religious flag of Sikhs, which was raised [9]. The spread of articles online that are not logical or having any facts in their claims will lead to many serious problems which are not just limited to politics or some regular issues but they also affect other domains such as sports, health, and also science and technology [10]. Financial markets are one of these areas affected by this kind of article or news [11], where a baseless rumour can have tragic consequences and may bring the market to a halt, and can affect the lives of thousands of people. There is increasing confirmation and evidence that Consumers react foolishly to news that later proved to be fake [12,13]. we can take the example of one such recent case regarding the spread of the novel coronavirus, where

fake reports were spread all over the Internet about the nature, origin, symptoms, and behaviour of the virus [14]. The situation worsened as more and more people read and talk about fake content online. It's not easy to find and identify whether the particular articles or news is fake or not on the internet. it's a daunting task.

There are many techniques by which we can find out whether an article is fake or not based on its textual content (Kind of words used) [15]. In all techniques present, the majority of these techniques use fact-checking websites such as "PolitiFact" and "Snopes". Researchers maintain a number of repositories that contain lists of websites that are identified as vague and fake [16]. However, the problem we face with these resources is that human expertise and logic are required to identify particular articles as fake.

The World Wide Web contains data in multiple formats such as documents, videos, and audio, and these things we take into consideration while searching or reading about any subject. It is relatively difficult to detect and classify without any human expertise and logic as news published online is in an unstructured format (such as news, articles, videos, and audio). However, if we take computational techniques like natural language processing (Naive Bayes) into consideration they can be used to detect discrepancies that separate a text article that is deceptive in nature from articles that are predicted on facts [17]. If we talk about other techniques, they involve the analysis of propagation of fake news in contrast with authentic news [18]. More importantly, the approach inspects how an unauthentically spurious news article propagates differently on a network as compared to a veridical article. The kind of response an article gets can be differentiated at a theoretical level so that the article can be classified as real or fake. To analyse the social responsibility of an article along with exploring the textual features a more hybrid approach can also be used for the inspection of an article whether it is deceptive or not.

In this paper, we propose a method to detect fake news articles using the Naive Bayes algorithm. The main goal and purpose of this system are to detect counterfeit news articles, which is a classic text relegation quandary with a proposition. It is a desideratum to build a model that can differentiate between "Genuine" news and "Fake" news in this era of convival media and the cyber world.

LITERATURE REVIEW

Scholars recommend a variety of machine learning and deep learning techniques for detecting fake news. The major objectives of this literature review are to identify the impuissance in the baseline methods and provide reliable alternatives. We have presented some of the traditional fake news detection techniques in this study.

Authors have found a simple approach for fake news detection. For that system, they have used naive Bayes algorithm. Implementation of this approach was tested using Facebook news posts as data set. Despite the model's relative simplicity, it achieves a classification accuracy of approximately 74%. Artificial intelligence methods can be used in order to detect fake news based on received results [19].

Modern society has been revolutionized by social media. Every person requires it, and it comes with a range of benefits and disadvantages. There is no doubt that Fake News is the current world problem. Hence, creating an algorithm that exhibits the highest degree of accuracy would be a revelation, one which will transform how social issues are addressed and the way politics are conducted. As a result, the researchers have developed a novel approach to detecting false news that includes sentiment as a key characteristic to increase accuracy. The proposed system also tests the suggested method's performance on three distinct data sets [20].

The news is an important part of our life. In everyday life, breaking news is useful for updating information that is produced around the world. If the news people referring to is fake then it will affect society. Therefore, there is an urgent need to locate the wrong news. So, in this article, researchers came up with a framework for identifying fake news but as we know that it is a hectic task to differentiate because of the vast news present on social media and on other platforms. And it's so tedious that they use ordering procedures to order huge information. Here, the researchers proposed a fake news location framework that relies on deals like Logistic Relapse (LR), Naive Bayes (NB), Support Vector Machine (SVM), Random Backwoods (RF), and Deep Neural Organization (DNN). They think of all the artificial intelligence techniques to identify fake news [21].

Fake news with no facts spread expeditiously in the cyber world and causes some solemn issues. So, it's a necessity to fight against fake news, at the moment it started. Researchers have done lots of strenuous exertion but the system still has inhibitions. One of the circumscriptions we have in the current scenario is that the majority of the models are focused only on one language and do not utilize any multilingual information. So, in this paper authors investigate the incipient approach of fake news detection predicated on multilingual evidence. it shows the efficacy of the proposed approach in manual and automated evaluation experiments [22].

As we have all known fact that since the last decade the craze of gregarious media and the cyber world has incremented Bermondsey and with that, the phenomenon of fake news has additionally incremented. So, for researchers, it's an incipient field and it's arduous to get expected results. The difficulties emanate from the semantics of natural languages and manual identification via human beings, let alone machines. In this paper, researchers propose a system to analyse the performance of several machine learning algorithms integrating implements such as FakeNewsTracker [23], doc2vec, Support Vector Machine (SVM), and decision trees. With their preliminary results, it was shown that SVM and the decision trees are felicitous to identify fake news .it has a precision of 95 percent. Generally, the decision tree method is more efficient than SVM [24].

Social media news consumption is gradually growing due to its ease of access, cheap and more attractive and it spreads fake news. False news has latent negative repercussions on people and culture. Some spread wrong information on social networks to gain attention. We have to be smarter to recognize what's fake or what's real. The unique feature of detecting fake news on social media makes today's detection algorithms ineffective or unsuitable. Afterward, it is important to consider secondary information. Secondary information may include social events on social media. So, in this research work, researchers present a simple approach to detecting fake news on social media using the K-Nearest Neighbour classifier. they achieved a classification accuracy of about 79% against the Facebook news article data set [25].

Fake news has been an issue since the Internet blew up. The very network that lets us know what is going on in the world is the ideal terrain for malicious and false news. This paper by researchers is attempting to quicken the fake news identification process by proposing a system that can reliably relegate fake news. Researchers propose a system based on textual characteristics that have the ability to reliably identify fake news in this paper. Machine learning algorithms like Naive Bayes, Passive Aggressive Classifier, and Deep Neural Networks were used on eight different datasets obtained from different sources. Researchers also include the analysis and results of each model in the paper. The arduous task of detecting false news can be trivial with the use of good models with good tools [26].

It is not necessary to say how much fake news affects society and that true information measures are difficult. A clever Score - based Multi-Source Fake News Detection structure is proposed in this work to computerize the discovery of phony news from various news sources. This frame extracts the textual features of genuine and false news articles using Term Frequency - Inverted Document Frequency. By assimilating text-based characteristics with the credibility value of multiple sources, the credibility of messages is valued. To study whether machine learning (ML) classifiers can detect and prevent spoofed messages, the researchers propose a framework to be applied to those classifiers. The experimental results determine the efficiency of the proposed framework with the gradient boosting algorithm of approximately 99.5% at the highest level. The experimental results, scholars got regarding the efficiency of the proposed framework with the Gradient Boosting algorithm of about 99.5% to the maximal level [27].

Fake news is affecting society and in various forms. We can take the example of US election news etc [8,9]. This research work by researchers (N. Kousika, Deepa. S, Deephika. C, Dhatchaiyine. B M, Amrutha. J) studies the chance of using deep learning techniques to discriminate against counterfeit news on the Internet using only their text. Three different neural network architectures are proposed for this purpose, including BERT, a model from Google's modern linguistic platform, which achieves cutting-edge results. This project is the application to detect "false news", the news of sources of the good reputation of NLP methods (natural language processing) deceives. This approach was implemented and investigated by researchers in the form of a software system. Can you build a prototype that can distinguish between "real" and "fake" messages? With this novel approach to fake news detection, SVM achieved 92% accuracy and Naive Bayes 73% accuracy. In this study by researchers, SVM may be better than the naive Bayesian classifier model in the new predictive approach [28].

This paper by distinguished researchers proposes a two- phase reference model called WELFake, which relies on word embedding (WE) through linguistic characteristics for counterfeit news detection using machine learning classification. In the first phase, the data record is pre- processed and the message content is verified for accuracy using linguistic characteristics. In the second phase, the sets of linguistic characteristics are merged with WE and the voting classification is applied. To approve its methodology, this article by scientists additionally cautiously plans a clever WELFake informational collection with around 72000 articles, which fuses various informational collections to create a fair order yield. Test results show that the WELFake model orders the news in genuine and counterfeit with a 96.73% which works on the general exactness by 1.31% contrasted with bidirectional encoder portrayals from the transformer (BERT) and 4.25% contrasted with convolutional neural organization (CNN) models. Our recurrence-based and centered examining composing

designs model beats prescient-based related works carried out utilizing the Word2vec WE strategy by up to 1.73% [29].

PROPOSED SYSTEM

Naive Bayes Classifier

The proposed framework uses a naive Bayesian computation to identify spoofed messages, it has a higher level of precision. The information is divided here into two sections (Test and Training). The preparatory information is processed and characterized in packets with comparison data records. Once the information has been prepared, the test information is forwarded to the collection that has comparison attributes for the group. Currently, a gullible Bayesian calculation is used to help know the accuracy of the fake messages used. to stop spam.

As far as machine learning is concerned, naive Bayesian classifiers are part of simple machine learning. As we know, Naive Bayes is a popular algorithm used to determine the accuracy of messages, whether they are real or fake messages. Several algorithms focus on common principles, so this is not the only algorithm for training such classifiers. Bayes can be used to check if messages are false or genuinely naive.

This classification technique is based on the Bayes theorem, which assumes that the presence of a particular feature in a class is independent of the presence of any other feature. It provides a way for calculating the posterior probability.

P(x) = p(c)*p(c)/p(x)

P(c|x) = posterior probability of class given predictor P(c) = prior probability of class

P(x|c) = likelihood (probability of predictor given class)

P(x) = prior probability of predictor

It is a kind of algorithm used in the classification of texts. The use of the token is correlated to the messages, which may or may not be forged in the naive Bayesian classifier, and then the precision of the messages is calculated using Bayes' theorem.

Architecture

Many websites known for posting news content frequently use PolitiFact and Snopes for fact-checking purposes. In addition, there are open repositories maintained by researchers [15] to take care of an up-to-date list of currently available records and hyperlinks to potential fact- checking sites which will help combat the spread of faux news. For our analyses, we have chosen two datasets from different spaces (from amusement to sports to legislative issues and diversion) that contain a blend of valid and bogus news. The informational indexes are accessible on the web and come from the World Wide Web. The datasets are openly accessible at Kaggle [30,31].



Fig. 1 Architecture of the System

4. Prediction

This model evaluates a news article as an input and then presents the user with a classification outcome along with the probability of being true that was calculated.

ADVANTAGES AND LIMITATIONS

Assuming the article is fabricated, we will count the number of times a word appears. Change that to a probability, and then calculate the chances that the article is a scam vs. the chances that it is genuine. Fast and efficient, this algorithm can reduce processing time to a great deal. Multi-class prediction problems can be solved with naive Bayes. The model can perform better than other models if it holds true to its assumption of feature independence and requires less training data. It is more suitable to use Naive Bayes with categorical

input variables rather than numerical input variables. Naive Bayes is very good for dealing with dynamic data and can be reshaped easily when new data is introduced. This method, however, has significant drawbacks. The largest is that it considers all features to be separate, which is not always accurate. Therefore, no relationships are learned among the features. The Naive Bayes models are not good at representing complex behaviour, resulting in low model size and good for a constant type of data. Our project is limited to news articles only that are text-based. It can't check if any multimedia i.e., image or video is tampered with or not, to spread false news. In the future, we try to overcome our limitations and work on the other types of spreads for fake news and improve our work.

First, you need to download the data from the internet to detect Fake News. Now the data set is divided into two parts, namely the test data set and the train data set. The Naive Bayes algorithm is now used to classify the train data into groups of similar units.

Data Pre-processing

The data in this section must be carefully checked and pre-processed before being used. To begin, we must first go over the train, test, and validation data files, then pre- process them using various methods, including Lemmatization, tokenizing, stemming, etc. In this step, all missing values are checked in depth.

Feature Extraction

A feature extraction and selection method were applied to this dataset using scikit and python. In order to select features, we use a method known as TF -IDF.

Classification

We distinguish the test data from the training data and categorize the training data set into groups with similar entities. Next, a matching algorithm is applied to the test data and the group is assigned based on the matching algorithm, and then the naive Bayesian classifier is applied further and the probability of each word is calculated individually. Finally, it is determined whether the data is false or genuine.

RESULT



Due to the unique characteristics and challenges of detecting fake news on social media (with articles and other sources) and elsewhere, existing algorithms from traditional news media aren't appropriate. We used naive Bayes to analyse the articles in our project. It is commonly used for classification problems in text and for problems with multiple classes. In our test, 83.74 percent of the predicted results were correct. We used a paper in literature that has a

74 percent accuracy rate. In addition, the authors also employed the naive bayes algorithm.

CONCLUSION

Therefore, by utilizing the Naive Bayesian theorem, we can conclude that any message from an immensely colossal or minute data set can be relegated as authentic or erroneous utilizing values from the anterior set in less time, which in turn helps users to rebuild from believing in special news.

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CAR AND HOUSE PRICE PREDICTION USINGLINEAR, LASSO AND RIDGE REGRESSION

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ABSTRACT

In this research we used Linear, lasso and Ridge regression for generating models for car and house price prediction, for car price prediction we did comparison between Linear and Lasso regression and for house price prediction we did comparison between Linear and Ridge regression the dataset for both car and house price prediction is taken from website Kaggle.

Keywords—Linear regression, Lasso regression, Ridge regression, car price prediction, house price prediction)

I. INTRODUCTION

Car and house are the most important possession a person can have people value driving a car because it confers prestigeand allows them to exercise personal control and autonomy while a house shields us from the whims of nature and hazards. A home provides a sense of security and well-being, which is more than just a physical structure but a symbol of power, authority, and a slew of other things but there exists alack of transparency and knowledge in determination of prices of house or values of used cars because of which people are not assured of the price that they are paying for buying a house or a used car also there are involvement of intermediaries in determination of prices which in turn includes their charges hence there is a need of system that can determine the values of housing properties and value of used cars. In this paper wehave made a comparative study of Linear and Lasso regression for car price prediction model and a comparative study of Linear and Ridge regression for house price prediction model. The dataset used here is taken from websiteKaggle.

II. LITERATURE REVIEW

Various researches regarding car and house price prediction are done previously

Nitis Monburinon, Prajak Chertchom, Thongchai Kaewkiriya, Suwat Rungpheung, Sabir Buya and Pitchayaki Boonpou [1] did a comparative study on various regression models using the dataset collected from a German ecommerce website they observed that gradient boosted regression trees gave the best performance in comparison of random forest regression and multiple linear regression witha MAE of 0.28.

Pattabiraman Venkatasubbu and Mukkesh Ganesh [2] did a comparative study on Lasso regression, Multiple regression and regression trees for predicting the prices of used cars Multiple regression performed well in comparison of others with an error rate of 3.468%.

Enis Gegic, Becir Isakovic, Dino Keco, Zerina Masetic and Jasmin Kevric [3] made use of three machine learning techniques Artificial Neural Network, Support Vector Machine and Random Forest for predicting prices of used cars in Bosnia and Herzegovina and obtained an accuracy of 87.38%.

CH.Raga Madhuri, Anuradha G, and M.Vani Pujitha [4] Predicted house price with the help of Regression techniques like Multiple linear, Ridge, LASSO, Elastic Net, Gradient Boosting and Ada Boost Regression where gradient boosting algorithm gave high accuracy as compared to other algorithms

Ayush Varma, Abhijit Sarma, Sagar Doshi and Rohini Nair

[5] proposed a house price prediction system by making a optimal use of Linear regression, Forest regression and Boosted regression with a further increase in accuracy by making use of Neural networks.

P. Durganjali and M. Vani Pujitha [6] Used different classification algorithms like logistic regression, decision tree, Naïve Bayes, random forest and Ada boost for house price prediction where Ada Boost gave the highest accuracy of 96%

III. METHODOLOGY

The work flow for the model generation of car and houseprice prediction can be given as



Fig 1: Workflow for car price prediction

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Fig 2: Workflow for House price prediction

At the start of the process, we first collect the dataset and perform various data preprocessing steps to prepare our data after this stage the data is split up into training and test set where training data is used for model generation by using algorithms like linear and lasso regression for car price prediction and Linear and Ridge regression for House price prediction the algorithm that performs well is selected for prediction. Now in order to use this ML Model for prediction we develop a web application where users can predict the value of their used cars or housing property based on their choice, they would be redirected to the respective web page for prediction.

IV. IMPLEMENTATION

A. Data understanding and preprocessing

Dataset for both car and house price prediction are taken from website Kaggle the car dataset is uploaded by Neha Birla under open database license and contains information about the cars listed on www.cardekho.com and contains features like name, year, selling price, present price, Kms driven, fuel type, seller type, transmission, number of previous owner's car had. House dataset is of Mumbai area uploaded by Sameep Seth under public domain license it contains information of houses all over the Mumbai such as area, location, number of bedrooms and various amenities available but our research focuses on the prices of house in Kharghar, Mira Road East and Thane West and we have considered features like area, location, number of bedrooms and whether a house is new orresale.

Attribute	Count	
Number o	f bedrooms	
1 bedroom	439	
2 bedrooms	593	
3 bedrooms	271	
Loc	ation	
Kharghar	512	
Thane West	405	
Mira Road East	386	

Table II. Distribution of categorical uata for nouse uataset	Tε	able	II:	Di	stri	buti	on of	f ca	tego	rical	data	ı for	house	datase	t
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The dataset may contain duplicate values or null values also we may drop some attributes that are not necessary in prediction process this data preparation is done with the help of python programming language for car dataset we drop the name feature as it is not important in prediction and for house dataset, we are considering area, location, and number of bedrooms.

Correlation Heat map is generated to know the statistical measure of linear relationship between variables or attributes of dataset, the value of correlation coefficient can range from

-1 to 1 correlation heatmap can be drawn using python's seaborn library.

Seaborn is a Python module for creating statistical visualizations. It interacts well with panda's data structures and gives a high-level interface to matplotlib. The seaborn library's functions present a declarative, dataset-oriented APIthat makes it simple to convert data questions into images that can answer them [7].

Table I: Distribution of categorical data for car dataset



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Fig 3: correlation heat map for car price prediction



Fig 4: Correlation heat map for house price prediction

B. Study of Linaer and Lasso regression for Car price prediction

For the model generation of car price prediction, we have done a comparative study of linear regression and Lasso regression available in the SciKit learn a machine learning library.

Linear Regression

Linear regression is a type of supervised learning machine learning algorithm. It carries out a regression task. Based on independent variables, regression models a goal prediction value. It is mostly utilized in forecasting and determining the link between variables. Different regression models differ interms of the type of relationship they evaluate between dependent and independent variables and the number of independent variables they employ.



Fig 5: Linear regressionLasso regression

Sometimes using standard regression methods to a set of candidate variables for generating a model tends to lead to overfitting in terms of the number of variables [8].

Least Absolute Shrinkage and Selection Operator is the abbreviation for LASSO It's a statistical formula for regularizing data models and selecting features.

Shrinkage is used in this model. Data values are shrunk towards a central point known as the mean in shrinkage. Simple and sparse models are provided by the lasso approach.



Fig 6: Lasso regression

For car price prediction the dataset was split up into 90 percent for training data and 10 percent for test data.

For Linear regression a R2 score of 0.879945 was obtained for training dataset and a R2 score of 0.836576 was obtained for test dataset. For Lasso regression a R2 score of 0.842785 was obtained for training dataset and a R2 score of 0.870916 was obtained for test dataset.



Fig 7: Actual vs Predicted price by linear regression for training dataset of car price prediction

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Fig 8: Actual vs Predicted price by Linear regression for testdataset of car price prediction



Fig 9: Actual vs Predicted price by Lasso regression fortraining dataset of car price prediction



Fig 10: Actual Vs Predicted price by Lasso regression fortest dataset of car price prediction

Table III: R2 score of linear and Lasso regression.

Algorithm	R2 Score			
Linear regression				
Training dataset	0.879945			
Test dataset	0.836576			
Lasso regression				

C. Study of Linaer and Ridge regression for house priceprediction

For the house price prediction model Linear and Ridge regression were studied here the dataset was divided into 70 percent for training data and 30 percent for test data

Ridge regression

Ridge regression is a model tuning technique that can be used to analyze data with multicollinearity. L2 regularization is achieved using this method. When there is a problem with multicollinearity, least-squares are unbiased, and variances are big, the projected values are far from the actual values. It reduces the size of the parameters. As a result, it's employed to avoid multicollinearity. By shrinking the coefficients, it minimizes the model's complexity.



Fig 10: Ridge regression

For Linear regression a R2 score of 0.668408 was obtained for training dataset and a R2 score of 0.693642 was obtained for test dataset. For Ridge regression a R2 score of 0.668403 was obtained for training dataset and a R 2 score of 0.693933 was obtained for test dataset.











Fig 13: Actual Vs Predicted price by Ridge regression fortraining dataset of house price prediction



Fig 14: Actual Vs predicted price by Ridge regression fortest dataset of house price prediction

Table IV: R2 score of Linear and Ridge regression.

Algorithm	R2 Score	
Linear re	egression	
Training dataset	0.668408	
Test dataset	0.693642	
Ridge re	gression	
Training dataset	0.668403	
Test dataset	0.693933	

D. Sample GUI for car and House price prediction

Both the models for car and house price prediction can be deployed with the help of a web application it consists of three web pages a home screen where user has choice to select whether they want to predict the car price or house price based on the user's choice user would be redirected to the desired web page for prediction

The web application is developed with the help of flask, JavaScript, HTML and CSS

Flask is a Python micro framework that provides the basic functionality of a web framework while also allowing more plug-ins to be added to expand the functionality and feature set. Flask is known as a Python micro framework because it keeps the basic functionality minimal while allowing for development flexibility [9].

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Fig 13: Sample GUI of home page



Fig 14: sample GUI of car price predictor



V. CONCLUSION

The research focused on comparative study between Linear and Lasso regression for predicting prices of used cars and Linear and Ridge regression for predicting prices of Hosing property, the dataset for both the models

were taken from website Kaggle the models can be deployed with help of a web application which makes it easier for users to predict the price of used cars or price of housing properties.

The R2 score of Linear regression on test dataset of car price prediction was 0.836576 and R2 score of Lasso regression on test dataset of car price prediction was 0.870916. The R2 score of Linear regression on test dataset of House price prediction was 0.693642 and R2 score of Ridge regression ontest dataset of House price prediction was 0.693642 and R2 score of Ridge regression ontest dataset of House price prediction was 0.693642 and R2 score of Ridge regression ontest dataset of House price prediction was 0.693642 and R2 score of Ridge regression ontest dataset of House price prediction was 0.693642 and R2 score of Ridge regression ontest dataset of House price prediction was 0.693642 and R2 score of Ridge regression ontest dataset of House price prediction was 0.693642 and R2 score of Ridge regression ontest dataset of House price prediction was 0.693642 and R2 score of Ridge regression ontest dataset of House price prediction was 0.693642 and R2 score of Ridge regression ontest dataset of House price prediction was 0.693642 and R2 score of Ridge regression ontest dataset of House price prediction was 0.693642 and R2 score of Ridge regression ontest dataset of House price prediction was 0.693642 and R2 score of Ridge regression ontest dataset of House price prediction was 0.693642 and R2 score of Ridge regression ontest dataset of House price prediction was 0.693642 and R2 score of Ridge regression ontest dataset of House price prediction was 0.693642 and R2 score of Ridge regression ontest dataset of House price prediction was 0.693642 and R2 score of Ridge regression ontest dataset of Ridge regression ontest dataset of House price prediction was 0.693642 and R2 score of Ridge regression ontest dataset of Ridge regression ontest d

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IOT BASED SMART ENERGY METER MONITORING WITH THEFT DETECTION: A SURVEY

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ABSTRACT

Energy theft is one of the major problems that the world faces today. This problem can be reduced by properly monitoring our energy consumption and avoiding energy wastage. Energy theft is a measure crime.so it directly affects to power consumption. This system used to detect the theft easily. This paper presents the design and modelling of prepaid energy meter system. The present system of energy theft also time consuming. The theft of the electricity increases the costs which is paid by customer. The system consists voltage sensor and current sensor to monitor the incoming voltage. if the variation between the voltage and current sensor in the incoming and outgoing is very large, then the theft is occurred and message provided to the concerned person via SMS Notification. The GSM module provides a mode of communication between the user and provider.

Keywords - Energy Meter, Micro-controller, Current Sensor, GSM Module, LCD Display, Internet of Things.

I. INTRODUCTION

Energy theft is the major problem that the world faces today. The best therapy for this is not the increases of energy production, but the actual use of available energy. Energy theft can be reduced to a certain amount by properly monitoring the energy consumption and avoiding loss of energy. But the main problem is that the energy monitoring cannot be done efficiently because consumer is not responsive of their power consumption. This system will show the amount of units consumed, transfers the data to the customer. The user can check their usage of energy from anywhere and at any time interval. The IoT is used to Turn on/off the system using relay and Arduino interfacing. The objective of this system is to monitor the amount of electricity consumed. The technology named as GSM technology is used so that the consumer would receive messages about the consumption of power if it reaches the minimum amount, it would automatically alert the consumer to recharge.

II. LITERATURE SURVEY

- 1. "Arduino based smart energy meter" that removes human intervention in meter readings and bill generation thereby reducing the error that usually causes in India. The system consists the provision of sending an SMS to user for update on energy consumption along with final bill generation along with the freedom of reload via SMS. The disconnection of power supply on demand or due to pending dues was implemented using a relay. The system employs GSM for bidirectional communication.
- 2. **"Smart meter using IoT"** on efficient energy utilization plays a very vital role for the development of smart grid in power system. The energy meter has many problems associated to it and one of the key problems is there is no full duplex communication to solve this problem, a smart energy meter is proposed based on Internet of Things.
- 3. "AMR approach for energy saving in Smart Grids using Smart Meter and partial Power Line Communication" on the raising demand of energy. Smart meters are one of the proposed solutions for the Smart Grid. In this, an AMR solution which gives detailed end-to-end application.

SR.NO	NAME OF TOPIC	AUTHOR NAME	YEAR	METHODOLOGYUSED
1	ARM based energy controlling system based on smart meter and web server	Landi C. Merola P.	2011	Web server collects the measurements of power consumption.
2	A new AMR method in Smart Networks for energy saving based on Smart Meter and partial Power Line Communication	Garrab A Bauallegue A	2011	AMR solution provides enhanced continuous application.
3	Design and application of Bluetooth smart energy meter	B.S.Koay S.S.Cheah	2012	Electronics energy measurement is continuously replacing current technology of electro-mechanical meters.

III. PROPOSED METHODOLOGY

The **"IOT Based Smart Energy Meter** Monitoring with Theft Detection" is shown in figure 1. The block diagram consists of Arduino microcontroller, Energy meter, WIFI module and IoT, Relay and transformer, GSM Module, Current Sensor, Loads etc.

BLOCK DIAGRAM:



Fig1: IOT Based Smart Energy Meter Monitoring with Theft Detection



Fig2: Prepaid Energy Meter with Theft Detection.

In this paper, we are going to explain a technique of electricity energy meter reading based on IoT concept. This design implements the energy meter using the IoT concept. This system is suitable for consumer and supply.

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This method reduces manpower during this connection and disconnection upload. These parameters can be obtained through mobile or laptop. WIFI is used for data communication. WIFI is configured with microcontroller. The Data from the Energy meter is sent to microcontroller and to WIFI module and it reaches the user's device. In this system the user can switch on/off the mains or home appliances from their Android smart phone app.



IV. COMPONENTS USED TO IMPLEMENT THE IDEA

- 1. Energy Meter
- 2. Current sensor
- 3. GSM Module
- 4. Atmega328 Microcontroller
- 5. WIFI Module
- 6. LCD Display
- 7. Resistors
- 8. Capacitors
- 9. Transistors
- 10. Cables and Connectors
- 11. Diodes
- 12. PC and Breadboards
- 13. LED
- 14. Transformer/Adapter
- 15. Push Buttons
- 16. Switch
- 17. IC
- 18. IC Sockets

A. Energy Meter:

The meter which is used for measuring the energy utilizes by the electric load is known as the energy meter. It is used in domestic and industrial AC circuit for measuring the power consumption.



Fig.1 Energy Meter Module

B. Microcontroller:

A microcontroller is a **small and low-cost microcomputer**, which is designed to perform the specific tasks of embedded systems like displaying microwave's information, receiving remote signals, etc.

C. Current Sensor:

A current sensor is a **device that detects electric current in a wire and generates a signal proportional to that current**. The generated signal could be analog voltage or current or a digital output.

D. GSM Module:

A GSM module or a GPRS module is a chip or circuit that will be used to establish communication between a

mobile device or a computing machine and a GSM or GPRS system.



Fig.2 GSM Module

E. Internet of Things: The Internet of things (IoT) describes physical objects that are embedded with sensors, processing ability, software, and other technologies, and that connect and exchange data with other devices and systems over the internet or other communications networks. It communicates with almost everything around the world. The communication can be a control signal from this world. It is a common internet data communication. The data is stored in cloud and sends to the energy meter to switch on/off objects.

V. ALGORITHM

Step 1: Start the program.

Step2: Interface the LCD and the Keypad to the Microcontroller.

Step 3: Initialize the LCD Display.

Step 4: Enter the card number.

Step 5: Configure the GSM and send number to the provider.

Step 6: If the number is valid then receive the recharged amount from the service provider.

Step 7: If the number is invalid then enter the correct number.

Step 8: When the electricity is consumed, then the recharged amount will get deducted.

Step 9: When 90% of the recharged amount is consumed, then the user will get an alert message to recharge the Energy Meter.

Step 10: When the recharged money gets over, the relay cut-off the power supply.

Step 11: Stop the program.

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Fig.1.Flowchart for microcontroller programming.

VI. POSSIBLE OUTCOMES

This project is focused on the connectivity and networking factor of the IoT. In this system, an energy consumption calculation depends on the calibration counting pulses is designed by using ATMEGA328P Microcontroller in embedded system domain. In the future, IoT and MC meter reading system is designed to continuously monitor the meter reading and if the customer does not recharge the system, service provider can disconnect the power source.

VII. CONCLUSION

This system helps in control the energy consumption and avoiding energy wastage is very important. This is an Arduino based implementation of energy meter by using IOT concept. In the proposed system, meter reading system is designed to monitor continuously the meter reading and transfer the reading to certain server. This data can be access from anywhere on the globe at any time. The design of Smart Energy meter using can make the users to pay for the electricity before its consumption. In this way, consumers hold credit and then use the electricity until the credit is exhausted. This module will reduce the burden of energy providing by establishing the connection easily and no theft of power will take place. This paper work exposes the purpose of energy monitoring and controlling by implementing prepaid system.

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A MACHINE LEARNING FRAMEWORK FOR DOMAIN GENERATION ALGORITHM (DGA) BASED MALWARE DETECTION

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ABSTRACT

Attackers typically employ a command and control (C2) server. It's generally utilised to sway people's opinions. Threat actors frequently use Domain Generation Algorithms (DGA) to carry out attacks. The communication between DGA and C2 generates network locations. Traditional malware control approaches such as blacklisting are ineffective against DGA threats. For dealing with DGA threats, we present a machine learning approach. We capture data in real time for up to a year. A two-level model and a prediction model are included in the suggested model. Clustering is utilised to determine which algorithm is employed to construct the DGA domain. It is capable of handling massive datasets that have been gathered. We attain an accuracy of 95.88 percent for classification and 92 percent for second level clustering, not to be precise but to be accurate.

Keywords: blockchain; consensus algorithm; smart contract; attacks; smart cities; security and privacy

I. INTRODUCTION

Malware attackers attempt to infiltrate layers of protection and defensive solutions, resulting in threats on a computer network and its assets. Anti-malware softwares have been widely used in enterprises for a long time since they can provide some level of security on computer networks and systems to detect and mitigate malware attacks. However, many anti-malware solutions typically utilize static string matching approaches, hashing schemes, or network communication whitelisting. These solutions are too simple to resolve sophisticate malware attacks, which can hide communication channels to bypass most detection schemes by purposely integrating evasive techniques. The issue has posed a serious threat to the security of an enterprise and it is also a grand challenge that needs to be addressed.

Some of the sophisticate malware attackers use either a static or dynamic method to communicate with a centralized server to service a Command and Control (C2). In a static method, everything is fixed. For example, the malware has both a fixed IP address and a fixed domain name permanently (i.e., its domain name will not change throughout its lifespan). Thus, as long this malware has been identified as a threat, a simple rule can be applied to resolve this malware threat issue. In a dynamic method, Domain Generation Algorithm (DGA) has been commonly used to communicate back to a variety of servers. The DGA is a sequencing algorithm that is used to periodically generate a large number of domain names, which are often used by malware to evade domain-based firewall controls. The generated domain names give malicious actors the opportunity to hide their C2 servers so that it is hard for the enterprise to identify the DGA. The domains generated by DGAs are shortlived registered domains and they are easier for human to identify but harder for machines to detect automatically. The dynamics of a DGA commonly utilizes a seeded function. That is, given an input such as a timestamp, a deterministic output will follow as pre-defined by the DGA. The challenge behind deterring a DGA approach is that an administrator would have to identify the malware, the DGA, and the seed value to filter out past malicious networks and future servers in the sequence. The DGA increases the difficulty to control malicious communications as a sophisticated threat actor has the ability to change the server or location periodically the malware communicates back (callback) to the C2 in an automated fashion. There is a grant challenge in the detection of a DGA. This study evaluates known DGA algorithms and malicious domains generated by those DGAs. In this research, we investigate machine learning approaches including multiple feature extractions, classification, clustering, and prediction techniques to understand those DGA domains. We also design a Deep Neural Network (DNN) model to classify a large dataset. Everyday, there are vastly running applications and services in the networking and their computer systems may frequently query domain names through DNS.

In this paper, we first propose a machine learning framework to classify and detect DGA malware and develop a DNN model to classify the large datasets of DGA domains that we gradually collected. We then experimentally evaluate the proposed framework through a comparison of various machine learning approaches and a deep learning model. Specifically, our machine learning framework consists of the following four main components: A dynamic blacklist consists of a pattern filter. The pattern filter is used to filter the incoming DNS queries in order to obtain the domains from them. Those filtered domains are stored in the blacklist. A feature extractor. It extracts features from the incoming domains that are not in the blacklist. Those domains will be processed in the next component. A two level machine learning model: the first-level classification and the second-level

clustering. To identify DGA domains, we first use various classification models to classify DGA domains and normal domains. Then, we apply the clustering method to group domains sequenced by the DGA. A time series prediction model: we propose a Hidden Markov Model(HMM) to predict incoming DGA domain features in order to better identify the DGA domains. The general goal of our machine learning framework is to determine which algorithm is employed so that our proposed framework can prevent future communications from the C2.

Furthermore, we have gradually collected the data for over one year and have obtained a large amount of datasets from real traffic. To analyze these data, we also propose a deep learning approach for large dataset classification. We first build a DNN model and then compare it with our machine learning models. The comparison results provide us an useful guideline for our future study in DGA detection and prediction. In our future research, we will also apply deep learning in clustering and prediction that are out of the scope of this paper.

II. PROJECT ARCHITECTURE

2.1. Problem Statement

The malware that communicates with an appropriate domain correctly, a threat actor must register each respective domain name in the sequence to maintain the C2 or risk the loss of a node in the distribution. Our research problem is to accurately identify and cluster domains that originate from known DGA-based techniques where we target to develop a security approach that autonomously mitigates network communications to unknown threats in a sequence.

2.2. Existing System

Threat models: Multiple conditions for a DGA to function in a network environment where filtering results in a firewall that protects the communication and an empty cell in an Internet domain that results in NXDOMAIN error. Each HMM date record represents a series of domain observations. First a sequence of domain name are processed by a feature extractor and each of these feature vectors is used as a training record. Then, similar sequences are clustered as a group of DGA domain names with certain outcomes. After the training process, if a sequence does not have an HMM sequence representation (or it is not presented in the training data but the test data), the HMM model then generates the future predicted results. Otherwise, we will use an existing HMM sequence presentation.

2.3. Disadvantages of Existing System

- 1. Firewall protects the communication and an empty cell in an internet domain that results in no domain error.
- 2. Queries not matching the knowledge are stored in a backlog of the software.

2.4. Proposed System

In our proposed system, Domains extracted from DGAs. Machine learning framework that encompasses multiple feature extraction techniques and the models to classify the DGA domains from normal domains, cluster the DGA domains, and predict a DGA domain. A deep learning model to handle large datasets. Multiple on- line sources from simple Google searching provide example codes for a DGA construction. Online threat intelligence feeds give an approach to examining current and live threats in real-world environment. Using real-time active malicious domains derived from DGAs on the public Internet measures the accuracy of the proposed approach. The structure of the data is presented in a CSV format of domain names, originating malware, and DGA membership with the daily file size of approximate 110MB. We propose a machine learning framework that consists of three important steps, as shown in Figure below. We first have the DNS queries with the payload as the input



Figure 1.

2.5. Advantages of Proposed System

- 1. Domain Generation Algorithm (DGA), which allows malware to generate numerous domain names until it finds its corresponding C&C server.
- 2. It is highly resilient to detection systems and reverse engineering, while allowing the C&C server to have several redundant domain names.

III. METHODOLOGY

This project we will develop using python and web technology.

3.1. Filtering packet data

To filter packet data, we are using pyshark which captures network packets.

We will store this packet information in pcap format

By reading packet we will filter the data and obtain domain name.

Packet flow also obtained from this.

If domain name extracted in this found in blacklist, we will stop further steps.

3.2. Feature extraction work

With the python coding we will calculate the following feature

- Length- length of domain name.
- MeaningfulWord Ratio,:- dictionary will be maintained of meaningful word and output will be taken by dividing with length of domain name
- PercentageofNumericalCharacters,:- numeric character involved in domain name system.
- Pronounceability Score—frequency of text in domain calculated.
- Percentage of the Length of the Longest Meaningful String (LMS): dividing the the meaningful word with the length of domain.
- Levenshtein Edit Distance: It measures the minimum number of single-character edits between a current domain and its previous domain in a stream of DNS queries received by the server. The Levenshtein distance is calculated based on a domain and its predecessor

3.3. Machine learning classification

Following algorithms will be applied on feature obtained above.

- Decision tree: -
- It calculates entropy and information gain and output generated but has problem of overfitting. We will generate module with the selected feature.
- ANN: it's a Artificial neural network
- Here we give input layer, hidden layer and output layer. then with the feature we calculate output.
- SVM: support vector machine
- It's a good binary classifier. we will train with feature and model will be generated.
- We are using sk learn python library
- Multiple Logistic regression: -the logistic model (or logit model) is used to model the probability of a certain class or event existing such as pass/fail, win/lose, alive/dead or healthy/sick.
- Naive Bayes: it calculates probability of occurring certain class. Model will be generated using pickle and stored
- Random forest: Random forest avoids overfitting problem and model will be generated, stored into pickle.

All this machine learning model will be generated and its

- o precision
- o recall

- o f1 score
- Accuracy will be calculated.

3.4. Clustering

Dbscan used for outliers' detection

Outliers are specific entries in dataset that are different than other point and don't play vital role in classification.

In statistics, an outlier is an observation point that is distant from other observations.

In this domain name will be clustered based on

1)Cryptolocker eg. nxgbdtnvrfker.ru

2)TOVAR e.g.: - gppwkpxyremp.net

3)Dyre eg: - q2aa41a5b31294e5e6f28d1adcf48a54b.tk

4)normalDomain eg:- easypdfcombine.com

3.5. Time series prediction

We use every domain cluster to train a separate HMM model

Each HMM data record represents a series of domain observations. First, a sequence of domain names are processed by a feature extractor and each of these feature vectors is used as a training record. Then, similar sequences are clustered as a group of DGA domain names with certain outcomes. After the training process, if a sequence does not have an HMM sequence representation (or it is not presented in the training data but the test data), the HMM model then generates the future predicted results

Once the model has been trained, a set of features is formed by a series of DGA domains. Then, we go to the prediction stage. In this stage, we produce a complete time-series list of domain features from a domain name to be synthesized. For the input of Realtime domains, we compare the predicted features with the features extracted from the observed new domain query.

3.6. Hardware and Software Requirement Hardware:

Hardware:

- 1. Processor: Intel Core i3 or more.
- 2. RAM: 4GB or more.
- 3. Hard disk: 250 GB or more.

Software:

- 1. Operating System: Windows 10, 7, 8.
- 2. Python.
- 3. Anaconda.
- 4. Spyder, Jupyter notebook, Flask.
- 5. MYSQL.

Technologies Used

Python

Python is an interpreted, object-oriented, high-level programming language with dynamic semantics. Its high-level built-in data structures, combined with dynamic typing and dynamic binding, make it very attractive for Rapid Application Development, as well as for use as a scripting or glue language to connect existing components together. Python's simple, easy to learn syntax emphasizes readability and therefore reduces the cost of program maintenance. Python supports modules and packages, which encourages program modularity and code reuse. The Python interpreter and the extensive standard library are available in source or binary form without charge for all major platforms, and can be freely distributed.

Often, programmers fall in love with Python because of the increased productivity it provides. Since there is no compilation step, the edit-test-debug cycle is incredibly fast. Debugging Python programs is easy: a bug or bad

input will never cause a segmentation fault. Instead, when the interpreter discovers an error, it raises an exception. When the program doesn't catch the exception, the interpreter prints a stack trace. A source level debugger allows inspection of local and global variables, evaluation of arbitrary expressions, setting breakpoints, stepping through the code a line at a time, and so on. The debugger is written in Python itself, testifying to Python's introspective power. On the other hand, often the quickest way to debug a program is to add a few print statements to the source: the fast edit-test-debug cycle makes this simple approach very effective.

MySQL

MySQL is well known as world's most widely used open-source database (back-end). It is most supportive database for PHP as PHP-MySQL is most frequently used open-source scripting database pair. The user-interface which WAMP, LAMP and XAMPP servers provide for MySQL is easiest and reduces our work to a large extent.

IV. COMPARITIVE STUDY

4.1. Comparitive study of DBSCAN and OPTICS

With the data provided today, recent advances in computational analysis have led to various economic strategies for extracting compelling models from huge databases. It plays an important role in data discovery by analyzing a large amount of information from multiple sources and synthesizing it into useful data. It can be used to analyze the amount of information in various fields such as sales, healthcare, science and technology. Cluster analysis is a widely used method to monitor trends in information volume. In this article, we want to evaluate the performance of various clustering methods such K-Means, DBSCAN, and OPTICS in terms of accuracy, outlier's formation, and likelihood of cluster size. Finding a cluster for different max radius values in which OPTICS is an extended version of DBSCAN. DBSCAN has many skills like it has an ability to detect the shape and outlier of cluster and handle the outliers. Also, it faster in clustering than OPTICS.

DBSCAN is incredibly sensitive to clump parameters: "MinPts" (minimum variety of objects) and radius " ε ", it fails to spot clusters properly if the density varies and if the dataset contains a giant dispersion, whereas in OPTICS the amendment in parameters has no major impact on the detection and classification. The key plan of DBSCAN is additionally applied in OPTICS whereby for every object of a cluster, the neighborhood of a given radius (ε) has got to contain a minimum of a minimum variety of objects (MinPts). DBSCAN can handle discrete data type where OPTICS can handle numeric data. The rule clusters regions with a sufficiently high density and detects clusters at random in noisy spatial databases. Defines a group as an outline set of points connected by density. A density-based group can be a set of closely related objects that are out of range density. Any object that is not in a cluster is considered noise. This methodology is sensitive to its parameters e and MinPts and leaves the responsibility to the user to select the values of the parameters that can cause the invention of acceptable clusters. If a spatial index is used, the quality of the DBSCAN method is O (nlogn), where n is the variety of information objects; otherwise, it is O (n2). DBSCAN can handle low dimensional data only so that speed of clustering get increase. Where OPTICS can handle high dimensional data. DBSCAN can also handle noise. But can't handle different size of clusters. In optics there is no need of inputs for clustering. But optics can handle clusters of different densities.

4.2. Comparitive study of CNN and SVM

Convolutional neural network (CNN) may be a feed forward neural network this can be usually wont to analysis visible photos through processing data with grid like topology. A CNN is likewise referred to as a "ConvNet". A Convolutional Neural Network (CNN) is a Deep Learning set of rules that might take in an input image, assign importance (learnable weights) to varied things within the image and have the flexibility to differentiate one from the various. The pre-processing needed during a CNN may be a good deal decrease compared to completely different category algorithms. Convolutional (Smiling Face) Feature Detector/Filter/Kernel: It extracts a couple of functions from our image, outlets in separate 2nd array and compress the image. A pooling layer is each alternative constructing block of a CNN. this can be basically a feature that reduces the pixels of "Feature Map" and alternate in Pooled Feature Map, Common approach is max Pooling. Flattening is dynamical the facts right into a 1-dimensional array for inputting it to the subsequent layer. we flatten the output of the convolutional layers to form one long characteristic vector. And it's associated with the ultimate classification model, that is called a fully- connected layer

SVM is a progressive classification and regression algorithmic application. The SVM development method maximizes prophetic accuracy while automatically keeping off over-fitting the training data. SVM comes the input file right into a kernel space. Then it builds a linear version in the course of this kernel space. SVM

performs properly with globe packages like classifying text, recognizing hand-written characters, classifying pictures, further as bioinformatics and bio collection analysis. SVM are the first-class equipment for machine learning and statistics processing. sturdy theoretical foundation (Vapnik-Chervonenkis theory). there may be no better restrict on the number of attributes; totally constraint is that the hardware. practical generalization to novel statistics. SVM is that the maximum properly-preferred rule for disbursed statistics. rule of choice for tough high-dimensional statistics. SVM helps active learning. – SVM models develop due to the fact the scale of the education set will increase, big statistics units might be difficult to handle. Active learning forces the SVM algorithmic program to restrict learning to the most informative training examples. SVM routinely selects a kernel. you will be capable of manipulate the model quality (accuracy) and consequently the performance (construct time)

CNN works on 2 frameworks that are THEANO and TORCH where SVM has scikit learn framework. In THEANO CNN can decoding alterations and features where extracted at last pooling layer. In TORCH framework also CNN can extract last pooling layers but the parameters are rectifier unit design, batch normalization, layer modelling, random affine transformation. In SVM scikit learn framework can convert Gray Scale conversion to reduce the image data to model functionality. SVM can clustering is used by fuzzy c-mean. We should definitely use CNN for sequence information, but they shine in getting to via extensive amount of image and finding non-linear correlations. SVM are margin classifier and assist definitely one-of-a-kind kernels to carry out those classification. anyplace SVM go through is predicting the class labels as soon as the size of the class labels is large. Also, it's hard to put SVM but the CNN layout inherently assist parallelization.

V. FUTURE WORK

In future it is intended to improve the system peroformance on the based-on dataset. Also use new techniques to get accurate result.

VI. CONCLUSION

Detecting DGAs is a difficult task in the security field. Blacklisting is useful when dealing with static methods. DGAs, on the other hand, are commonly utilised by attackers to communicate with a number of services. Because they are dynamic, merely utilising blacklisting to detect a DGA is insufficient. In this study, we offered a machine learning framework for dealing with DGA threats, as well as the construction of a deep learning model. A dynamic blacklist, a feature extractor, a two-level machine learning model for classification and clustering, and a prediction model make up the proposed machine learning system. Over the course of a year, we gathered a real-time threat intelligence feed that included all domains and current threats on the Internet.

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BLOCKCHAIN BASED CROWDFUNDING AND BLOODDONATION MANAGEMENT WITH BED AVAILABILITY

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ABSTRACT

Due to covid crisis everybody was suffering from 3 major problems i.e., financial aid, blood/plasma donor, bed availability at hospitals. Financial aid can be provided through crowdfunding. Crowdfunding are made on paper that isn't the least bit safe as they might be duplicated or forgery may be done. Even if the agreements are digital, they may be hacked if no security surrounds them. For blood, hospitals are directly dependent on blood banks. That's why use this web application. This web-application provides threefeatures Crowdfunding through blockchain, Hospital bed availability and blood donation system without being dependent on blood bank. The Crowdfunding part is done through smart contracts with the funding amount being in the smart contract. In hospital bed availability hospitals can register themselves and fill in the details and regularly updateinformation regarding available beds . In Blood Donation hospitals can send notification to the people of required bloodtype in a particular region given those people are registered on the blood donation system part of the web application

Keywords—component, formatting, style, styling, insert (key words)

I. INTRODUCTION

Crowdfunding is a way of raising funds for a project or venture by raising small amounts of money from a large number of investors, mostly via the internet. Before Crowdfunding was started people would have to struggle a lot to get funding for their start-ups. It was difficult for people to gather and convince investors to invest in their ideas. But now there is no need for such a struggle as many Crowdfunding platforms have evolved, which are helping a lot of people in acquiring required funding thereby making their dreams cometrue. Crowdfunding is a very effective way to raise funding for your new innovative ideas and implement them. It is a setup where you specify your goals, the amount you want to raise, and the deadline to reach them. If you miss the goal the donations are returned to the donors. The existing platforms take a percentage cut from every donation made as to their profit and we also heavily dependent upon a third party to connect with the donors, but these platforms also have a risk of scams. In recent years many frauds have taken place where millions were stolen. People can create a fake campaign and raise money. All these investors' money is being stolen. With a decentralized setup, we can have a trust less platform usingBlockchain, and therefore the only fees everyone will have to

pay are just the gas fees. With the help of smart contracts, the risk of scams is also eliminated as the amount funded is stored in the contract and only given to the campaigner when approved by the investor. In Traditional Crowdfunding Techniques any technologies were used but here use of blockchain technology is the central idea.

In this web application hospital will be able to register themselves, provide data about the hospital, available beds etc. And update the same. Users will be able to see the bed availability in the particular hospital they desire and contact the hospital to book the bed. Hospitals when in need of blood will be able to directly notify the registered users of that particular blood group in a particular region and the users will be able to contact the hospital if they wish to donate the blood.

II. MOTIVATION

Due to covid crisis people suffered from 3 major problems i.e. financial aid, finding availability of beds at hospital and blood/plasma donors. So we have came up with a solution where major problems can be reduced to some extent. Peoplehad to visit different platforms for help. Due to no decentralization people are afraid if their donation goes to theright hands and the organization managing the donations take a major cut as commission fees so we are building decentralized blockchain bases crowd funding platform so that there is complete transparency of the transactions.

III. LITERATURE SURVEY

Saadat, M.N., Abdul Halim, S., Osman, H., Mohammad Nassr, R., & F. Zuhairi, M. (2019). Blockchain based crowdfunding systems. Indonesian Journal of Electrical Engineering and Computer Science. In this paper the authorspresented the idea of using Blockchain Technology for crowdfunding. They pointed out the faults in the traditional crowdfunding platforms which have lack of security and campaigns are not regulated with a central

authority being incharge of everything they most likely lead to fraud and loss of money of the contributors .They presented the idea of using smart contracts for transactions .

Baber, H. (2019). Blockchain-Based Crowdfunding: A 'Pay-it Forward 'Model of whirl. In this paper the author describes crowdfunding as something which has revolutionized the way of raising funds for the start-ups and also for existing or traditional businesses. Crowdfunding has made fund raising easy as people don't have to go door to door asking for funds.

Consortium, I., & Josse, J. (2020). ICU Bed Availability Monitoring and analysis in the Grand Est region of France during the COVID-19 epidemic. *medRxiv*. In this paper the authors explains the use of ICUBAM (ICU BED AVAILABILITY MONITOR) a tool as the name suggest is used to monitor the availability of ICU beds. In this paper they explain the process in which they directly interact with intensivists twice a day by sending a SMS with a web link to INCUBAM form where they enter the number of free and occupied Beds of different categories.



IV. PROBLEM DEFINATION

Traditional crowdfunding platforms are monitored by single authority leading to a biased judgement if any issue shall arise. There is a lack of transparency in these platforms which usually is a risk to contribute to .Also the platforms cut a huge chunk out of transactions as commission which is costly in case of small transactions. Hence there is a need for decentralized platform where no single being is in charge and every contributor can view transactions.

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V. SYSTEM ARCHITECTURE

In our application, the user will be able to donate for funds, check bed availability at hospitals and hospitals can connect directly with the donors.

STEP 1: People who are willing to donate must have a meta mask account for donating, hospital admins needs to register into their section, then they will be able to log in withappropriate user-id and password. People willing to donate blood/plasma should register in the blood donation section.

STEP 2: If the donor has a meta mask wallet he/she is ready to donate.

STEP 3: After successful registration of hospital admin, they can update/edit/delete information.

STEP 4: After the registration of donors(blood/plasma), hospital admins will get in contact with the matching donors.

STEP 5: Users who want to get to know about the availability of bed, don't have to register they can view the availability without logging in.

VI. RESULTS

Make a web application with three feature involving crowdfunding, hospital bed availability and blood donation system. Providing the crowdfunding feature with absolute transparency. Making sure that users can view bed availability in desired hospitals without logging themselves. MakingHospitals independent from Blood Banks by connecting donors directly to the hospitals.

VII. CONCLUSION

The We have built a web application which has features of Crowdfunding, Hospital Bed Availability and Blood Donation. More research and work will be needed for the improvement and betterment of web application.

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FLOOD PREDICTION AND MODELLING USING BAGGING CLASSIFIER AND ANN

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ABSTRACT

Changing patterns and behaviors of river levels that may lead to flooding is an exciting and effective research area. They are designed to reduce the economic and social impacts of floods. Non-linear (NARX) and Support Vector Machine (SVM) machine learning algorithms are suitable for predicting changes in river water levels, thereby increasing the potential for flooding. These two algorithms use the same hydrological variables as well as flood resources such as rainfall, river inflows, high eruptions, seasonal flow, flood frequency, and other related flood prediction variables. In the flood forecast process, water level is a very important part of hydrological research.

Predicting using machine learning algorithms works well because of their ability to process data from various sources and isolate and reverted to flood and flood classes. This paper provides insight into the nature of the two algorithms depending on the level of flooding.

Keywords: flood, prediction, time series, NARX, SVM, Testing, Logistic Regression,

INTRODUCTION

Floods can cause human casualties as a result of significant socio-economic impacts, for example in coastal and inland areas affected by heavy monsoons. (Chapi et al., 2015; Komi et al., 2017; Minh et al., 2018; **** et al., 2014). Flash floods are more dangerous depending on their potential for flood areas without warning. Rapid flood erosion and landslides can cause sudden morphological changes in the area (Wan Tu et al., 2016). Floods affect the land environment by transporting chemicals and other hazardous industrial waste, contaminating surface and groundwater as well as farmland.

Over the past two decades, the frequency of floods worldwide has increased by more than 40% (Hirabayashi et al., 2013). In fact, between 1995 and 2015, nearly 109 million people were affected by floods; With a loss of US \$ 75 billion per year

Physical models have long been used to predict aquatic events such as cyclones, precipitation / shallow water conditions, shallow water conditions, hydraulic patterns of currents, and more global circulation phenomena, including weather, oceans and floods. Coupled effects. Although physical models have shown great capabilities for predicting diverse range of flood scenarios, they often require a wide variety of hydro-geomorphological monitoring datasets, requiring intensive calculation, which limits short-term forecasting. Furthermore, as noted in the reference, the development of physics-based models often requires in-depth knowledge and expertise on hydrological parameters, which has been described as highly challenging. In addition, several studies have shown that there is a difference in the short-term estimation capabilities of physical models (Costable and Macion). For example, in many cases such models fail to assess correctly. Van den Honnert and McNani recorded the failure of the 2010 flood forecast in Queensland, Australia. Similarly, numerical estimation models have been reported in the progress of critical calculations and are not reliable due to systematic errors. However, major improvements have recently been reported to the hybridization of models, as well as to physically oriented models of flooding through advanced flow simulations. Floods are one of the most devastating natural disasters and are extremely complex to model. Contributed to research on the progress of flood assessment models, risk mitigation, policy recommendations, and mitigation of human casualties and property associated with floods. Over the past two decades machine learning (ML) methods have greatly contributed to the advancement of prediction systems that mimic the complex mathematical expressions of flood physical processes, providing better performance and lower cost solutions. Due to the huge advantages and potential of ML, its popularity among hydrologists has increased dramatically. The researchers aim to introduce innovative ML methods and find more accurate and effective estimation models through hybridization of existing methods.

The principle contribution of this paper is to demonstrate the state of the artwork of ML models in flood prediction and to present perception into the maximum suitable models. on this paper, the literature wherein ML models had been benchmarked thru a qualitative evaluation of robustness, accuracy, effectiveness, and velocity are mainly investigated to provide an intensive evaluate on the numerous ML algorithms used inside the area. The overall performance evaluation of ML fashions offers an in- intensity understanding of the specific techniques in the framework of a complete evaluation and dialogue. As a end result, this paper introduces the maximum promising prediction methods for each long-time period and short-time period floods. furthermore,

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the primary traits in enhancing the exceptional of the flood prediction fashions are investigated, amongst them, hybridization, records decomposition, algorithm ensemble, and version optimization are reported as the handiest techniques for the development of ML methods. This survey may be used as a guiding principle for hydrologists as well as weather scientists in selecting the proper ML technique in keeping with the prediction undertaking. In addition to numerical and bodily models, records- pushed models additionally have a long lifestyle in flood modeling, which these days won greater recognition. information-pushed methods of prediction assimilate the measured weather indices and hydrometeorological parameters to offer higher insight. amongst them, statistical models of autoregressive moving average (ARMA), more than one linear regression (MLR), and autoregressive integrated moving average (ARIMA) are the maximum commonplace flood frequency evaluation (FFA) methods for modeling flood prediction. FFA was among the early statistical methods for predicting floods. Regional flood frequency analysis (RFFA) has been reported to be more efficient than the physical model when considering more advanced version, calculation cost and generalization. Floods can be considered random processes and can be estimated using some probability distribution from historical flow data. For example, climatological averaging method (CLIM), empirical orthogonal function (EOF), multiple linear regression (MLR), quantile regression techniques (ORT) and Bayesian forecasting models are widely used to predict large floods. However, they have been described as inappropriate for short-term estimation and in this case, they require major improvements due to lack of accuracy, complexity of use, cost of calculation and rigidity of the method. Furthermore, for a reliable long-term estimate, at least a decade of data from the measurement gauge must be analyzed for meaningful reference. However, in the absence of such datasets, FFA can be managed using hydrological models of RFFAs, e.g., MISBA and Sacramento, as reliable empirical methods with field applications where measurements in the stream are not available. In this case, distributed numerical models can be used as an attractive solution. However, they do not provide quantitative flood forecasting and their forecast skill level is "moderate" and lacks accuracy.



Fig. Forecasting Model for Flood Prediction

Literature Survey

Table 1: Flood Prediction Relevant Work

Sr. No	Reference	Aim of study	Finding of Study
1	1	This report presents a flooding forecast process by applying SVM. Authors investigated the 2- year knowledge based on 2005 and 2006. A total of 7 critical lake floods that happened in the downtown of Chiang Mai, Thailand was used as data. SVM was used for function approximation and the regression.	This study reveals that SVM a E-intensive loss function is able to perform more accurately as compared to MLP models. Moreover, the outcome from the blind test sets illustrates that the SVM can be used for the forecasting of flooding events. The planned SVM forecast types may also be applied in a real-world flooding caution system of commercially available data.
2	2	This study also aimed at the forecast of flood using SVM. The area under study was Bird Creek, USA catchment areas for training. And the unseen data for testing and model calibration. Rainfall and river flow were derived from 12 rain gauges situated in/ near the catchment area. The	A comparison with some benchmarking prediction algorithms was made i.e., Transfer functions, Trends and Naïve models. It illustrates SVM has the capacity to outperform them all in the time data series, at the expense of a large number of

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		study took in account the number of parameters to the kernel function optimization.	time and effort. This report also suggests linear and nonlinear kernel features (i.e. RBF) may provide remarkable activities against one another for various conditions in the exact same catchment.
			result in the SVM reaction to various rainfall inputs, wherever light rainfalls could create completely different
3	3	The aim of study was to predict flood in Dhaka, Bangladesh data to establish forecasting capabilities of SVM and	The comparison of ANN with SVM to predict flood
		compare them with ANN performance	yielded interesting results. Due to non- regularization and non- optimization requirements SVM proved a robust methodology. For a 7-day lead forecasting SVM was close to ANN in case of testing and verification results.
			However, values of SVM were marginally better than of ANN. The
			author attributes this as structural risk minimization ability of SVM
4	4	The aim of this study was better attribute selection, and discharge level estimation of Rawal Lake, Islamabad. SVM was one of the comparing algorithms for above mentioned study.	12 years" data was streamlined for attribute selection. Different classification models were used to determine the best selected attributes level and capacity of the Dam. J48 Tree produced the best results in this regard. The Forecasting methods to predict the discharge time were SVM, ANN (MLP), RBF and ARIMA. The results showed that SMOreg forecast model an improved version of SVM generated better results than its counterparts.

Table 2: Comparative analysis of single ML models for the prediction of short-term models

Modelling	Complexity of	Input
Technique	Algorithm	Dataset
ANN	High	Historical
BPANN	Fairly High	Historical
MLP	Fairly High	Historical
ELM	Fair	Historical
CART	Fair	Historical
SVM	Fairly High	Historical
ANFIS	Fair	Historical

PROJECT ARCHITECTURE

Problem Statement

Flood Prediction & modelling using various machine learning approach & comparative study of these approaches. Also implement different to get best accuracy of predicted data.

Existing System

There are many models and system were made previously. Some are based on short term or long term. Few were used same algorithms with different modification. Most of models are based on Sensor based prediction or Data refer prediction which works on simple algorithm. But all the existing systems model give only past or current situation report only.

Instant Predict: Most of the model can't do prediction instantly as they need to check each data in step wise manner.

Future Prediction by Self Training: As Most of model work on current Scenario, we can't actually predict upcoming Situation.

Some Model predict the future Situation using different Machine Learning but most of work using sensor-based mechanism. So again, same case that they can't predict situation of more than a week as it depends on the flow of water in the river. And few models work on long term they predict floods on annual based.

Disadvantages of Existing System

We need to provide data-set from various each time to predict.

We need to wait for the prediction.

No Proper alerting System during the disaster event.

no user choice-based prediction.

Proposed System

Our System works on machine learning to predict flood using Logistic Regression Classifier. This system uses two approaches to predict the floods.

Fetch the data-set from proper source to train the model.

The train model use svm, ltsme, and L-R Classifier algorithm to run and predict the Floods.

The GUI of this project is user friendly it can give options to user to select the prediction time phase. User can choose time-phase like hourly, daily, quarterly prediction.

The below fig. shows the flow chart of our model. We have also made a comparative phase for different algorithms to predict the flood and show the accuracy. All the predicted accuracy then gets into average to give the best prediction of flood.

The Data-set are saved in csv format and also all the data which are scrapped from sites are save in different csv file like extreme, normalize, etc.

All output of predicted flood also gets save in csv format to use those data for model training. We have also implemented a GUI-based graph plot in which we can demonstrate the resultant output and also comparison with the previous result.

We also implemented in the scrapping mode to get data in countries, state or city format.

Our System works almost on all Water zone like heavy rainfall, river flood, coastal region flood, etc.

This system is easy to use and predicted floods very instant of time in comparison of previous model.


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Fig. Flowchart of Proposed Model Advantages of Proposed System

We have implemented an automated technique to get or fetch data from different source of government records.

We have made a UI based on user choice to predict floods of any respective times like: hourly, daily, monthly, quarterly, annually.

METHODOLOGY

This survey identifies cutting-edge ML methods for flood prediction, where peer-reviewed articles are explored in top-level subject areas. In articles identified by search queries using a search strategy, performance evaluation is given priority and a comparison of ML methods to be included in the review to identify the ML methods that work best in specific applications. Additionally, to select an article, four types of quality criteria were considered for each article, namely, Source Generalized Effects for paper (SNIP), Site Score, SC Imago Journal Rank (SJR) and H-Index. The papers were reviewed in terms of flood resource variables, ML methods, prediction types and results obtained.

Fig. Hierarchical Step to Study Methodology

Applications in flood forecasting are classified according to flood resource variables, i.e., water level, river flood, soil moisture, rain-discharge, precipitation, river flow, maximum flow, river flow, rain-flow, flash flood, precipitation, runoff flow, seasonal flow. Flood maximum discharge, urban flood, plain flood, groundwater level, precipitation phase, flood frequency analysis, flood magnitude, surge level, high flow, storm surge, typhoon rainfall and daily flow. Among these major influential flood resource variables, spatial testing of rainfall and water cycle plays a very important role in runoff and flood modeling. That is why quantitative precipitation estimates for avalanches, mudslides, and ice melting have traditionally been used for flood forecasting, especially in the event of flash floods or short-term flood forecasting. However, rainfall forecasting has been shown to be inadequate for accurate flood forecasting. For example, in the long- term flood forecast scenario, the flow estimate is based on rainfall as well as soil moisture estimates in the catchment area. Although high-resolution rainfall forecasting is required, other flood source variables are considered. Thus, the methodology of this literature review aims to include the most effective flood resource variables in search queries.

It is possible to be mapped to a virtual-world problem function. It requires input information, mapping process and output. It is the basis for supervised machine learning in Artificial Intelligence (AI). The learning algorithm is trained in a function

(s) used to evaluate outputs or labels based on the inputs or features provided. Training is provided with the right labels, so the algorithm adjusts itself with the tuning of the most important hyperparameters in controlling behavior and making the right assessment. Training stops when an acceptable level of performance is achieved. Therefore, supervised machine learning (a mixture of labeled and unlabeled data) has been used to detect and predict flooding in a variety of ways. In a broader sense, supervised machine learning is divided into two categories: classification and regression.

Classification modelling

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The response vector classification or taxonomy when each training example is labeled is related to learning problems. The taxonomy algorithm groups data into classes based on the learned mechanism.

Regression modelling

For comparison, the regression model seeks to find the relationship between the input vector X and the continuous output variable Y: ([X, Y]), which attempts to estimate the value of the response variable Y with the aim of reducing the damage function. Makes: Lower Square Errors (L2) and Mean Squared Errors (MSE). The regression function is built for m: () * + estimate and can be minimized with the help of loss function as follows:

 $E\{[Y-f(x)^{2}]\} = E\{[Y-f(x)]^{2}\} + \int [f(x)-m(x)]^{2}$

Px(dx)

M predictor with L2 risk reduction factor: officially used for regression analysis [12]. Two algorithms (SVM and NARX) with supervised learning method are further explained in this paper. SVM is mainly used in taxonomy practice and uses the NARX regression approach.

Muskingum model

The Muskingum model is one of the maximums broadly used methods for flood routing prediction. The Muskingum version contains four parameters that need to be determined for correct flood routing. in this context, an optimization technique that self- searches for the greatest values of these 4 parameters might enhance the traditional Muskingum model. in this look at, a hybrid of the bat set of rules (BA) and the particle swarm optimization (PSO) set of rules, i.e., the hybrid bat-swarm algorithm (HBSA), changed into developed for the finest willpower of these 4 parameters. information for the three unique case studies from the United States and the UK have been applied to study the suitability of the proposed HBSA for flood routing. Comparative analyses based on the sum of squared deviations (SSD), sum of absolute deviations (unhappy), blunders of height discharge, and blunders of time to peak confirmed that the proposed HBSA primarily based at the Muskingum model done superb flood routing accuracy in comparison to that of other methods even as requiring less computational time.

IV1. Short Term Flood Prediction

Short-term lead-time flood forecasts are considered important research challenges, especially in highly urbanized areas, to provide timely warnings to habitats to reduce damage. In addition, short-term forecasts can greatly contribute to water resource management. Despite recent improvements in numerical weather forecasting (NWP) models, artificial intelligence (AI) methods, and ML, short- term forecasting remains a challenging task. This section is divided into two subdivisions - single and hybrid methods of ML - to examine each group method individually.



Fig. Expansion of Short term & Long Term

IV1.1 Short-Term Flood Prediction Using Single ML Methods

To gain insight into the performance of ML methods, a comprehensive comparison of the examined ML methods is required. Table 1 captures the main ML methods, i.e., non-linear autoregressive networks with ANN, MLP, Exogenous Input (NARX), M5 Model Tree, DT, CART, SVR and RF, following a wide range of single ML methods. There is a performance comparison. In short-term flood forecasting. A review and discussion of these methods will follow to identify the most appropriate methods presented in the literature.

Table: 3 Short tern	n prediction	using ML	methods
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Modelling Technique	Flood Resource Variable	Prediction Type	Region
ANN vs Statistical	Streamflow and Flashflood	Hourly	USA
ANN vs Traditional	Water and surge Level	Hourly	Japan
ANN vs FFANN	Water level	Hourly	India

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ANN vs M5	Peak flow	Hourly	India
Model tree			
MLP vs MLR	River flow and Rainfall	Daily	Algeria
MLP vs	River Runoff	Hourly	Morocco
MLR			
RF vs SVM	Rainfall	Hourly	Taiwan



Fig. Machine Learning Algorithms Comparison.

COMPARATIVE STUDY

SVM MODEL: Hurst et al. Support vector (SV) proposed and classified as a non-linear search algorithm using statistical learning theory. Later, SVMs were introduced as a class of SVs that were used to reduce the overfitting and expected error of learning machines. SVM is very popular in flood modeling; It is a supervised learning machine based on the Statistical Learning Principle and Structural Risk Reduction Rule. SVM's training algorithm creates models that offer new probabilistic binary linear classifications, which reduce the empirical classification error and increase the geometric margins by inverse problem solving. SVM is used to estimate time size based on training from previous data. Over the past two decades, SVM support has also expanded into a regression tool called vector regression.

Wavelet Neural Network (WNN) MODEL: Wavelet Transform (WT) is a mathematical tool used to gather information from different data sources by analyzing local variations over a time series. In fact, WT has a significant positive impact on modeling performance. Wavelet Transform supports reliable decay of the original time series to improve data quality.

Estimation accuracy is improved by discrete WT (DWT), which splits the actual data into bands, thereby improving flood prediction. DWT breaks down initial data into different resolution levels to collect better quality data for model building. DWTs, due to their beneficial properties, are widely used in flood time-range estimation. In a flood model, DWT is widely applied, for example, rain-flow, daily flow, and reservoir flow. In addition, hybrid models of DWT, for example, wave-based neural networks (WNN) that combine WT and FFNN, and wave- based regression models that integrate WT and multiple linear regression (MLR) have been used over time. Estimates. Floods.





Ensemble Prediction Systems (EPSs) Model: Several ML modeling options are provided for flood modeling with a strong background. Thus, there is an evolving strategy to switch from a single model prediction to a set of models suitable for a specific application, price and dataset. The ML ensemble has a limited set of alternative models, which usually allows more flexibility than alternatives. Collective ML methods in flood forecasting has a long tradition. In recent years, ensemble prediction systems (EPS) have been proposed as effective assessment systems to provide a set of N references. In EPS, n is the number of independent realizations of the model

probability distribution. EPS models typically use multiple ML algorithms to provide high performance using an automated evaluation and waiting system.

Such a waiting process is performed to expedite the performance evaluation process. The purpose of EPS is the timely and automated management and performance evaluation of aggregate algorithms.

Therefore, EPS performance for flood modeling can be improved. EPS can use many fast-learning or statistical algorithms as classification teams, e.g., ANN, MLP, DT, Rotation Forest (RF) bootstrap and boosting, allowing high accuracy and rigidity. Based on the estimated rate used at the event, a collective assessment system can then be used to measure flood probability.

Training and Validating Models

Certification standards were applied to check the accuracy and assessment effect of each built model in both the training and test components. The results show that the NB model outperformed the NBT in terms of training phase ACC (96.8%), Kappa (0.95), low RMSE (0.115) and MAE (0.12). Both NB and NBT models were evaluated during the testing phase and the results obtained were similar to those in the training phase. The predictive efficiency of the NB model is higher than the NBT mode and the comparison of the Kappa index results shows an almost exact agreement between the estimated and actual (observations) in the training and test stages. Applied to all models, the ROC curve method outperformed the NBT model (AUC = 0.984), NB (AUC = 0.979), SAW (AUC = 0.97), TOPSIS (AUC

= 0.968), and Vicor (AUC) = 0.965. Does. In the verification phase. Although all models provided equally appropriate results, the NB model performed better than the rest in terms of the expected effect (AUC = 0.98). The NB models were followed by NBT (AUC = 0.97), SAW and VIKOR (AUC = 0.96) and TOPSIS (AUC = 0.95).

CONCLUSION

We believe that this system is going to help a lot of people as well as the govt in predicting the disaster and also in reducing its impact on general people.

Every year people won't have to suffer the same, and hence we'll be able to make society a little better with this.

FUTURE SCOPE

We will modify or system in an android system and allow various user to check the situation with the help of this. We will also implement IMS (instant messaging system) to alert people in the specific area or region. We will also research on various different methods to get more accuracy. We will also modify our system and implement various to predict other disaster like tsunami, earthquake, etc.

ACKNOWLEDGENENT

This Research paper includes various comparative study to proposed the updated model. All Schemas and algorithm which are used in this project are mentioned with their author's name. We have Referred various papers and analyze their models to build our model and all researcher data and their model mentioned properly. We Have also made it open for other people and researcher to provide feedback and they can use our model to proposed more better models for this disaster event.

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ONLINE QUIZ EXAMINATION WITHAUTOMATIC SUPERVISOR

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ABSTRACT

In times like COVID-19 where exams are taken onlineit is important to check if students are cheating or not. The paper focuses on a web app which allows teachers to create exams and student to attempt and an auto proctor system which will detect is correct student is giving exam and reports if student performs any malpractice. Auto proctor systems are basically application of face detection and to build it we will useYOLOv5.

Keywords: Yolov5, Auto Proctor System

I. INTRODUCTION

Exams are the important factor to decide student's yearly/term performance but in scenarios like COVID-19 where online exams became new normal it becomes easy for students to copy and pass exams. It is not possible for teachers to keep check on each andevery student while supervising online exam through zoom or meet calls. There are auto proctored systems to check if student is doing any malpractice or not but they fail to detect if correct student is appearing for the exam and to detect if the student is looking in front of screen or not so we need a robust auto proctor systemwhich can reduce the malpractice.

II. MOTIVATION

In current scenario it becomes easy for students to copy in online exam when teachers are told to supervise (e.g. Zoom or Google meet). In current autoproctor system it is not possible to if correct student is giving exam so it becomes important to have robust Auto Proctor System which can detect that if student is paying attention to the screen and if student doesn'tlooks at screen report it as malpractice.

III. LITERATURE REVIEW

"Face Detection and Tracking Using OpenCV, Rishi Kumar, Kruti Goyal, Kartikey Agarwal, 2017" According to paper Haar Cascade is best solution for face detection and tracking and we should use OpenCV for face detection. The drawback is Yolo algorithm has stronger robustness.

"Real-time face detection based on YOLO, Wang Yang, Zheng Jiachuan, 2018", The paper discusses face detection method based on yolo v3 which has shorter detection time and stronger robustness, which can reduce the miss rate and error rate.

"Custom Face Recognition Using YOLO.V3, 1st Suman Menon M, 2nd Anju Geroge, 3rd Aswathy

N, 4th Jaimy James, 2021", In this paper the aim of software is to make a positive identification of a face in a photo or video image against a pre-existing database of faces.

"Alex Kristjan Urosevic - Student authentication framework for Online exams" this paper discusses about accurate authentication methods. Facial as well as voice recognition have been more accurate than other authentication methods. The drawback is people wearing disguises or slightly changing their appearance can throw off facial recognition technology too.

"Kerry Williams (2020), Emerging Technology And The Future Of Online Proctoring" The paper focusses on indicating the reading or use of unauthorized materials, detect additional objects such as phones or people entering the environment, can help to detect and flag potential malpractice to a human proctor

IV. PROBLEM STATEMENT

In times like covid-19 where exams are being taken online we can see it becomes difficult for a teacher tokeep an eye on every student when google meet is used and students pass exam by malpractices so we are making an application where teachers do not need to present live to supervise an exam and AI will supervise.

Problem statement is "To develop an online quizexam web application which can do following tasks: 1- Allow teachers to host exam and students toattempt it.

- 2- To know whether correct student is giving the exam by face recognition.
- 3- Keep a check on students and if they are doing any malpractices take their snapshot as proof. "

V. PROPOSED SYSTEM

We are creating a web app using technologies HTML, CSS, JS, Flask web framework which will help teacher to create the exam and student to attempt the exam and will use Yolov5 algorithm to detect if the student is looking in front of screen or not and a face recognitionlibrary to ensure correct student is giving exam as wellas to check number of faces in front of screen.



Fig 1. System Architecture



Fig 2. RAD Model

RAD model is Rapid Application Development model. It is a type of incremental model. In RAD model the components or functions are developed in parallel as if they were mini projects. The developments are time boxed, delivered and then assembled into a working prototype.

Basically, there will be two modules one is "Face detection AI" and other is "Teachers portal" (Quiz Creation) and we will work parallel on them and later we will develop "student portal" to give exams.

VII. CONCLUSION AND FUTURE WORK

The paper proposes proctored system quiz web application using YOLOv5 algorithm. The application will ensure that correct student will give exam and catch all possible malpractice. The application fails to detect noise and would not be able to differentiatebetween students if they are twins or looking very similar and these can be future topics to research. The accuracy of model is satisfactory.

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VI. METHODOLOGY

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BLOCKCHAIN FOR GOVERNMENT SERVICES

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ABSTRACT

Blockchain is a technology which is evolving day by day and has seen a vast scope of applications possible other than limiting to cryptocurrencies. One of which application could be "Blockchain for Government Services". Here we discuss about one such solution where government can digitalise the whole certification process and people will no longer need to keep hard copies of their birth certificates, domicile certificates, education details etc. In this solution access control facilities for both users to maintain their privacy and government to only grant filling rights to legitimate organizations have been implemented. Given that this project will serve as a prototype for future innovations or applications in the sector and is not a solution which will be adopted as it is by the government.

Keywords-blockchain, ethereum, e-documents

INTRODUCTION

People have some issues regarding management of their important documents (birth certificate, education details, bank account details, etc.) which are used for Identification and authentication by a number of organizations. A lot of this data is stored in different databases by the government which increases data redundancy. Some of these like education certificates are mostly used in the form of hard copy only which has led to people making fraud certificates etc. at times.

Here, in this paper we discuss a solution for this issue using the advancing blockchain technology.

Blockchain can be used to prevent fraud documents. To reduce data redundancy this one platform can be used by all the organizations and government on national level. This system will also allow users to store documents in a systematic manner and would solve the problem of hassles people face when managing documents.

Problem Statement

General public and different organisations/companies need a better and advanced document management system as general public is tired of having to take photocopies of same documents numerous times to submit them to different organisations. Organisations or other companies also fall prey to fraud documents given by public. Our system not only makes this procedure much easier but also provides privacy, security and fraud free solution to users with the help of blockchains and digitalisation.

In this project we aim to create a system where all this information can be stored for each person with an unique ID and by accessing that ID we can get the details and background of that person since birth where all this information will be stored on blockchain.

Blockchain is a system of recording information in a way that makes it difficult or impossible to hack, or cheat the system. It is also immutable which means the data can't be changed by anyone once entered.

In this project, problem statement is "To develop a web application for storing important documents of people required for professional use for easy and efficient access and secure storage using blockchain technology over Ethereum platform."

LITERATURE REVIEW

Blockchain

A blockchain is a sequence of blocks which contains a complete list of transactions like conventional public ledger. The blockchain is extended by each additional block and hence represents a complete ledger of the transaction history. Blocks can be validated by the network using cryptographic means. In addition to the transactions, each block contains a timestamp, the hash value of the previous block and a nonce, which is a random number for verifying the hash [1].



Fig. 5. An example of blockchain which consists of a continuous sequence of blocks [2]

Block :

A block consists of the block header and the block body. In particular, the block header includes:

- Block version: indicates which set of block validation rules to follow.
- Parent block hash: a 256-bit hash value that points to the previous block.
- Merkle tree root hash: the hash value of all the transactions in the block.
- Timestamp: current timestamp as seconds since 1970-01-01T00:00 UTC.
- nBits: current hashing target in a compact format.
- Nonce: a 4-byte field, which usually starts with 0 and increases for every hash

Calculation [2].

Related Existing Systems

There are a number of systems existing on blockchain based identity management and some research papers on blockchain based document management systems.

Startups and companies working on identity management include ShoCard, Uport, Ascribe GmbH, I/O Digital, BlockVerify, BlockAuth, UniquID, Jolocom, Cambridge Blockchain, Cryptid [3].

Among these three systems were studied in [4], which gives us the following details :

Uport doesn't contain user control and consent. Uport and Sovrin have minimal disclosure for a constrained use. All the three systems contain directed identity. There is no human integration required for any of the three systems.

The research challenges in these existing systems were pointed out in [5], which include Elimination of Intermediaries, Privacy-enhancing identity management, Scalability and Optimization concerns, Communication parties trust and user experience concerns for non-technical users.

Limitations of Existing Systems/ Research Gap

The vast majority of existing systems are based on identity management. There is bare minimum research based on documents and government certificates management approach based on blockchain platform.

Proposed System

The proposed system contains smart contracts, Ethereum blockchain for storing documents, a Node.js and Express backend and conventional front end.

This project includes development of a web app where all the data such as

- a. Government Certificates
- b. Education Details
- c. Bank Details
- d. Medical Details
- e. Bussiness Details

About a person will get stored inside a blockchain with his unique ID.

This project also includes implementation of access control facilities against unauthenticated and unauthorized users.

Here, we will have three actors Owner, General public and Government officials/Organisations.

Owner can grant fill access rights to Organizations/Government officials.

General public can give access to who should fill or view documents.

Organizations/Government officials shall be able to fill documents if permissioned from both owner and GP for the particular domain.

Requirement Analysis

A brief description of softwares, IDE's and languages required for the project is given below.

Developer Side :

- HTML, CSS, JavaScript: For creating and styling web pages.
- Solidity: It is a high-level programming language used to write smart contracts for blockchain.
- Ganache: A software that provides a local blockchain for testing and development purposes.
- Truffle: Development environment, testing framework and asset pipeline for blockchains which uses Ethereum Virtual Machine (EVM).
- Node.js, MongoDB, web3 module and metamask wallet.

User Side :

- Any browser.
- Metamask wallet : For connection to blockchain based applications.

High Level Architecture

BGS's high level architecture is illustrated through the context diagram shown in figure below. It will have following categories of users:



Fig. 6. High level Architecture

The proposed system contains smart contracts, Ethereum blockchain for storing documents, a Node.js and Express backend and conventional front end.

Information management App:

The proposed application over internet from where the user can interact with our system, store and access documents, control access of unauthorized users.

Ethereum Node:

This will be the system which will contain all the information of our blockchain and perform operations over the chain as per the user demands.

Smart Contract:

It is a piece of code where all the logic behind our system will be contained. All the nodes can call the specified contract in our app for each request made by the user.

MongoDB Database:

This is a centralised repository for our app which contains details about all the requests user's make to each other and the Unique ID's of all the users who use our system.

Functional Requirements and use case

The system contains three actors General Public, Organizations/Government Officials, Owner.



Fig. 7. Use Case Diagram

The main features of the project include View documents, Request Owner/GP, View sent requests, View received requests and Fill Details function. They have been assigned to the specified actor as shown in Fig. 3.

Smart Contract Structure and Design

There are 6 contracts designed for specific domains. The AccessControl contract will contain all the logic behind permissions management and access control features. Other contracts are namely GovernmentCertificates, BankDetails, MedicalDetails, BussinessDetails, MedicalDetails, EducationDetails.



Fig. 8. Class Diagram

The in detail methods and variables smart contract should contain have been illustrated through Fig. 3.

Selection of Blockchain

Ethereum blockchain is used as it has vast scope of applications with the help of smart contracts and solidity language. Ethereum is a distributed public block chain network that focuses on running programming code of any decentralized application. More simply, it is a platform for sharing information across the globe that cannot be manipulated or changed.

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CONCLUSION

In this paper we provided and discussed a solution for managing important documents of public.

In the current form, our system is enough capable. It provides a way to store and retrieve documents in a systematic and easy way. All these processes do not take much time and work error free if all the requirements are met. The system is secure due to blockchain and provides privacy by access control features implemented.

The system can be improved by adding custom documents feature to user.

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NOTESAC (AN ENCRYPTED NOTEBOOK)

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ABSTRACT

There are world efforts to make technology act with the education field for better learning achievements. Technology tries to replace the traditional learning environments, media, and activities into the digital age. However, slow progress has been achieved to transfer the note taking activities into the digital era. In this project, we explored current note taking tools which developed to bridge the gap between paper-based and technology-based notes. We tried to identify key specific problems and challenges in the current note taking system. This project is providing extensive investigation with systematic analysis about the impacts of current note taking tools in learning to identify constraints and limitations of typical note taking systems and developing a note taking application which is more easy to use with freely available features.

INTRODUCTION

Learning is the process of acquiring and understanding knowledge. Human learning process occurs as part of education or personal development which involves several activities. Note-taking is one of these activities performed toacquire knowledge, and improve learning outcomes. It is a task of recording information synthesis from a transient source, such as reading material and attending lectures. Note taking tasks assist learners in the process of concentration, thinking, memorizing, recalling processes, and enhancing performance. It is a complex human behaviour related to personal information management with a variety of underlying mental processes, and cognitive interactions. Note-taking research had begun early in the 1920s, when Crawford performed an experimental study to examine the impacts of taking notes during lectures on student's performance.

Challenges on the usability of traditional notes clearly appear via information management tasks because of the pervasiveness of current digital technology. Furthermore, people are expected to manage a large amount of information with different formats from varying resources to complete their academic tasks. Traditional note-taking was unable to meet these challenges and encouraged the development of electronic note-taking applications. Currently used note taking applications have various cons which makes the usersuse the traditional note instead of digital notes. So we are developing such a digital note-taking system which overcomes the cons of the current note-taking systems available in the market.

BACKGROUND AND MOTIVATION

NoteSac is a refined system which allows users to securely store all the notes. 1. Great alternative to boost the knowledge in the field of web technology. 2. Great learning on how to work on different technologies together. 3. Getting hands-on experience working with cryptography to make secured applications. 4. This technology can help us get placed in an Awesome Tech Company. 5. There are always Freelance Opportunities. 6. It's creative and fun to work on the complete development of the application.

PROBLEM STATEMENT

We are developing such a kind of application which can be used by any type of users such as students, employees and also common people in order to keep their notes of any forms such as image, text, voice note, screenshot in a highly secured platform 2 In this project, the problem statement is "To develop an encrypted notebook named NoteSac to do the following task: 1- Create and save notes in the form of files and folders. 2-Save voice notes. 3- Also save screenshots and images. 4- Sorting the notes by newest created or newest modified. 5- Notes can be accessible through any platform. 6- Notes will be secured using encryption decryption technique."

PROJECT OBJECTIVES

1) Capable of analyzing the features, characteristics, functionality and drawbacks of current note taking tools. 2) Develop a successful note taking application to overcome thedrawbacks of the current note taking system. 3) To create user engaging UI/UX design. 4) Create a login and signup system for the user registration. 5) Create a landing page where users can see all its notes and also create new notes. 6)Notes can be created as a text file, image, screenshot, voice note etc. 7) Develop the database for storing the credentials of the user and notes using sqlite. 8) To increase the note storing capacity of the application. 9) Sorting the notes by newest created or newest modified note. 10) Select the highly secured encryption and decryption technique. 11) Notes will be secured using the selected encryption and decryption technique. 12) To make the application responsive. 13) To

make the application accessible through different platforms. Make the application design user friendly. 15) Using best programming practices and tricks for making the application.

PROJECT IMPORTANCE

The main objective of this project is to help the users. It provides an automation procedure of storing the personal information or notes in a secured platform. Theimplementation of this application helps different kinds of users. The users can store their notes in different forms such as text, images, voice notes. All users can make multiple accounts on this platform and can provide access level as per their choice. They can use this platform for their personal useat no cost. Therefore, the platform is free of cose, efficient and easy to use.

SCOPE OF PROJECT WORK

In a paper-based society, it is challenging for people to carry all their notes with them. In addition, it is potentially more challenging to sort through paper notes to review a particular concept. So our note taking app can be helpful to many individuals including a) Students who can use this app to take notes during lectures and sessions. b) Teachingprofessionals who can create their own notes for referring during lectures and meetings. c) Working employees who can save notes during meetings and seminars d) And also by those individuals who tend to note down their day to day tasks.

ORGANIZATION OF THE REPORT

The Major Goals of our project is: There are certain goals when it comes to development of web application and some of these are to : > Enhance the quality of the tracking by developing a native platform > Meet the availability of users by making the platform accessible through any device > Improve the efficiency and effectiveness > Improve space and time flexibility

LITERATURE REVIEW

Is easy to use. Any type of naive user can also use NoteSacfor storing their notes.

PROPOSED SYSTEM

Introduction

We will be developing such a type of responsive web application which helps users to store their personal information or notes of any forms like voice note, image, textin a highly secured platform named "NoteSac". We will make applications accessible through different platforms such as Android phones and Web browsers. The application is easy to use. Any type of naive user can also use NoteSac for storing their notes.

Requirement Analysis

- 1. Customers: Any type of users such as students,teachers, employees and also common people can access the Web application throughout the world.
- Functionality: ♦ The application is capable to provide an environment for users to save their notes in a secured platform ♦ Also users can access their account from any platform and can make changes. ♦ Any

number of users can access the system at any time. \clubsuit The users can create

Problems with Present System

The problem with the present system is that: \bullet The few existing system includes no offline support, features are pricey, premium required to get access to various features, also no proper sorting is done of the notes to newest created or newest modified \bullet Time Consuming \bullet Not easy to use \bullet Not accessible through different platforms \bullet Tech issues

Limitations of Existing Systems multiple accounts and also provide the access level as pertheir choice.

- 3. Platform: It will be launched as a Web-based application.
- 4. Functional Requirements: User should be able to enter user-credentials (username and password) User should be able to view the list of topics created by him/her User should be able to edit or delete the topics from the list User should be able to create notes under the topics User should be able to edit/save/view/delete the created notes User should be able to add images/text/audio in the notes User should be able to change password

Note-taking application	Cons
Notion	 No offline Support Quirks in the editor due to the block system
Evernote	 Pricey i.e features are available only on premium
OneNote	 Messy interface i.e notes not sorted properly Limited lagging capabilities
Roam Research	 No offline capability Expensive Not easy to use
Bear	 Just Mac and iPhone i.e not available for Windows
Standard Notes	 Limited image support Can't drag and drop notes between folders and tags
Apple Notes	 Features are available on premium
Slite	1. Slow platform
Ulysses	 Pricey Mac and iOS only

Non-functional Requirements: • Availability: Usershould be able to access the system at any time and also 5. in offline mode • Reliability: Each data record is stored on a well-built efficient database schema. There is no risk of data loss. The internal evaluation of data is well coded. • Security: All the information entered by the user including username, password as well as the data entered in the notes is stored in an encrypted and secured format.

Feasibility Study ReportEconomical Feasibility :- The product is economically feasible as it provides the following benefits: > Freely

Major Project Contribution

We will be developing such a type of responsive web application which helps users to store their personal information or notes of any forms like voice note, image, textin a highly secured platform named "NoteSac". We will make applications accessible through different platforms such as Android phones and Web browsers. The

application available > Reduce the workload for taking notes in paper orbook > High storing capacity > Security

- Operational Feasibility :- This product is operationally feasible as it is designed as a container of various 1. forms of notes. This provides consistent and integrated notes management. It is usable by all levels of people.
- Technical Feasibility :- The system is self-explanting and does not need any entire sophisticated training. A 2. system has been built by concentrating on graphical user interface concepts, the application can also be handled easily by a naive user.

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Framework

A. B. C.



Architecture



Framework

Algorithm

Proposed System Architecture

Proposed System Framework

Devs Hardware interface:

- Dell Laptop: Processor: Intel Core I3-8th Gen, Memory:4GB Ram(min), Operating System: Windows 10 ≻
- ≻ Vivo Y83 Android Mobile(Testing device)Devs Software interfaces:
- ≻ IDE: Visual Studio Code(VSC)
- Browser: Google Chrome ≻
- Web Application Framework: Flask \succ

METHODOLOGY

In this project, the methodology chosen will be discussed for the completion of the whole project. This project will be implemented using agile development methodology. Our project tries to overcome the drawbacks of current note- taking applications and provides a solution that is user friendly, secure, robust and easily accessible. We identified the supportable security features of the note-taking app and generalized the results of our reverse engineering analysis of the operation principle and process of the security features.

Agile development is a user focused method that takes into consideration of user stories in building a system. It helps to make a system more user friendly in order to satisfy user's requirements. In addition to its biggest perks as to being able to continuously improve, it gives the system the opportunity to adapt to continual changes a system has to undergo in the ongoing changes and upgrades of technologies. The phases of this methodology are asmentioned below:

- 1. Requirements gathering
- 2. Design

- 3. Development
- 4. Testing
- 5. Deployment

AES-GCM - or AES in Galois/counter mode - is an authenticated encryption algorithm, or more specifically an AEAD algorithm (authenticated encryption with associated data). These types of algorithms are handy as they provide confidentiality and integrity protection in one neat package. The plaintext is passed through the algorithm once, and the output is the ciphertext and the authentication tag. Vice versathe ciphertext and expected authentication tag are passed through the algorithm, and the output is the plaintext, or - in case the computed tag does not match the expected tag - a decryption error.

Details of Hardware and Software

User interface: Html,CssTechnologies:

- > Python 3.8.x
- > SQLite
- > JQuery
- Git & Github
- > AES 128 GCM cipher technique

The steps involved to perform the implementation of theincome tracker is listed below:

- 1. Requirements Gathering: The requirements to build up anincome tracker are gathered.
- 2. Design: The gathered requirements from the Requirements Gathering phase are used in order to identify and to proceed to the designing requirements phase.
- 3. Development: The development of the system begins in this phase.
- 4. Testing: In this phase, the development of the system is at its final stage after the product of the system has gone through a quality assurance test to ensure the system isperforming as it should be.
- 5. Deployment: Lastly, in the deployment phase, the system should be performing in great condition given that the system has been tested and is expected to be ready by the end of the last presentation.

GUI IMPLEMENTATION

Login Page



whole application responsive and provide the accessibility of the application through various platforms such as Web browsers and Android phones.

CONCLUSION AND FUTURE-WORK

Thus, after considering the pros and cons and studying about each of the current note-taking platforms present in the market, we will design our project NoteSac - a note taking app with many features and good security. If an individual may be a professional, a student, a teacher or anyone who is willing to note down information in any form and is looking for a secured platform for this purpose, Notesac is a good alternative for him.

SignUp Page



Admin Page



IMPLEMENTATION PLAN

The next semester we will complete the implementation of aes 128 GCM algorithm in our project and try to make allthe notes and credentials secured. We will also make the

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CART – E-COMMERCE SHOPPING WEBSITE

Ritu Shailendra Jha, Nandini Vijay Gurav, Ritu Raju Jha and Mrs. Aabha Patil (Guide) Computer Engineering, Department, Shree L. R. Tiwari College of Engineering

ABSTRACT

In today's generation, most people are using technology for leading their lives and fulfilling their daily needs. In this generation most of us using E-commerce websites for shopping for clothes, groceries, and electronics. We will be developing one E- commerce web application by using MERN stack technology as it contains MongoDB, Express.JS framework, React.JS library, Node.JS platform. This application will be fully functional with different views for user and admin and it will also be integrated with payment gateway for checkout. By using the website we can buy different types of products based upon customer interests. In this project, we can add different products and can delete them also. We have developed administrative functions for the website such as create a product, create categories, Admin dashboard, Manage products, Manage categories. For customers they can quickly add their items to the cart. Based on the items in the cart then the bill gets generate and the customer can pay by using stripe.

Index Terms: - JavaScript, Software Stack, Framework, Library, Performance Analysis, React.js, MongoDB, Node.js, Express.js

INTRODUCTION

An eCommerce website is an information technology method in which traders, businesses/distributors/marketers can sell products/services and the customer can purchase on that website electronically by using the internet on the mobile and computer. It means an e- commerce website is an online shop. e means electronic.

Commerce means business. Website means the group of HTML web pages that is created to market/sell information/product/services.[2]

From a bigger perspective, every website on the internet is an eCommerce Website. It can be the platform, it can be a marketplace, it can be a portal, it can be apps, it can be an entertainment website, shopping website, online courses website and online degree college.

Click to Cart is especially useful for those who don't have time to travel for shopping. The fundamental concept is to permit the customer to buy virtually using the internet and make the most of it.

Produced System

We are proposing one E-commerce web application by using MERN stack technology as it contains MongoDB, Express.JS framework, React.JS library, Node. JS platform.

This application is fully functional with different views for user and admin and it also has integrated with payment gateway for checkout. By using this website we can buy different types of products based upon customer interests. In this project, we can add different products and can delete them also. We have developed administrative functions for the website such as create a product, create categories, Admin dashboard, Manage products, Manage categories. For customers, they can quickly add their items to the cart. Based on the items in the cart then the bill gets generated and the customer can pay by using stripe.

In this project we are intended to develop a full stack E-commerce shopping using MERN technology with easy and interactive UI interface for this we have decided to divide proposed methodology into 5 modules starting from Coding, designing UI Interfaces using React context, seller management, customer management, delivery management and payment management.

Our project 'Click To Cart' will connect small scale business/shops such as book stores, electronic shops and food restaurants in one portal. The purpose of this project is to makes a web application which will be easier to find interesting products and easier to sell goods. This E-commerce web application admin can add some categories like summer sales, winter festival, etc. which will by attracting customers. Customers also can easily search for their favourite goods. They can also buy them easily by just adding to the cart and they can increase or decrease by clicking on the "+" sign and "-" sign. After adding they can check the total amount of the thing which have been added to the cart. A successful payment gateway way enabled so payment can be done by debit card, credit card, and net banking.

Problem Statement

Businesses, in any field, have a lot of competition. They are always on the lookout for a proven way to increase their business revenue.[4] Restaurants, retail shops, vape stores - whatever a business may want to sell, if the business doesn't have an e-commerce website, they are leaving money on the table!

The world has moved online- a fact that businesses have to accept and put up a website to address. Amazon is a prime example of a website with all the key elements making up a good e-commerce site. The e-commerce website of Amazon was initially put together with simple HTML, CSS and JavaScript. But as time progressed and different frameworks came into the limelight, the website got a makeover. Through this project, we will discover a way to build an E-Commerce website, relying on React and Firebase.

Project Objective

In this project intended to develop a full stack websites using MERN technology with the objectives to:

To facilitate online buying and selling which can be useful for small scale industries/beginners and support them.

To understand social, environmental and ethical issues related to the project topic

To Research and review literature papers and reports to get complete idea of the working modules of the system

To develop and learn required skill for completion of the project till End -term project submission

To learn how to create and manage a responsive website.

To Gathered data for analysis and did analysis for software and hardware requirements

To Documentation of all the stages

To provide a searchable database of all customers and accounts.

To provide a secure interface for payment transactions.

To automate the time-consuming process of going to the stores.

Project Importance

E-commerce is a huge part of the economy and is vital to businesses that sell their products or services online. E-commerce gives businesses the ability to reach more customers than traditional retail. With so many people making their purchases online, it is the fastest-growing retail market.

In all, numerous opportunities exist for India in order to expand the scope of e- commerce research and to benefit from the same. Individuals, organizations, policy makers and government alike are poised to gain from insights that could be offered by research on EC.[6]

Scope of Project Work

An interesting yet easier to understand UI.

Improved database queries.

Add more varieties of products.

Organization of the Report

Customers and potential buyers can be provided with a lot of information that make their shopping experience quicker and easier as well as improved customer service. They will also have the opportunity to purchase products and service 24/7 comfortably and conveniently.

LITERATURE REVIEW

Survey of Existing System

The benefits to companies that achieve Business-to- customer (B2C) e-Commerce are compelling. Effective B2C e-Commerce implementations can help organizations realize substantial cost savings, increase revenue, provide faster delivery, reduce administration costs, and improve customer service.[7] Thus, e-Commerce might be a major area for research thanks to its novelty and exploding growth. Extensive research in E-Commerce implementation studies indicates that the definition of implementation has been argued and confusing for researchers. Development of E-commerce is done by B2B and B2C and help the customer to fulfil the requirement.

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Problem with Present System

We all know that technology has become an essential tool for online marketing these days. If we see all over the world, most of the people are showing interest to buy things online. However, we can see that there are many small shops and grocery stores selling their things offline. With this type of selling most of us will face bad experiences. For instance, in some shops the seller has the product to sell in the offer but the buyer may not know about it, or the customer may need the product urgently then he will go to the shop, but the product is out of stock, in that case, he will face a bad experience. Moreover, in online shopping customers can select a wide range of products based upon their interests and their price also, one can compare prices also from one store to another by using online shopping. By encountering all the problems and weaknesses of the offline shopping system, creating an E-commerce web application is necessary for searching and shopping in each shop.[4] These days we have seen so many e- commerce websites are created like Flipkart, Amazon, Myntra one can easily buy their necessary products by using these websites. By using these types of websites one can buy their products also as the cost of the product will be slightly high in offline shopping when compared to online shopping. For creating these types of E-commerce web applications MERN stack will be the best option that can help us for creating the most effective and powerful web applications.

Limitation Of Existing System

Security: One of the main limitations of eCommerce is security. In most cases, people are hesitant to provide their personal and financial details in spite of advanced data encryption security systems in place. Moreover, there are some websites that do not have the capability and features installed to authenticate transactions.[8] As such, there are instances of fraudulent activities. The fear of providing financial information like credit card details hinders the growth of eCommerce.

Lack of Privacy: To some extent, the privacy of a customer is compromised in eCommerce. You need to provide your personal details, such as an address, telephone number, and so on to the seller. There are still lots of sites that do not have the advanced technology to protect sensitive information. Moreover, there are also sites that illegally collect consumer statistics without permission. This is one reason why people get skeptical while using eCommerce.

Product Suitability: As already mentioned, it is not possible for people to physically examine the product in eCommerce. In many cases, the original product may not match the picture or specifications in the eCommerce site. This absence of 'touch and feel' creates a discouraging effect.[10]

Detail of Software Requirement

Software Details:

For Front-End:

HTML, CSS, JAVASCRIPT

To Run the program: Use Command Prompt (CMD) in Desktop OR Laptop.



Table-1-1- Software Composition

Hardware Detail:

Any type of PC can support this program and work.



Table-1-2-detail of software architecture

CONCLUSION & FUTURE WORK

This project helps in understanding the creation of an interactive web page and the technologies used to implement it. The design of the project which includes Data Model and Process Model illustrates how the database is built with different tables, how the data is accessed and processed from the tables. The building of the project has given us a precise knowledge about how MERN is used to develop a website, how it connects to the database to access the data and how the data and web pages are modified to provide the user with a shopping cart application.

ALGORITHM

The algorithmic procedure for making the website is as follows

For the implementation section we have divided the complete designing process into two algorithms first part for developing client-side and second for administration both the algorithms are presented as follow :

Client-side: At client-side visitor and customer both can be users Customer need to register visitors can visit the products and price details Customer will have to input details and get customer ID Data can be updated :

Customer can make any inquiries



Figure 2-1: Client-side Algorithm

Administration Side Methodology Admin will login

Input category Id and product Id Add item Add price and sales Check and collect Payment Manage Order and shipping Update data



Figure 2-2: Administration-side Algorithm

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These are some of the algorithms that we might use in our project implementation to make the system more interesting:

Product Recommendation algorithm

Sorting Algorithm [3]

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E-commerce has initiated new way of distribution channel and online shopping tendency to increase the needs and wants of customer. Due to change in information technology, e commerce is emerged and played in industry arena by the way of selling the product and services.[5] Ecommerce is the trading the product and services using the network and internet tools. Technology supports the new initiative and attitude of customer buying behavior. Various studies have been initiated to understand the attitude and behavior of customer by using online shopping.[1] They found that online shopping support towards ease accessibility, timeless, perceived risk, product features and attribute have more impact in buying intention. Through this article, we analyzed how these variables support with one another and how it persuades buyer behavior with small group of respondents.

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CALORIES ESTIMATION AND FOOD IDENTIFICATION USING DEEP LEARNING AND IMAGE PROCESSING

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ABSTRACT

Today's important attribute for a healthy body depends on the number of calories consumed, hence monitoring calorie intake is necessary to maintain good health. As the like for trend and variety of fast food items is increasing, people are also becoming more aware and conscious about calorie intake as the higher number of calorie intake creates a lot of problems like obesity, hypertension, high cholesterol, diabetes, heart attack etc. that invokes the need of medical consultancy. People suffering from such problems require an easy way to control their calorie content in their daily diet. In order to keep track of the amount of calorie intake of a person, we made a food recognition and calorie estimation system that identifies the food and estimates the calorie of the food image which is given as input. We trained more than 1500 images in each category for our model.

We have used CNN (Convolutional Neural Network) as a classifier for food recognition and obtained 97.11% accuracy. Based on the food weight in grams, volume is estimated and the calorie of the food item is determined.

Keywords: - Convolution Neural Network (CNN), Otsu's Method, Python, Canny Edges Detection (CED), Watershed Segmentation, Morphological Operators.

INTRODUCTION

Obesity and overweight have traditionally been linked to intake of high calorie food and lifestyle. Obesity is defined using Body Mass Index (BMI) of the individual. A person is considered obese when the (BMI) is greater than or equal to 30 (kg/m2). Unfortunately, more and more people will meet criteria for obesity. The main cause of obesity is the imbalance between the amount of food intake and energy consumed by the individuals. It is noticed that obesity or overweightness cause a number of chronic diseases such as breast and colon cancer, blood pressure, heart diseases, type II diabetes.

Food is the key of human's body. So, a diet plan always needs to take into consideration the total number of calories to be consumed to maintain a fit and healthy life. But, in most of the cases, people face difficulties in estimating the amount of food intake due to lack of nutritional information, which includes the manual process of writing down this information, and other reasons. As such, it will be useful if there is a system to keep track and maintain the calorie intake. Therefore correct prediction of food calorie is equally important. In recent years, many systems built for performing the same task require the manual input of food items, their ingredients, amount and some other specific details which becomes a tiresome process and the users of any system wants it to be user friendly and easy to access and use. Using image as an input and providing to the system to give the result is supposed to be a lot easier. Hence, in our proposed model we allow users to upload the picture of a food item as input and the rest of work will be accomplished by the machine rather than the user.

So, to reduce this difficulty of tracking the calories consumed by a person we came up with an idea of building an automated system for prediction of calories.We are proposing an imagebased Food recognition and Calorie Estimation System which will only require the image of the food item for the prediction of the calories present in the food item. This system will allow users to upload food images in different views like top view, side view, etc. For image classification we have used Convolutional Neural Network (CNN). Food(s) and calibration objects are detected by an object detection method called CNN.We trained more than 1500 images in for our model. In this algorithm, we are providing an image to convolutional as an input and we get a convolutional feature map as output. Using image segmentation we are dividing an image into different regions based on contour, characteristics of pixels of food image. We calculated calories with the help of segmented images using formulas and thumb whose dimensions are already known to us. Using a segmented image, we first calculate the volume of the food item and then mass of the item and finally the calorie of the item using relation between the mass and calorie of a food item. Experimental results of combination of different segmentation methods such as color, texture, graph-cut segmentation and deep learning neural network showed an accuracy of 97.11%. An accurate estimation of daily nutritional intake provides a useful solution for keeping healthy and to prevent disease

Propose System

To build our system, we will take advantage of the existing methods and overcome all their drawbacks.

-Proposed food recognition and calorie measurement system aims to allow the user to upload the picture of food items at any time and any place to measure calorie value from the uploaded photo. This unique method will provide more accurate results than other methods.

-We provide a calibration reference (user's thumb) in our images, allowing more accurate measurement of the size of food ingredients, leading to higher accuracy in calories measurement.

-We are using a different variety of food dataset (e.g. fruits, fast food, vegetables , nonveg items) for training our model.

-We are building our own food dataset with multiple brands of cameras to capture the image of the same food item, providing an opportunity for the food recognition system to become more robust with changes in camera brands. We provide multiple shooting angles for the same food item, allowing the development of more accurate food recognition methods.

-We are using CNN algorithm to obtain more accuracy. Also we are using Python language rather than Matlab for better performance.

-Our aim is to obtain more accuracy (greater than 94 percent) than existing models.

Image Preprocessing

Images give better results on a white background and also if they are fed to the system after presenting them to the system as they are expected to b e and hence pre-pro cessing of images is required. It includes background subtraction to remove noise and unnecessary information. In order to have accurate results for our segmentation, a simple transformation must be performed on the image to change the image size into standard format .To do so , the size of each image will be compared with standard size categories . If the image size is not compatible with any size category, some cropping or padding techniques will be applied to the image.

Image Classification

For image classification we have used Convolutional Neural Network. In this algorithm, we are providing an image to convolutional as an input and we get a convolutional feature map as output.

CNN

A Convolutional Neural Network (ConvNet/CNN) is a Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other. The first step in our approach is to generate a pre-trained model file with the help of CNN network. This is performed by initially capturing a set of images of one particular class (e.g. 50 images of apple class) and then labeling them with object name-set (object being apple).



Figure 2.1 : CNN Architecture CNN is built with following major steps:

Convolutional Layer : This layer is the first layer that is used to extract the various features from the input images. In this layer, the mathematical operation of convolution is performed between the input image and a filter of a particular size MxM. By sliding the filter over the input image, the dot product is taken between the filter and the parts of the input image with respect to the size of the filter (MxM). The output is termed as the Feature map which gives us information about the image such as the corners and edges. Later, this feature map is fed to other layers.

Max Pooling 1 : In most cases, a Convolutional Layer is followed by a Pooling Layer. The primary aim of this layer is to decrease the size of the convolved feature map to reduce the computational costs. The Pooling Layer usually serves as a bridge between the Convolutional Layer and the FC Layer.

Depending upon the method used, there are several types of Pooling operations.

Max Pooling, the largest element is taken from the feature map.

Average Pooling, calculates the average of the elements in a predefined size Image section.

Sum Pooling, the total sum of the elements in the predefined section is computed in this.

Full connection: After receiving inputs from the previous neurons, the final layer is the fully connected one. It takes the output of the previous layers, "flattens" them and turns them into a single vector that can be an input for the next stage. The FC layer helps to map the representation between the input and the output.

Dropout : It is a technique used to prevent a model from over fitting where randomly selected neurons are ignored during training.

Activation Functions: There are several commonly used activation functions such as the ReLU, Softmax, tanH and the Sigmoid functions. Here we are using ReLU and softmax functions.

Image Segmentation and Feature Extraction

A mixture of methods including canny edge detection, watershed segmentation, morphological operators and Otsu's method will be used to segment the food item to obtain the contour of the food and the contour of the thumb. We use the thumb finger for calibration purposes. The thumb is placed next to the dish while clicking the photo and this thumb gives us the estimate of the real-life size of the food item and helps estimate volume accurately.

We have 3 factors from image segmentation

-Food spixel area

-Skin pixe larea

-Actual skin area (skin multiplier)

2.4. Volume Estimation

A mixture of methods including canny edge detection, watershed segmentation, morphological operators and Otsu's method will be used to segment the food item to obtain the contour of the food and the contour of the thumb. We use the thumb finger for calibration purposes. The thumb is placed next to the dish while clicking the photo and this thumb gives us the estimate of the real-life size of the food item and helps estimate volume accurately.

We have 3 factors from image segmentationWe know that, our thumb size is approximately 5 * 2.3cm is a skin multiplier

Calculation of food area:

We have four type of shape of foods

Sphere - like apple, orange, tomato, onion

Cylinder - like banana, cucumber, carrot, egg

Columnar -like bread, cheese

Irregular -like noodles, sauce

Volume estimation of sphere:

 $EstimatedRadius = \sqrt{\frac{EstimatedFoodArea}{\Pi}}$

 $EstimatedVolume = \frac{4}{3} * \Pi * Radius$

Volume Estimation For Cylinder:

EstimatedHeight = PixelHieght pixeltocmmumtiplier

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 $EstimatedRadius = \frac{EstimatedFoodArea}{(2*EstimatedHeight)}$

EstimatedV olume = Π EstimatedHeight Radius2

Volume Estimation For Columnar object:

EstimatedHeight = PixelHeight pixtocmmultiplier

 $EstimatedRadius = \frac{EstimatedFoodArea}{(3.0*EstimatedHeight)}$

 $EstimatedVolume = \frac{4}{3} * \Pi * Radius * Height$

Volume Estimation For Irregular-sized object:

stimatedV olume = EstimatedFoodArea

0.5(Assuming width as 0.5)

2.5Weight and Calorie Estimation We are going to provide food density (g/cm 3) and food calories (cal /g) to the system. Using this information we can estimate weight and calories intake in given food.

 $EstimatedArea = \frac{FoodpixelArea*ActualSkinArea}{SkinPixelArea}$

Architectural Overview



Figure 3.1: System Architecture

Step 1: User will upload the image of food item onto the web page :

Users can upload the image of the food pro duct which is already clicked by them and that image will act as input to the system. For all images we have considered a white plate to ignore the background of the images.

Step 2 : Image Recognition will occur :

System will recognize the given food item. CNN is used in food recognition and provides higher performance than the traditional methods.

Step3:Image Segmentation

System segment the image of the food item to obtain the contour of the food and the contour of the thumb.

Step 4: Volume will get calculated and Calorie gets Detected

Using a segmented image, the system first calculates the volume of the food item and then mass of the item . Finally the system will calculate the calorie of the item using relation between the mass and calorie of a food item.

Step 5: Experimental Results will be displayed to the user

Recognized food items and the predicted calories will be displayed to the user as an output.

Technology Used 4.1Hardware and Software-

Software Requirement:-

Anaconda Navigator:

Anaconda Navigator is a desktop graphical user interface (GUI) included in Anaconda distribution.

Navigator allows us to launch common Python programs and easily manage conda packages, environments, and channels without using command-line commands.

We can use it to find the packages you want, install them in an environment, run the packages, and update them - all inside Navigator.

For our project we are using, Jupyter Notebook and PyCharm.



Jupyter Notebook :



Jupyter is a free, open-source, interactive web tool known as a computational notebook, which researchers can use to combine software co de, computational output, explanatory text and multimedia resources in a single document.

The Jupyter Notebook application allows us to create and edit documents that display the input and output of a Python or R language script. Once saved, we can share these files with others.

With a Jupyter Noteb o ok, we can view co de, execute it, and display the results directly in our web browser.

Live interactions with code:

Jupyter Notebook co de isn't static; it can be edited and re-run incrementally in real time, with feedback provided directly in the browser.

Notebooks can also embed user controls (e.g., sliders or text input fields) that can be used as input sources for co de.

Documenting code samples:

If we have a piece of co de and we want to explain line- by-line how it works, with live feedback all along the way, we could embed it in a Jupyter Notebook.

The code will remain fully functional and we can add interactivity along with the explanation, showing and telling at the same time.

Pycharm :



PyCharm is the most popular IDE used for the Python scripting language. PyCharm is a hybrid-platform developed by JetBrains as an IDE for Python. It is commonly used for Python application development. Some of the unicorn organizations such as Twitter, Facebook, Amazon, and Pinterest use PyCharm as their Python IDE!

Features of PyCharm:

Intelligent Code Editor:

It helps us write high-quality co des! It helps identify errors easily

It consists of color schemes for keywords, classes, and functions. This helps increase the readability and understanding of the code.

It provides the auto complete feature and instructions for the completion of the code.

Code Navigation:

It helps developers in editing and enhancing the co de with less effort and time.

With co de navigation, a developer can easily navigate to a function, class, or file.

A programmer can locate an element, a symbol, or a variable in the source co de within no time.

Assistance for Many Other Web Technologies:

It helps developers create web applications in Python.

It supports popular web technologies such as HTML, CSS, and JavaScript. It also supports Angular JS and Node JS for developing web applications.

Developers have the choice of live editing with this IDE. At the same time, they can preview the created/up dated web page.

VS Code



Visual Studio Code is a powerful source co de editor which is available for Windows, macOS and Linux. Instead of a project system, it allows users to op en one or more directories, which can then be saved in workspaces for future reuse.

Features of VS Code:

Language support:

Visual Studio Co de includes basic built-in support for most common programming languages such as C++, Java, Python, PHP, Go ,etc.

It provides syntax highlighting, bracket matching, co de folding, and configurable snippets.

VS Co de also ships with IntelliSense for JavaScript, Type Script, JSON, CSS, and HTML, as well as debugging support for No de.js.

Data collection:

Visual Studio Code collects usage data and sends it to Microsoft, although this can be disabled.

It is in the open-source nature of the application, due to which the telemetry code is accessible to the public.

Version control :

Source control is a built-in feature of Visual Studio Code.

It has a dedicated tab inside of the menu bar where you can access version control

settings and view changes made to the current project.

Design Details

Use Case Diagram

Level 0 DFD



Figure 5.2: Level 1 DFD

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Level 1 DFD



Figure 5.3: Level 1 DFD

METHODOLOGY

The project consists of two steps, identifying food from an image and converting the food identified into a calorie estimation. We performed food image classification using CNN (convolutional Neural Network).

Steps Followed :

Pre-Processing : Some basic pre-processing has been performed to clean the dataset where the irrelevant and noisy images of 15 categories have been removed.

Random rotations max 40 degree.

Random zoom applied.

Shear angle in counter- clockwise direction in degrees

Trained the model:

We trained the model with images of 15 categories using the classifier CNN (convolutional Neural Network) which is a class of deep, feed forward artificial neural networks that has successfully been applied to analyzing visual image.

Implementation Details Phase I : Dataset Collection

Phase II : Environment Setup

-Setting up of model

Phase III : Training Dataset Phase IV : Estimation Process

-Image segmentation

-Calorie estimation

Phase V : Testing model

Phase VI : Deployment of Model

CONCLUSION 8.1 CONCLUSION

We have verified that our proposed measurement system is useful, convenient and very user friendly, which could encourage users to use the system at each and every meal time .We built our own dataset comprising more than 1500 food images with careful attention of shooting angle and illumination variations. In the above project, we have calculated the calories of spherical shape foo d items using deep learning and image pro cessing. For that we have implemented three modules .First, we detect the object using CNN. Our results shown that the accuracy of our model for food recognition is 97.11%. After that image segmentation is performed and based on volume estimation, weight and calories are calculated successfully for spherical food items.

Future Work

-As a future work, the model can be extended to include more categories and more number of images per categories and can estimate the calorie from all types of food.

-In the next phase, we are going to work on volume and calorie estimation pro cess for all shapes of food.

-We are planning to deploy our model into the web application for user convenience.

-We plan to enhance our system by notifying the user about how much the user should intake in calories.

APPLICATIONS

Helps people to deal with problems like obesity, hypertension, high cholesterol, diabetes, heart attack, etc. which may further lead to medical consultancy

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elps people to focus on weight loss resulting in a healthylifestyle.

Helps fitness freaks to keep a track of their daily calorie consumption.

Motivating people to adapt a healthy lifestyle by tracking calorie intake

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PERFORMANCE ANALYSIS OF DATA MINING ALGORITHMS FOR VOICE RECOGNITION

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ABSTRACT

Voice Recognition, speech signals is an important but challenging component of Human- Computer Interaction (HCI), it is a part of Natural Language Processing (NLP). In the literature, Voice recognition (VR), many techniques have been utilized to extract speech from signals, including many well- established speech analysis and classification techniques. Data mining techniques have been recently proposed as an alternative to traditional techniques in VR. This paper presents an overview of Data Mining techniques and discusses some recent literature where these methods are utilized for speech-based voice recognition.

Keywords—Voice recognition, Data mining, Regression, Segmentation, Unsupervised learning.

INTRODUCTION

The process involved with deciding feelings/perspectives communicated by an individual on a specific theme is called opinion investigation. Feeling investigation is otherwise called opinion examination. Since there was a colossal expansion in informal communities like websites, Facebook, Twitter, You Tube, and so forth, sped up in the field of opinion investigation. For an association that is set up for an association to work on its business to deal with its standing on the lookout, it is important to discover an assessment on the web. This web-based assessment helps the association or finance managers to get where they are on the lookout, how individuals ponder their item, the assistance they offer is acknowledged or not by customers, and this should be possible through feeling examination, Opinion Mining. Opinion examination to discover the words related with specific sentiments, yet additionally to discover the connection between words, so the inclination can be precisely recognized. A few methodologies were as of now accessible to separate opinion.

The most majority of the exploration on Sentiment examination depends on the message accessible on the web utilizing different procedures, for example, AI, vector machine support, feeling investigation inactive, message mining, and so on As per the examination did up until now, the feeling will be separated into two gatherings, that is, Automated Sentiment Analysis and Human Sentiment Analysis or Human Analysis. At whatever point we get signals from any amplifier, there is a commotion issue in the signs produced by the amplifier. So prior to examining signals, the fundamental necessity is to wipe out those commotion signals since, in such a case that the clamor stays in the signs it will be

hard to break down the signs. There are a few procedures accessible that could be utilized for this reason: Notch Filter, Noise Gate, and Nyquist Noise Gate Plug-in, and so forth numerous calculations or approaches have been utilized around here of opinion location or examination. These calculations and approaches utilized enjoy their own benefits and drawbacks. Yet, the vast majority of these calculations or approaches depend on text examination. The references of the different message based feeling investigation methods, for example, message mining and overlays, a proposed way to deal with voice opinion examination dependent on voice prompts. A Database is made with various voice signals and these signs were investigated for feelings. Alongside this diverse message based procedures or various issues identified with feeling examination were additionally talked about like Paper Work Based Sentiment Analysis, Sentence Lexicon Acquisition, include based feeling investigation and so on.

FEASIBILITY SYSTEM

To comprehend the issue, we met 4,444 clients of the help. We directed a study and gathered 4,444 reactions from 100 individuals. The primary goal of this review was to decide client assumptions and distinguish patterns in the utilization of call focus administrations. Following is the division of inquiries in the structure, results for the equivalent have been appended beneath.

Telecom Service Provider

Reason for call in telecom call centres

Balance/ Bill Enquiries

Report complaints

Change in services

Talk to customer care Identification of ease of interaction procedure Comfort ability to interact with ASR enabled IVR on daily basis.

We gained amazing outcomes after the classes, we had the option to set up the accompanying realities.

There was equivalent appropriation between individuals utilizing diverse call place administrations.

Significantly individuals called call focuses to ask changes in assistance followed by charge enquiries.

Larger part of clients felt the hole in current IVR advances.

Around 60% of individuals were agreeable to communicate with the ASR empowered call place while 25% individuals needed to give such framework prior to expressing comfortability.Based a shot above realities we distinguished that ASR call Centres would be critical

to future and would expand the matter of the association with such help.

LITERATURE REVIEW

Sentiment analysis to meet customer needs efficiently. This architecture is the data manager, it does not store a lot of customer data and processes the data to understand the results The relevant literature is presented in this section or gap identified where system get more accurate result given shown below Real Time Emotion Recognition from Facial Expressions Using CNN Architecture

Author Name: Ozdemir, Mehmet Akif; Elagoz, Berkay; Alaybeyoglu, Aysegul; Sadighzadeh, Reza; Akan, Aydin (2019). IEEE Xplore: 11 November 2019.

Proposed System Work can Deep 1D and 2D CNN LSTM to achieve 91.6% and 92.9% accuracy. The technique can be used in this paper are used CNN, DBN, LFLBs, LSTM.

Solution: The presented model can be extended to multimodal emotion recognition.

A Proposed Approach with Analysis of Speech Signals for Sentiment Detection.

Author Name: Atal Tragi M.tech, Computer Science and Engineering Amity University Noida, India. International Conference on Communication Systems and Network Technologies (2018)

Proposed System Work Different methods like use of textual data, face expressions, voice signals, body movements and physiological signals were adopted for sentiment detection. Presented paper discuss about emotions/Sentiment and proposed an approach for analyzing these sentiment based on speech signals of an individual. The technique can be used in this paper are used Pitch, Corpus based approach, Noun phases, Emotions, Sentence lexicon Acquisition Speech Analyzer.

Solution: Training of database accurate result

Data Mining for Detecting Errors in Dictation Speech Recognition

can be used in this paper are used Document retrieval, speech data mining, and Speech recognition. The propose data mining models for detecting errors in DSR. Instead of relying on internal parameters from DSR systems, we propose a loosely coupled approach

Solution: Process user's audio, to be used for work process automation. Given a speech input, our aim is to identify the speaker, detect speaker's gender, and analyze the speaker's emotion.

Speech Emotion Recognition from 3D Log-Mel Spectrograms with Deep Learning Network

Author Name: HAO MENG, TIANHAO YAN, FEI YUAN, and HONGWEI WEI. IEEE Access

2019.

Proposed System Work It is better than the 64.74% from previous state-of-the-art methods in the spontaneous emotional speech of the IEMOCAP database. In addition, we propose the networks that achieve recognition accuracies of 90.78% and 85.39%. The technique can be used in 3-D Log- Mel, Dilated CNN, Residual Block, Center Loss, BiLSTM, Attention Mechanism.

Solution: Technique for sentiment detection is one of the simplest techniques which we have in this field. According to this approach a document/or paper provided by the writer and based on that document emotions of an individual were detected.

A Novel Music Emotion Recognition Model for Scratch-generated Music.

ISSN 2394 - 7780

Author Name: Zijing Gao, Lichen Qiu, Peng Qi, Yan Sun

IEEE Xplore 2020

Proposed System Work We propose a novel music emotion recognition model for Scratch generated music. First, we build a Scratch-generated dataset by the main melody extraction algorithm. Then, for each music, we extract their underlying features and input them to the CNN module. After that, the features learned by CNN are input to RNN to get the final classification results. The technique can be used in Scratch-generated, music, CRNN, emotion, recognition

Solution: In our model, the CNN module can learn the important features of music while RNN can learn the sequential features. The experimental results show that the

Author Name: Lina Zhou, Member, IEEE, Yongmei Shi, proposed model performs better than traditional music Student Member. IEEE transactions on speech and audio emotion recognition mode

processing, vol. 13, no. 5, September 2019. The technique

OBJECTIVES

The objective of the project is to process user audio that will be used to automate work processes. With voice input, our goal is to identify the speaker, identify the gender of the speaker, and analyze the speaker's emotions.

PROPOSED SYSTEM

A. Proposed approach has the following two steps:

Feature Extraction: It splits the input signal into short-term windows (frames) and computes a number of features for each frame. This process leads to a sequence of short-term feature vectors for the whole signal. In many cases, the signal is represented by statistics on the extracted short-term feature sequences and extracts a number of statistics (e.g. mean and standard deviation) over each short-term feature sequence. Features include like Energy, entropy of energy,MFCCs

Regression and Segmentation: Regression is important in audio analysis, e.g. in the context of speech emotion recognition, where the emotional state is not a discrete class but a real-valued measurement (e.g. arousal or valence). Segmentation is a very important processing stage for most of audio analysis applications. The goal is to split an uninterrupted audio signal into homogeneous segments. Segmentation can either be supervised: in that case some type of supervised knowledge is used to classify and segment the input signals. This is either achieved through applying a classifier in order to classify successive fix-sized segments to a set of predefined classes, or using HMM approach to achieve joint segmentation-classification. Unsupervised: a supervised model is not available and the detected segments are clustered (example: speaker diarization)

The project is divided into two phases.

Enrolment Phase or Training Phase: The enrolment or training phase is the initial phase where the input speaker signal is pre-processed and its features are extracted. Pre-processing is a form of cleansing to make it suitable to identify and extract characteristic features of the speaker signal. The process of feature extraction will enable the presentation of the speaker vocal characteristics to construct a model for that particular speaker.

Matching Phase: The matching phrase is responsible to identity the voice functionalities by comparing the test voice prints with the existing models stored in the database during the enrolment phase; the comparison of unique characteristic features is what defines 'matching'

Algorithm & Actual Process

Steps of algorithm and actual works process as follows:

Input data set contains the voice signals that are parsed and MFCC features are extracted using the PyAudioAnalysis library and tagged as per the respective labels.

Once we have the extracted feature set, we train the model using the SVM (Simple vector machine) algorithm to classify the voice features as per the desired label. During the training phase, each and every dataset item is given as the input to the Simple Vector machine algorithm for analysis of future data.

We have the model trained with the training data based out of SVM and other algorithms, we get the model that can actually classify the future inputs.
Once we have the model ready, we give the test input to check the accuracy of the model. Depending on the output, we tune various parameters of the system and consider various features for further dry runs to optimize the maximum efficiency.

Now any test voice that needs to be checked with the model, is taken either by recording or by giving a wav file to the system.

Our system converts the wav file into features and runs through the model and gives the output to the user



FIG.1.Algorithm works

CONCLUSION

It is observed that different emotional states have different frequency and time to complete a sentence. Three different emotional states of Angry, Sad, and

Neutral were analyzed based on pitch frequency and the time it took to complete a particular sentence. To analyze these signals, we use a speech analyzer that shows the variation in pitch frequency and time base in various speech signals. Database in English is used for analysis purposes. In the end, you can see that there is variation in time and pitch frequency between angry and sad emotional state. Therefore, both pitch time and frequency can be used to estimate these emotional states. While the neutral emotional state in terms of both parameters of Time and frequency of tone that is between anger and sadness. Now future work will be to use a large database with more voice signals and to try to analyze these signals for other emotional states as well.

ACKNOWLEDGEMENTS

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BUILDING MOBILE APPLICATION USING FLUTTER-A COMPARATIVE STUDY BETWEEN REACT NATIVE AND FLUTTER

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ABSTRACT

Labourers are workers with a specific on-field skill set. Moreover they are very unorganised which makes it difficult for people to directly hire them. They gather around at some random place in large numbers and then get hired IF and ONLY IF a contractor knows about the place or randomly sees it, else they have to return to their homes with nothing. According to MGNREGA and PLFS (Periodic Labour Force Survey), 93% of laborers are unemployed during the world wide covid-19 pandemic situation. So our application provides a platform for both the workers as well as the companies/ users to, get hired or hire respectively. This application focuses on ALL the workers in unorganised sectors like construction labours, tailors, maisons, carpenter, plumber etc. (Anyone with any job profile can open a profile) Using this application, a company who wishes to work for the government or private, any big projects can hire workers directly OR any individual person who wishes to hire someone for minimalistic furnishing, plumbing jobs etc can do so too.

INTRODUCTION

Flutter is a cross-platform UI toolkit that is designed to allow code reuse across operating systems such as iOS and Android, while also allowing applications to interface directly with underlying platform services. The goal is to enable developers to deliver high-performance apps that feel natural on different platforms, embracing differences where they exist while sharing as much code as possible. Our project is made on this very Flutter platform. Labourers are workers with a specific on-field skill set. Moreover they are very unorganised which makes it difficult for people to directly hire them. They gather around at some random place in large numbers and then get hired IF and ONLY IF a contractor knows about the place or randomly sees it , else they have to return to their homes with nothing. According to MGNREGA and PLFS (Periodic Labour Force Survey) , 93% of laborers are unemployed during the world wide covid-19 pandemic situation.

So our application provides a platform for both the workers as well as the companies/ users to, get hired or hire respectively. This application focuses on ALL the workers on unorganised sectors like construction labours, tailors, maisons, carpenters, plumber etc. (Anyone with any job profile can open a profile)

Using this application, a company who wishes to work for the government or private ,any big projects can hire workers directly OR any individual person who wishes to hire someone for a minimalistic furnishing, plumbing jobs etc can do so too.

Background study

Introduction of React Native :

React Native is a mobile app development framework that enables the development of multi-platform Android and iOS apps using native UI elements. It is based on the JavaScriptCore runtime and Babel transformers. With this setup RN supports new JavaScript (ES6+) features, e.g. arrow functions, async/await etc. This famous framework for **mobile app development** started in the summer of 2013 as Facebook's internal hackathon project. The first public preview was released in January 2015 at Reactjs Conference and in March of 2015, Facebook made React Native open and available on GitHub.

It has been **widely adopted** by developers and organizations because of its ability to produce native apps and great User Interfaces, since then. In the graph below, you can visualize the increasing trend for React Native. In just 1.5 years after its release, it surprisingly overtook Android and iOS development. Talking about the, Native mobile apps, they are apps which are specifically created for an operating system, either Android or iOS in this case.



For building a native app on iOS, we use Objective-C/Swift development language and for Android we use Java/Kotlin.. Therefore one should not be surprised by the fact that many of the apps we are using today have

business logic built using mostly JavaScript rather than Java/Kotlin or Objective-C/Swift. Some of them for example are Myntra, UberEats, Facebook, and Instagram.

To answer how React Native works? Let's look at the below image of the default RN application:



If you are a web developer familiar with older standards of JS only then a portion of the above snippet probably won't look like JavaScript to you. ES2015 (otherwise called ES6) is a lot of enhancement to JavaScript that is presently a part of the official standard. ES6 isn't upheld by older browsers, that's why there is a need to use transpilers like Babel.

Thanks to the Babel transpiler, React Native supports many features of JavaScript ES2015, so you can utilize this technology without stressing over its compatibility with different devices. If you aren't comfortable with ES2015, you can pick it up just by going through sample codes from the resources listed under the resource section.

This is JSX, a type of grammar for encapsulating XML inside JavaScript. It allows you to write your code inside markup language. It appears like HTML that we use in web development, but instead of using <div> or , you will utilize React Native components. Here, <Text> is a built-in component that just shows some content and View resembles <div> or .This was an example of displaying "What is React Native". This line of text acts as a component. Anything you see on the screen is a type of component. It can be really straightforward. The main thing required is a render function, which returns some JSX to render.

Each such component maps to the native building blocks when we synthesize our React Native App to Android or iOS Apps. Like in this case <Text> is mapped to <TextView/> in Android and UILabel in iOS.

Introduction of Flutter

Flutter is a cross-platform UI toolkit that is designed to allow code reuse across operating systems such as iOS and Android, while also allowing applications to interface directly with underlying platform services. The goal is clearly to enable developers to deliver high-performance apps that feel natural on different platforms, embracing differences where they exist while sharing as much code as possible.

During development, Flutter apps run in a VM that offers stateful hot reload of changes without the need of a full recompile. For release, Flutter apps are compiled directly to machine code, whether Intel x64 or ARM instructions, or to JavaScript if targeting the web. The framework is open source, with a permissive BSD license, and has a thriving ecosystem of third-party packages that supplement the core library functionality.

This overview is divided into a number of sections:

- 1. The layer model: The pieces from which Flutter is constructed.
- 2. Reactive user interfaces: A core concept for Flutter user interface development.
- 3. An introduction to widgets: The fundamental building blocks of Flutter user interfaces.
- 4. The rendering process: How Flutter turns UI code into pixels.
- 5. An overview of the platform embedders: The code that lets mobile and desktop OSes execute Flutter apps.
- 6. Integrating Flutter with other code: Information about different techniques available to Flutter apps.
- 7. Support for the web: Concluding remarks about the characteristics of Flutter in a browser environment.

Architectural layers

Flutter is designed as an extensible, layered system which exists as a series of independent libraries that each depend on the underlying layer. No layer has any privileged access to the layer below, and every part of the framework level is designed to be optional and replaceable.



To the underlying operating system, Flutter applications are packaged in the same way as any other native application- A platform that is like a specific embedder and provides an entrypoint, coordinates with the underlying operating system for access to services like rendering surfaces, accessibility, and input; and manages the message event loop. The embedder is written in a language that is appropriate for the platform: currently Java and C++ for Android, Objective-C/Objective-C++ for iOS and macOS, and C++ for Windows and Linux. Using the embedder, Flutter code can be integrated into an existing application as a module, or the code may be the entire content of the application. Flutter also includes a number of embedders for common target platforms, but other embedders also exist. At the core of Flutter is the Flutter engine, which is mostly written in C++ and supports the primitives necessary to support all Flutter applications. The engine is responsible for rasterizing composited scenes whenever a new frame needs to be painted. It also provides the low-level implementation of Flutter's core API alongwith graphics, text layout, file and network I/O, accessibility support, plugin architecture, and a Dart runtime and compile toolchain.

The engine is exposed to the Flutter framework through dart:ui, which wraps the underlying C++ code in Dart classes. This library exposes the lowest-level primitives, such as classes for driving input, graphics, and text rendering subsystems.

Typically, developers interact with Flutter through the Flutter framework, which provides a modern, reactive framework written in the Dart language. It nonetheless includes a rich set of platform, layout, and foundational libraries, composed of a series of layers. Working from the bottom to the top, we have:

- Basic foundational classes, and building block services such as animation, painting, and gestures that offer commonly used abstractions over the underlying foundation.
- The rendering layer provides an abstraction for dealing with layout. With this layer, you can build a tree of renderable objects. You can manipulate these objects dynamically, with the tree automatically updating the layout to reflect your changes.
- The widgets layer is a composition abstraction. Each render object in the rendering layer has a corresponding class in the widgets layer. In addition, the widgets layer allows you to define combinations of classes that you can reuse. This is the layer at which the reactive programming model is introduced.
- TheMaterial and Cupertino libraries offer comprehensive sets of controls that use the widget layer's composition primitives to implement the Material or iOS design languages.

The Flutter framework is relatively small; many higher-level features that developers might use are implemented as packages, including platform plugins like camera and webview, as well as platform-agnostic features like characters, http, and animations that build upon the core Dart and Flutter libraries. Some of these packages come from the broader ecosystem, covering services like in-app payments, Apple authentication, and animations. The rest of this overview broadly navigates down the layers, starting with the reactive paradigm of UI development. Then, we describe how widgets are composed together and converted into objects that can be

rendered as part of an application. We describe how Flutter interoperates with other code at a platform level, before giving a brief summary of how Flutter's web support differs from other targets.

Special features React Native :

Wider audience: You don't have to decide which audience to target, i.e., iOS or Android users, as cross-platform software runs on both, which gives you access to a wider user base.

Platform consistency

There are also some navigation and design differences between iOS and Android, and they are in cross-platform development, dealt with by default, thanks to the shared codebase. This helps with creating a consistent app brand identity on both platforms with less effort than if built on native.

Reusable code

This is one of the biggest advantages of cross-platform development as you can build just one codebase for both Android and iOS at the same time. Native app development requires writing code separately and frequently. It needs two different software developers to perform the job – one for iOS and one for Android.

Quicker development

Since only one codebase is required to handle iOS and Android, and everything is in one place, product development is much faster. Cross-platform applications are built as single projects, even though they support different devices, and a large amount of code can be reused between platforms.

Reduced costs

Building cross-platform applications can be 30% cheaper than building native apps, all thanks to the ability to reuse code and faster development, which directly impacts the cost. What you've read so far might lead you to think that cross-platform development is flawless. Well that's not the case, , it has some disadvantages. Let us get into them right now.

Requires more expertise to ensure high performance

It is a common myth that cross-platform apps perform worse than their native counterparts. For instance, both Flutter and React Native aim to run at 60 frames per second. In most cases, cross-platform applications can perform to the same standard as native apps provided that the developers have enough skill and expertise.

Harder code design

Since cross-platform apps must be responsive to various devices and platforms, it makes coding more complex. This results in more work for developers who have to include exceptions for different devices and platforms to account for the differences – especially when it comes to more complex features.

Special features of Flutter

On the surface, Flutter is a reactive, pseudo-declarative UI framework, in which the developer provides a mapping from application state to interface state, and the framework takes on the task of updating the interface at runtime when the application state changes. This model is inspired by work that came from Facebook for their own React framework, which includes a rethinking of many traditional design principles.

In most traditional UI frameworks, the user interface's initial state is described once and then separately updated by user code at runtime, in response to events. One challenge of this approach is that, as the application grows in complexity, the developer needs to be aware of how state changes cascade throughout the entire UI. For example, consider the following UI:



Widgets

As mentioned, Flutter emphasizes widgets as a unit of composition. Widgets are the building blocks of a Flutter app's user interface, and each widget is an unchangeable declaration of part of the user interface.

Widgets form a hierarchy based on composition. Each widget nests inside its parent and can receive context from the parent. This structure carries all the way up to the root widget (the container that hosts the Flutter app, typically MaterialApp or CupertinoApp), as this trivial example shows:



Flutter has its own implementations of each UI control, rather than deferring to those provided by the system: for example, there is a pure Dart implementation of both the iOS Switch control and the one for the Android equivalent.

This approach provides several benefits:

- It provides for unlimited extensibility. A developer who wants a variant of the Switch control can create one in any arbitrary way, and is not limited to the extension points provided by the OS.
- It avoids a significant performance bottleneck by allowing Flutter to composite the entire scene at once, without transitioning back and forth between Flutter code and platform code.
- Decouples the application behavior from any operating system dependencies. The application looks and feels the same on all versions of the OS, even if the OS changed the implementations of its controls.

Pros Cons of React Native

The fact that React Native actually renders using its host platform's standard rendering APIs enables it to stand out from most existing methods of cross-platform application development, like Cordova or Ionic. Existing methods of writing mobile applications using combinations like JavaScript, HTML, and CSS typically render using webviews. While this approach can work, it also comes with drawbacks, especially around performance. Additionally, they do not usually have access to the host platform's set of native UI elements. When these frameworks do try to mimic native UI elements, the results usually "feel" just a little off; reverse-engineering all the fine details of things like animations takes an enormous amount of effort, and they can quickly become out of date.

In contrast, React Native actually translates your markup to real, native UI elements, leveraging existing means of rendering views on whatever platform you are working with. Additionally, React works separately from the main UI thread, so that your application can maintain high performance without sacrificing capability. The update cycle in React Native is the same as in React which means that when props or state change, React Native re-renders the views. The major difference between React Native and React in the browser is that React Native does this by leveraging the UI libraries of its host platform, rather than using HTML and CSS markup.

For developers who are accustomed to working on the Web with React, this means that you can write mobile apps with the performance and look and feel of a native application, while using familiar tools. React Native also represents an improvement over normal mobile development in two other areas1. the developer experience and 2. the cross-platform development potential.

If you've ever developed for mobile before, you could be surprised by how easy React Native is to work with. The React Native team has baked strong developer tools and meaningful error messages into the framework, so working with robust tools is a natural part of your development experience.

For instance, because React Native is just JavaScript, you don't need to rebuild your application in order to see your changes reflected. Instead, you can hit Command+R to refresh your application just as you would any other web page. All of those heavy minutes spent waiting for your application to build can really add up, and in contrast React Native's quick iteration cycle feels like a godsend.

Additionally, React Native lets you take advantage of intelligent debugging tools and error reporting. If you are comfortable with Chrome or Safari's developer tools Figure 1.1), you will definitely be happy to know that you can use them for mobile development, as well. Likewise, you can use whatever text editor you prefer for JavaScript editing: React Native does not force you to work in Xcode to develop for iOS, or Android Studio for Android development.



Figure 1-1. Using the Chrome Debugger

Besides the day-to-day improvements to your development experience, React Native also has the potential to positively impact your product release cycle. For instance, Apple permits JavaScript-based changes to an app's behavior to be loaded over the air with no additional review cycle necessary.All of these small perks add up to saving you and your fellow developers time and energy, allowing you to focus on the more interesting parts of your work and be more productive overall.

Working with React Native can dramatically shrink the resources required to build mobile applications. Any developer who knows how to write React code can now target the Web, iOS, and Android, all with the same skill set. By removing the need to "silo" developers based on their target platform, React Native lets your team iterate more quickly, and share knowledge and resources more effectively.

Besides shared knowledge, much of your code can be shared, too. Not *all* the code you write will be crossplatform, and depending on what functionality you need on a specific platform, you may occasionally need to dip into Objective-C or Java. But reusing code across platforms is surprisingly easy with React Native. For example, the Facebook Ads Manager application for Android shares 87% of its codebase with the iOS version, as noted in the React Europe 2015 keynote. The final application we'll look at in this book, a flashcard app, has total code reuse between Android and iOS. It's hard to beat that! As with anything, using React Native is not without its downsides, and whether or not React Native is a good fit for your team really depends on your individual situation.

The largest risk is probably React Native's maturity, as the project is still relatively young. iOS support was released in March 2015, and Android support was released in September 2015. The documentation certainly has room for improvement, and continues to evolve. Some features on iOS and Android still aren't supported, and the community is still discovering best practices.

Because React Native introduces another layer to your project, it can also make debugging hairier, especially at the intersection of React and the host platform. React Native is still young, and the usual caveats that go along with working with new technologies apply here. Still, on the whole, I think you'll see that the benefits outweigh the risks.

Pros Cons of Flutter

Flutter started out as a startup and later was acquired by Google. Today, it's an open source project which uses Dart (a programming language unique to Flutter) for app development. Alongside faster and easier code writing, Flutter also provides excellent components to make the apps have a more native-like feel and, as a result, better user experience.

Flutter enables you to make changes in your code instantly when it comes to fixing bugs. It has a great UX and flutter based apps have a smooth performance. Testing of these applications takes less time. Developing an application in Flutter is very easy and efficient.

Flutter is quite popular but has not been for long enough to have it's resource base. So while coding in flutter you will have to start from the scratch. Dart is not a popular language so before making flutter apps you'll have to learn dart language first which is supported by Flutter.

Results

Flutter is said to be a strong contender to React Native. For now, though, React Native is more mature and stable - not to mention that it takes advantage of the most popular programming language, JavaScript, and already has a large community of users and supporters behind it.

At the same time, however, Flutter seems to be growing at an unprecedented rate. It also happens to be faster than React Native - there's no need to go through a JavaScript bridge, and thanks to the use of Dagger it's easy to write & compile code at speed. It might be just a matter of time before it's used more widely.

This doesn't mean that other cross-platform technologies become obsolete, though. After all, the nature of both Flutter and React Native allows to reduce time-to-market and makes developing mobile apps more efficient, which attracts increasingly more developers and app owners.

Here's a short comparison of Flutter vs React Native:

	Flutter	React Native	
Definition	Google's UI toolkit for developing natively compiled applications for mobile, web, and desktop from a single codebase	A framework for building native iOS and Android applications with JavaScript	
Creators	Google	Facebook March 2015, F8 Conference JavaSoript +	
Official release	December 2018, Google I/O		
Programming language	Dart		
Free & open-source	3 + .		
When to choose it	 If you want to reduce time-to-market as much as possible If you plan to scale the app across different platforms and oporating systems If you like experimenting with new, not fully mature technologies 	 If your developers are already fluent in JavaScript If you prefer creating your app's Ul with native components If you approciate having a vast number of tutorials and libraries at your disposal 	

CONCLUSION

The verdict? Both Flutter and React Native have their pros & cons when it comes to cross-platform mobile development. Flutter definitely has its limitations, but the benefits are hard to ignore for specific use cases. Essentially, if you want to reduce development cost & time, and release the app on all available platforms simultaneously - Flutter can be a good choice. Each app is different, though, which is why you should always go after a solution that can support your goals and strategy in the long run.

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DESIGNING COVERT CHANNEL USING INITIAL SEQUENCE NUMBER

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ABSTRACT

The process of exchange of data within the Local Area Network (LAN) or via the Internet may get exposed, altered or damaged by a violent person who has been portrayed as a real threat to the transport and information system especially if this information was sensitive, important and accessible only to authorized person. Therefore this data should be protected from such threats. Many theories were raised under the pretext of data protection against these threats, such as hiding the contents of a posted message called cryptography or concealing the existence of such a message called steganography.

Two ways to hide this data have been suggested. One of them used the source port and the destination fields for the Transmission control Protocol (TCP) title as the stego key. And another uses a combination of source and source port headers for Transmission Control Protocol (TCP) with protocol and translation fields for Internet Protocol (IP) title fields. The process is summarized with the use of the optional OR (XOR) between that data required to be encrypted with the STEGO key. The sequence number field has been selected in the Transmitter Control Protocol (TCP) to be the hidden data network company. Four characters are included in this field and are sent to one connection.

Keywords—CovertChannel,Steganography,Cyptography,LAN,TCP,XOR,OR,stegokey,headers,Transmission Control Proto- col

INTRODUCTION

A covert channel is a logical link between two compromised systems through which two end applications can secretly exchange information without being detected. A covert channel remains undetectable to an intermediary, despite the very fact that the intermediary may have privileges like a capability to intercept and observe all communication traffic along this channel. A covert channel is intended to be hidden within the traditional communication traffic of a legitimate logical channel, like TCP or UDP. Secret information is embedded within the legitimate channel packets in such the way that only the top applications can detect and retrieve this information. Anyone else watching the network traffic is unable to detect the presence of such information within the legitimate channel packets. Because a covert channel hides within a legitimate logical channel, it's a awfully simple yet effective mechanism for exchanging information between two end applications without alerting any firewalls or intrusion detectors on the network.

In this paper, we describe the design, implementation of hiding the data by using field of TCP header. It is implemented by constructing the packet that consists of headers and payload. The sequence number field of TCP header was chosen for performing data hiding and sending it to network traffic. The intended recipient is captured the constructed packets and extracted it to retrieve the original data.

LITERATURE SURVEY

Previous works show many techniques used to hide data in TCP/IP protocol suite either by using reserved or unused bits in headers and payload or by using synchronization time of the packets or combine them.

Rownland [ROW 97] applied his ideas to hide data using Initial Sequence Number Field (ISN) (16-bit) of TCP by multiplying ASCII of each character with (65536*256) to generate number which was placed as a sequence number value for each connection. On receiver side, opposite process was applied to get the character by dividing the sequence number's value on (65536*256). The big disadvantage, when every character is transferred through a connection, is that many requests were made to connect to the server without receiving Synchronize- Acknowledgement (SYN/ACK) packet would attract the attention

Ciobanu [CIO06] suggested SCONeP (Steganography and Cryptography Over Network Protocols) and used ISN after solved the issue which was appeared in [ROW97] by sending a Reset (RST) packet to abort a connection instead of an Acknowledgement (ACK) packet after 4-bytes would be transmitted. The data was encrypted and compressed before transferred.

Singh[SIN13] implemented data hiding by using the identification field (16-bit) with ISN field (32-bit) for disguising (6-bytes) of characters after encrypted it using an algorithm which was chosen by the sender and whether to compress it or not is determined by the sender.

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Biswas[BIS16] was using the sequence number field as a carrier for Rivest-Shamir-Adleman /Data Encryption Standards (RSA/DES) key that was used to encrypt the data then, the ciphertext was embedded in the data field. The receiving packet was captured through wireshark application. After the ciphertext was taken from the data field and obtaining the key from the sequence number field, the ciphertext was decrypted to get the data.

METHODOLOGY AND IMPLEMENTATION

Transmission Control Protocol (TCP)

TCP is a connection oriented protocol, meaning that the data must be transferred after the connection is established. In addition to establish connection and data transmission, the connection must be released. Because it uses sequence number to ensure delivery correctness and confirmed no data was lost when network failure occur by applying retransmission / timeout mechanism, so it was considered a reliable protocol. It is also using sliding window algorithms to transfer large files. Also, it is stream-orientation because it uses buffer in sending and receiving and this enable application to write very small or an amount of data and divide it into appropriate size [DOR16]. It is also process – to process communication through using port numbers [FOR10]. Port numbers from (1-1023) are system ports. Port numbers from (1024-49151) are registered ports while ports from (49152-65535) are private ports.

TCP segment consists of header part and data part. As shown in fig(), the header part fields are:

Source Port Address: It is a (16-bit) length and its role is identifying sending service in.

Destination Port Address: it is a (16-bit) length and its role is identifying receiving service from.

Sequence Number: It is a (32-bit) and it is assigned to every byte of TCP segment since TCP is byte stream as mentioned previously. When the sequence number must be generated randomly through establishing connection, SYN bit flag should be set and it was known as ISN.

Acknowledgement Number: it is also a (32-bit) and it is essentially representing the sequence number that expected to receive as a next data byte.



Text Hiding Using Sequence Number field Implementation

Although, there are fields that are suitable for hiding like reserved or option fields of TCP header protocol but sequence number was chosen for hiding information. A reserved field isn't used because it's designed for future use. All bits set to zero so any change to its values may attract attention. Although the option field size can go up to a (40-byte) but it's vulnerable to filtering. This results in exclude from hiding.

The selection of using sequence number field implies that TCP and IP headers must be created manually because within the normal transmission of knowledge in client- server architecture, operating system's kernel was taking care of adding required headers.

IP and TCP header have variable size between 20-60 bytes looking on the existence of an option field. within the proposed system, the option field wasn't taken into consideration.

Some fields of the 2 protocol headers must remain unchanged through data transmission while others must be changed.

Some fields of the 2 protocol header are version, header length, and sort of service. Other fields like identification, flags, and fragment offset that specified for fragmentation strategy are changed through fragmentation, total length, time to measure, checksum, source address and destination address are going to be changed. Protocol field has (6) value that's pointed to payload of IP header is TCP segment.

In other side, fields of TCP header like source port, destination port, sequence number, acknowledge number, flags, checksum, and window fields should be changed through transmission.

irrespective of which software system was used, root privilege level access should be used since custom header of packet was created.

As mentioned, through packet creation, The sequence number field are going to be utilized in hiding data. during this proposed system, two methods for generating and hiding data in sequence number field were used.

In the primary one, source and destination ports of TCP header fields were used.

A combination of fields from IP and TCP protocols headers (source and destination ports, version and protocol) were were used for generating the sequence number fields within the second method.

Sending packet that include the hidden data in sequence number field was in SYN packet. SYN packet is that the first packet in three way handshake process.

Receiving packet to extract the hidden data was in SYN- ACK packet which represents the second packet in three way handshakes and also acts as a reply to the connection request from sender.

SYSTEM MODEL

The structure of the propose system for Hiding text in

TCP/IP is illustrated in below fig(). It consist of three models. The sender (client), server and receiver are the three models respectively.

Three parts are in the sender model. These parts are: create packet, send SYN packet, receive SYN-ACK packet. The second model is the server. The main function of the server is to listen for the connection and reply to the sender. The last model is the receiver model. It consists of three parts. These parts are: capturing packet, analyzing packet and data extraction procedures.



Generate Sequence Number

As described earlier, two methods are applied to hide data through the sequence number field. These methods are as follows:

Using TCP Header Fields

Source and destination ports were chosen to be a stego – key as shown in Figure (). The generation of source port will be



Algorithm for Generating sequence number

Input:

Data to be hidden, source port, destination port

Output:

Sequence number along with hidden data

Begin

Step 1: Convert characters of data to decimal Step 2: Convert result of step1 to binary

Step 3: Store the result of step2 to data variable Step 4:Convert source port number to binary Step 5:Store the result of step4 to srcport variable Step 6:Converting destination port to binary

Step 7:set result of step 6 to destport variable

Step 8:Concatinate source and destination ports in their binary representation

Step 9:set result of step 8 to srcdest variable

Extraction of Data through Acknowledge number

random through using random function in python.

A hiding is accomplished by using XOR operation. Since XOR is

a logical operation, so all values were converted to binary. The steps of this function are illustrated in algorithm.

As described earlier, two techniques were used to implement the hiding process.

In These techniques, the sequence number field is used for hiding but in extraction process the acknowledgement field is used since it was resulting from sequence number value +1 with the other fields that were using through hiding process to get the hidden data as shown in figure.

The Source Address is : The Destination Address	192.168.3.107 is : 192.168.3.102	
The Data to be Hidden in	and a second sec	
	The Hidden Data	
Acknowledgme Number	at Steg	, Key
	Destination and Source ports	Destination and Source ports with version
		de TBhada

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The hidden data will be extracted from the acknowledgement field of SYN-ACK packet since the data is hidden in sequence number field of SYN packet. As mentioned previously, acknowledgement number value is sequence number value+1.

Attention is taken for source port and destination port because their values are replaced with each other with respect to sender and server. After that, the data is retrieved as illustrated in algorithm.

Algorithm Data Extraction using acknowledgement number with srcdstports Input:

Acknowledge number, source port, and destination port

Output:

Hidden Data Begin

Step 1: converting acknowledgement number to binary

Step 2: set result to ackn variable

Step 3: converting source port to binary Step 4: set result to binsrcport variable

Step 5: converting destination port to binary Step 6: set result to bindestport variable

Step 14: set result to hiddendata variable Step 15: return hiddendata

End

RESULTS

Geneating Stego Key

The Geneartion of Sequence Number is started Message to binary = 011010000110010101010001110000 Source port to binary = 0110100111010110 Destination port to binary = 0000100111111000 Concatination of source and destination XOR of Message with Source The Generated "

Extraction of hidden key:

Extraction of the Hidden Data is started Acknoweldgement to binary = 0011100101111110100010000 Destination port to binary = 000010011111000 Source port to binary = 010100010001001 Concatination of source and destination ports in binary= 01010001000110100000100111111000 XOR of Acknoweldegment with Source and Destination ports 011010000100011001010100001100001

The Hidden Data is : help

The Source Address is : 192.168.3.107 The Destination Address is : 192.168.3.104 The version value is : 4 The protocol value is : 6

The Data to be hidden is : help

To ensure that all packets are transmitted, the packet sniffing program Wireshark will be used to collect all transmitted packets through my network. As shown in Figure below the SYN packet of the proposed system is sent from "192.168.0.104" source address to "192.168.0.105" destination address and "7365" random source port to "8080" destination port. The analyzed packet can be shown for the two protocols IP and TCP. In Figure IP Header of SYN packet is shown.

Serious issue was the restriction of field's sizes, since it is limited to a fixed size. This limitation may restrict the size of data in turn. Therefore, in order to send more data, the sender has to increase the connections. As compared with [ROW97], the proposed methods are transferring four bytes through one connection while in [ROW97] one byte is transferred. The stego_key in [ROW97] is a static value summed with the ASCII of each character to be transferred while in the proposed methods its value is variable and contentiously changed. In

both [CIO06] and [SIN13], two algorithms' for encrypting and compressing are applied to (4-byte) of data before transferring it. This leads to increase the used resources for processing.

FUTURE WORK

The proposed system can be developed by adding interfaces to program. It can also make it as a tool running from terminal.

Ņ	Fransmission Control Protocol, Src Port: 7563, Ost Port: 8000, Seq: 831437733, Len: 0
	Source Port: 7563
	Destination Port: 8088
	[Stream index: 5]

Since sequence number goes in a continuous fashion we can think of a algorithm that can be used to send more than 4 bytes of data when the connection get established.

	Sequence number: 831437733
	Acknowledgment number: 0
	Header Length: 20 bytes
•	Flags: 0x002 (SYN)

Other fields can be exploited for hiding as sequence number as like identification field in conjunction with sequence number. Other protocols can be used and its fields combined with fields of IP and TCP protocol headers.

The SYN-ACK packet can be seen as shown in Figure below The receiver of the hidden data captures this type of packet to extract data from it.

Timé	Source	Destination	Protocol I	Length Identification	Info
35 4.766696478	217.12.15.95	192.168.8.194	TCP	54 8x9888 [8]	443-48298 [RST] Seq=4217397166 Win=0 Len=0
36 4.760787184	217.12.15.96	192.168.0.104		54 9x9993 (6)	443-48298 [RST] Seq=4217387166 Win=8 Len=8
37 4.865921346	104.197.53.200	192.168.8.104	TLSv1.2	119 0xe147 (57671)	Encrypted Alert
38 4.865945940	192.168.0.104	104.197.53.200	TCP	66 9x4a69 (19949)	50718-443 [ACK] Seq=1800359945 Ack=3452385.
39-4-806529423	104.197.53.200	192.108.8.104	TCP	68 0xe148 (57672)	443-50718 [FIN, ACK] Sec=345238549 Ack=180.
48 4.866573414	192.168.0.104	104.197.53.200	TOP	66 0x6a51 (19041)	50718-443 [FIN, ACK] Seq=1800358945 Ack=34_
41 5.120116835	104.197.53.200	192.168.8.184	TCP	66 0xe149 (57673)	443-58718 [ACK] Seq=345238558 Ack=18883599.
42 7.898962412	192,168.0.104	192.168.0.105	TCP	54 0xdd5e (56670)	7563-6080 [SYN] Seq=831437733 Win=53270 Le.
43 7.699155268	PosSyste_d7:98:a4	Broedcast	ARP	60	Who has 192.168.0.1847 Tell 192.168.0.185
44 7.699170633	HonHaiPr_41:e3:21	PosSyste_d7:98:a4	ARP	42	192.168.0.104 is at 20:33:7a:41:e3:21
45 7.899178297	HnnHsiDr #1+63+71	Breadcast	400	69	Who has 192 168 R 1842 TAll 192 168 R 185
46 7,899968564	192.168.0.165	192.168.0.104	TOP	68 9x9999 (6)	8688-7583 [SYN, ACK] Seq=2613593383 Ack=83.
47 7.478859953	192.100.0.104	217.12.10.90	11391.2	112 0X8+07 (Jeace)	Application paca
48 7.537676496	192.158.0.104	217.12.15.95	TLSV1.2	112 0x84d8 (58584)	Application Data
49 7.546589558	192.158.9.184	217.12.15.96	TLSV1.2	97 9xe4d9 (58585)	Encrypted Alert
59 7 541323386	192.168.8.164	217.12.15.95	TOP	68 8xe4da (58586)	48288-443 [FIN, ACK] 500=3808914352 Ack=27.
51 7.629220832	217.12.15.96	192.168.0.184	TLSV1.2	112 0x9feb (40939)	Application Data
52 7.762693260	217.12.15.96	192.168.0.184	TLSV1.2	97 9x9fec (40940)	Encrypted Alert
Sequenc	e number: 2613	593363			
Acknowl	edgment number	: 831437734			
Header	Length: 24 byt	es			
Elena	OUDID / CVN AC	1			
Flags:	UXUIZ (SYN, AU	K)			

CONCLUSION

In this proposal, a steganography system based on TCP/IP protocols was constructed. The basic requirements for hiding data in such carrier are described. A good combination for network programming was shown through python as a modern programming language and Linux. TCP/IP header fields were found as a good carrier for sensitive data to be hided. With few minor operations with the field's contents, a secure carrier can be constructed. The

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RECIPE SEARCH AND RECOMMENDATION SYSTEM

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ABSTRACT

Recommendation systems have particularly become popular these days and are used almosteverywhere whether it we online shopping, reading books, watching movies, or searching for a recipe. Taking this in consideration our system can give recipes from different cuisines when provided with the image of the dish, name of the dish or ingredients used as input. The system has the feature of giving caloric value of the several ingredients used in the recipe for preparing the dish. User can publish his/her recipes and can view that have been published by other users. The system aims topromote the healthy aspects by keeping the nutritional value in consideration. It can also be helpful for cooking enthusiasts as a social media application curated by them and for them. The application can provide options of getting ingredients online from several websites that will be listed for a specific ingredient. It clearly promotes thefood industry and its growth by allowing people to explore different cuisines and trying new dishes.

Keywords— recommendation system, food search, recipe, cuisines, RNN, CNN

I. INTRODUCTION

Nutrition is one of the biggest modifiable factors in our lives and hence it plays an important role. Although eating is a basic need, sometimes people do not know what to choose. They are not sure what to cook for dinner, lunch or have in snacks and breakfast. Humans perceive flavor in different ways and have different taste. Therefore, we cannot say that a single dish would be liked by everyone.

A recommender system to suggest them what to cook using the ingredients that are already available at home can help them cook well. In [6] the authors developed a system that infers people's preferred ingredients based on the recipes they like People are more considerate about health these days and believe in calorie-based eating. We can see people who track their daily nutrition and calories of the ingredients involved in a dish. So, a recommender system that provides calorie value of the ingredients used in a recipecan prove to be helpful.

People enjoy food photography as they appreciate food. However, picking appropriate food to eat implies complex decision making processes [4]. Food photography has become a very popular trend in this era. We can see several social media sites flooded with food images every day. Although the image of the food looks very delicious but justby looking at the image one can't name the dish or guess about the recipe of the dish. Keeping all these terms in our mind, our recommender system will be able to suggest recipes using the search feature providing options of search by ingredients, search by images and search by name.

It will provide the calorie value of the ingredients that would be used during the food preparation using the recipe. This helps user to cook attentively given a dietary preference along with the list of the items involved in the recipe.

There are several cooking apps and websites available today that are used to find the recipe of a dish based on some preference whether it be by keywords like name of the dish, food ingredient or even by using the name or type of the cuisine.

Talking particularly about cooking, it is a hobby for some but is also a major problem for others. It also becomes difficult to decide what to cook and how to cook when you don't have enough ingredients at home.

In this era of technological advancement[5], we can see that how everything is available on the internet and can be surfed with the help of browser on mobile as well as large screen devices. Like that one can also search for the food recipes online and get a variety from it. But there are instances when one doesn't have access to the internet and moreover, we often keep on scrolling the internet in search of a specific dish but certainly end up cooking or eating unhealthy due to lack of time and ease of cooking. To overcome such problems a system needed to be developed that can also contribute to the food industry and its development

II. RELATED WORK

Recommender systems are lifesavers in the infinite seething sea of e-commerce, improving customer experience. Rather than relying on recipes ingredients, [13] proposed an Ensemble Topic Modelingbased approach that relied on features that were previously extracted from a recipe database to deliver recommendations. Recommender engines are eliminating the tyranny of choice, smoothing the way for decision-making, and boosting online sales. Moreover, ubiquitous AI technologies are sneaking into e-commerce, too, not only solving the problems of irrelevant recommendations but predicting the customer's next steps.

Smart cooking has recently become the center of increased interest as shown by the development of related workshops such as the Workshop on Multimedia for Cooking and Eating Activities [7]. In this domain, the increasing importance of food related tasks in computer vision has motivated the creation of many related datasets. To solve more complex tasks, other initiatives provided richer sets of images.

For example [8], one proposed the Food-101 dataset, containing around 101,000 images of 101 different categories. Super Cook [9] is a recipe search engine that lets user search by ingredients they have at home. This helps to find set of recipes; the user can make with the ingredients that are available at home. Super Cook can help users save hundredson grocery bills by showing how to fully use the ingredients user has at home. But this website has some issues when handling by the user that is when a user search for a dish it displays only the image of the dish to be prepared along with the name and if a user needs the description, then it will be displayed in multiple pages. Which creates a problem of buffering and user should have the network connection for searching needed information.

In this Project we decided to use Deep Learning. In general, deep learning (DL) is the subfield of ML learning from multiple levels of data representations and abstractions. Convolutional Neural Networks (CNNs) are a good fit for unstructured multimedia data processing given effective feature extraction. They are processing the data like image, text, audio, and video.

III. LITERATURE REVIEW

3.1 Recipe Recommendation using ingredient network In this study they have developed a system that tells the user's preference of ingredient, cooking method and food preferences greatly affect a person's lifestyle and their health.

3.2 Recipe Recommendation

In this study we found that the ingredients used need to be provided. The food recommendation system uses content- based filtering algorithm that is well established for their nutritional value.

3.3 Optimization Framework for Flavour and NutritionBalanced Recipe: A Data Driven Approach

In this paper we found that the choice of the food is mainly depended on both flavour and nutrient but the biasness towards to the flavour factor has led the human to effect badly on their healthier lifestyle. Recipe recommendation literature typically considers either flavour or nutrient factor.

3.4 Cuisine classification using recipe's ingredient

This paper talks about how the systems is able to explore the linkage between recipe's ingredients and identification of a cuisine. This has been tackled as a problem of cuisine classification.

3.5 Yum-Me: A Personalized Nutrient-Based Meal Recommender System

In this study we studied how the system has been designed to meet individuals' nutritional expectations, dietary restrictions, and fine-grained food preferences.

3.6 A recipe recommendation system based on automatic nutrition information extraction

In this paper we found that a recipe recommender system is based on automatic nutrition information extraction and howit can be used by the users to get the nutrition information.

IV. PROPOSED SYSTEM

A. Introduction

There are many instances when we are not sure what to cook for dinner, lunch, or breakfast. Thinking of what to cook is additionally a difficult problem. To attract children liking, parents need to change the menu every day. It is difficult to think what to cook with limited ingredient within the kitchen. Sometimes we have the right ingredients but are confused like what to cook from them. There are days when we crave for a certain dish by looking at its picture but do not know the name of it. Although we can search for the recipe online [10], but we often keep on scrolling several websites and ultimately eat something that is easy to cook and end up feeling guilty for eating unhealthily. For the solution we are developing a web application that can help you find recipes using the ingredients you already have, by the images of a dish and displaying calorie of each ingredient. If the ingredients involved in arecipe are notat home, it would give websites where you can find that.

B. System Architecture



Fig. 1. System Architecture

The overall architecture of the Recipe Search and Recommender System has been divided into three categories viz. Web Interface, Server end Back-end Logic. The admin and user are the two actors responsible for performing tasks and evaluating the recommender system. The admin can view the user database and the dataset API that will be used during the overall process. The user has options of login and registration that is verified. User can publish recipes and people already having an account on the system can view them. User can even search the recipes and get recommendation using the search by image, search by name, and search by ingredient feature. The data taken during the registration is encrypted and stored in the database that is only accessible to the admin.

We have tried to use a collaborative filtering technique along with the k-means clustering and KNN algorithms too. The web app also consists of a chat feature. We will be using the socket.ioof python for the use.

V. IMPLEMENTATION

To investigate research questions, first step is to collect a recipe dataset we could use to build the recommender system that considers both the user's preferences. Users' preferences are learned via collaborative filtering (CF), a popular approach that relies on user ratings and that reports better results compared to content-based approaches.CF methods allow a recommender system to rank recipes according to a score that represents how likely the recipe is to correspond to the user's preferences. The recommendation system will allow user to give input either in Image for or text form, so CNN (Convolution Neural Network) is used for image classification and RNN (Recurrent neural network) is used to work on text input.

Convolutional Neural Networks (CNN) is variants of Multi-

Layer Perceptron (MLPs) which are inspired from biology. These filters are neighborhood in enter area and are consequently higher suited to take advantage of the robust spatially neighborhood correlation found in natural images. Convolutional neural networks are designed to process two- dimensional (2-D) image. A CNN architecture used on this venture is that described. The community consists of three types of layers namely convolution layer, sub sampling layer and the output layer.

Starts with an input image. Applies many different filters to it to create a feature map. Applies a ReLU function to increase non-linearity. Applies a pooling layer to each feature map. Flattens the pooled images into one long vector. Inputs the vector into a fully connected artificial neural network. processes the features through the network. The final fully connected layer provides the "voting" of the classes that we're after. Trains through forward propagation and backpropagation for many, many epochs. This repeats until we have a well-defined neural network with trained weights and feature detectors.

Recurrent neural networks (RNN) are a class of neural networks that are helpful in modelling sequence data. Derived from feedforward networks, RNNs exhibit similar behavior to how human brains function. Simply put: recurrent neural networks produce predictive results in sequential data that other algorithms can't. RNN's and feed-forward neural networks get their names from the way they channel information. In a feed-forward neural network, the information only moves in one direction — from the input layer, through the hidden layers, to the output layer. The information moves straight through the network and never touches a node twice.



Fig 4.1. Implementation

VI. CONCLUSION

The project helps to make users aware of the various dishes which can be cooked from the available set of ingredients when given as input by a user. Nutrition and health being the most important aspects of one's life are also one of the most neglected areas. This project will also ensure that a user is aware of his/her food intake and calorie value and thus they can easily explore and make healthier meals from the ingredients already available.

Our future scope includes Discussion forum for Q/A among the users and Peer to peer direct chat communication. The

Post's feed can be further developed to recommend posts basedon user's choices.

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HEALTHCARE APPLICATION USING REACT NATIVE - A STUDY ON REACT NATIVE AND ITS FEATURES

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ABSTRACT

Today's world revolves around smartphones. The arrival of wide-ranging, easy operating systems like Android and iOS have turned the most cell phone into a powerful personal device proficient of carrying out almost all the tasks of an individual asks it to do. The smartphone market has grown largely since of all the convenient functions it offers with the help of apps. Healthcare mobile app development has become a multi- million industry due to the massive rush in the demand for smartphones. Our application aims at Interlinking of nearby Hospitals for Resource sharing in Emergency where patient/relative of the patient can find nearby hospitals and resources available in hospital. The goal of this project is to provide proper health care facilities during emergency to the patients. React Native allows us to write native apps in JavaScript for both iOS and Android. It gives us the ability to use all the native components like gestures, push notifications, camera, and location. There are some other JavaScript libraries for building mobile apps like ionic or PhoneGap.

Keywords-Code-Base, React-Native, Firebase, Cross-Platform, Mobile App

INTRODUCTION

React Native is a JavaScript framework for real, natively interpreting mobile applications for Android and iOS. React Native is based on React, which is Facebook's JavaScript library used for building user interfaces, but instead of aiming the browser, it aims on mobile platforms. In simple words: web developers can now write mobile applications code that look and feel actually "native," all from the comfort of a JavaScript library that developers already know and love to code in. Plus, because most of the code we write can be shared between platforms, which make it easy to simultaneously develop for both iOS and Android. Similar to React for the Web, React Native applications are written using a mixture of JavaScript and XML-sequel markup, known as JSX. Then, under the hood the React Native "bridge" invokes the native rendering APIs in Objective-C (for iOS) or Java (for Android). Thus, your application will render using real mobile UI components, not web views, and will look and feel like any other mobile application. React Native also exposes JavaScript interfaces for platform APIs, so your React Native apps can access platform features like the phone camera, or the user's location. React Native currently supports both Android and iOS, and has the potential to expand to future platforms as well. In this book, we'll cover both iOS and Android. The vast majority of the code we write will be cross-platform. And yes: you can really use React Native to build production-ready mobile application.

RELATED SURVEY

In this research we have explored applications developed using a similar approach that has been deployed in Play store and App Store to validate its functioning. The applications are illustrated below:

Practo mobile application: Practo is a company which deals with ordering medicines and making appointment with the doctor and is really ahead in the game of health care in India's north region. It deals with all kind of doctors, assists in getting appointment from anywhere and holds a good user interface.

Myra: This company also deals with health care, and being a Bengaluru- based company offers advantage of getting the medicines under 1 hour at the doorstep. In inception to navigating in the mobile app, user enters medicine name and quantity, sees the product and generates the order.

NetMeds: This company also deals with ordering medicines and delivering the medicines at the user's doorstep.

ANALYSIS OF METHODOLOGY

Analysed Framework

Analyzed framework Comparison would be made of the two most common JavaScript front end Frameworks, and dominance of react.js continues to rise over the years. The following figure displays the rating of all accessible JavaScript frameworks:



React Vs Angular

Javascript is one of the most popular and easier languages among all the developers nowadays. There are a lot of developers, and they love to build their application, project and web related thing using script but still there is a confusion when they have to pick up right framework or library for their project. Angular and React.js is the topmost priority for all but still, most of them can't decide between both on which one would be good for their project. Freshers want to know which one is easy to learn and since with less functionalities React.js is easier as it has more demand in the market and developers want to learn something which is easier and faster to code.

React.JS is a library and not a framework to build interactive user-interfaces. On the other hand, Angular is a complete framework.

Learning: Angular is a complete framework which requires a lot of learning to be done and developers must put in a lot of effort. In advance topic, it requires to learn change detection etc. On the other hand, React.Js is just a library and so it is having fewer topics and easier to learn as compared to Angular. React uses JSX (Javascript XML) which is a way of writing HTML into JavaScript. React provides flexibility and developers can learn quickly using this.

Server side rendering is yet another important advantage for some type of React.js implementations using Axios etc whereas it is a bit difficult to connect to server using Angular.js

Components: Angular works on Real DOM. Angular follows bidirectional data flow also it is larger in size with a lot of memory(92K B) in comparison of React. React on the other hand works on Virtual DOM which is a lightweight copy of a Real DOM size(46KB) of React is smaller than Angular.

Downloads: Everywhere popularity of react is better and is having more downloads as compared to angular which is a complete framework with all the functionalities needed by users or developers. \Box SEO: Relatively better SEO in comparison with angular

Binding: React.js has 2-way binding data property and Angular.js has 1-way binding property

TypeScript vs JavaScript/Flow: React uses JavaScript, a dynamically-typed language (which means you don't have to define the variable's type). Because many developers already know and love JavaScript, this can be seen as a pro. Conversely, Angular uses Typescript which is old and not favoured that much by the users or developers

Mobile solutions of React are usually better than Angular 3.12

SPECIAL FEATURES OF REACT NATIVE

Open Source

Like many other (popular) open-source projects, it's reassuring to understand that thousands, sometimes many developers worldwide are using an equivalent technology, facing equivalent struggles and encountering equivalent bugs. Any questions are often answered by a legion of developers, potential bugs are going to be fixed even before one has noticed them, and forums are flooded with useful tips, workarounds.

Backed by Facebook

Considering the fact that Facebook believes in this project, it is certain that they're going to invest considerable time and energy in improving the framework and delivering upgrades on a daily basis. This has proved to be the case thus far, and undoubtedly will continue for several more years. Because of

Facebook, React is proving to be a future-proof, sustainable choice.

Speed Up Development

One of the most reasons for Facebook to make React must are this advantage: compared to a standard Javascript page, it takes far less time to load an internet page using React. This is one of the significant React Native features as it suggests that users will see React- generated pages more quickly than others, and can be less inclined to abandon it. On top it also means Google will scan these pages more quickly, and attribute a better score to them. a really valuable advantage for web applications.

These are the basic features of React Native. Apart from these basic features, there is a lot more technicality to it, which has changed and improved with each version. Let's have a look at those.

Community Driven

The development of react-native can be dated back to 2013. This was mainly driven by the need of the developer community. It was the search for a mobile alternative that would combine the advantages of mobile app development along with the power and agility of the native React environment, which resulted in the development of React Native.

Hereafter it was continuously pushed forward by the development community. availability of a massive group of enthusiastic JS and native developers willing to share their technical know-how is an added advantage to using such a community-driven environment. React Native's community happens to be one of the strongest communities in the cross-platform mobile application development world that plays a major role in react native features. Its popularity started increasing because developers started contributing from all over the world leading to a strong community presence.

Maximum Code Reuse & Cost Saving

With React Native, one can use the same code for deployment both for iOS and Android. This method is significant in saving in improvement time and cost to half. In practice, the cost-saving may be a bit lower however still more enough to make the investment worth the while. According to recent calculations, approximately 90% of the code may be reused between Android and iOS, but it might be wise to calculate some more time for practical adjustments as well.

Live Reload

Respond Native may be considered as the mobile next step after React: It expands on the React thoughts and permits you to make powerful mobile applications. In fact, React Native features a fascinating additional feature that is not found in the native frameworks: the 'live reload' feature, which empowers you to quickly observe the aftereffect of the most recent change that you have made to the code. If you've got two home windows opened – one containing the code and the opposite showing a cell screen because of the code – observe the impact of what you have changed in one screen, on the other screen.

REACT ADVANTAGES & DISADVANTAGES

React is a JavaScript library used to build reusable UI components. open sourced by Facebook in. Some of the reasons for choosing react as the front End development are as follows:

Easy to learn as we can quickly build things

It helps us build a rich interface as poorly looking interface wouldn't look good.

Faster development and can be used to earn money faster too. Productivity is an important factor and React is definitely exhaling in that case as well.

It is trusted by great companies and all these companies uses React to build their websites. One of the well-known companies is Netflix itself

It has got strong community support and the number of downloads exceeds Angular

It is one of the trending topics and everyone is keen on the development too.

Some disadvantages along with all advantages are as follows:

Need to import libraries for state and model as React doesn't implement MVC and also is not having a complete structure.

CONCLUSION

This paper examined the use of react is primary for the front end technologies and for the creation Web applications. The front end frameworks React and Angular were compared and React was definitely a better choice. React was discussed in details and its advantages and disadvantages were listed too. The criteria for

selection of specific framework were clearly identified and react should be chosen in most of the cases. Also, one more concept was discussed as well that is nothing but The Virtual Dom in react and its advantages on how it increases the performance of the UI and also reduces the delay.

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ARTIFICIAL INTELLIGENCE AND ITS IMPACT ON SOCIETY

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ABSTRACT

Artificial intelligence (AI) is considered as a new concept. It is associated with the concept that intelligence is supposed to be manifested by the computer systems. It was the sole property of humans previously. Without human help, the AI can take decision and can solve complex problems in different sectors of the society. Artificial Intelligence has been developing rapidly in recent years in terms of software algorithms, hardware implementation, and applications during a vast number of areas. The aim of this review is to stay track of most recent scientific accomplishments, to know the supply of technologies, to understand the tremendous potential of AI in Society, and to provide researchers in related fields with inspiration. AI can be a major force for social good; it depends in part on how we can shape this new technology. It has brought in a vital societal change in the perspective of exposure of human intelligence. The entrv cutting age technology (AI)has caused some impacts the of this in society deriving huge advantages as well as throwing some entangled challenges.

Keywords: Artificial intelligence (AI), Machine learning, Neural network, IOT etc.

1. INTRODUCTION TO AI

Artificial Intelligence is ability of machines to perform tasks that are associated with human beings [1]. AI is a branch of computer science in which we can create intelligent machines which can behave like a human, think like human and able to make decisions on their own [2]. AI is also defined as the intelligence of human, it also refers to situations where machine can simulate human minds in learning and analysis and work to solve the problem. This kind of intelligence is referred as machine learning [3].

AI involves both hardware and software. From a software perspective, AI is concerned with algorithms. An artificial neural network (ANN) is a conceptual framework for executing algorithms. From hardware perspective AI is mainly concerned with implementation of Neural Network algorithms on a physical computation platform [4]. Due to rapid development of AI software and hardware technologies, AI has been applied in various fields such as IOT, machine vision, autonomous driving, natural language processing and robotics.

There are many positive impacts on human in the field of healthcare, scientists, medical researchers, clinicians, mathematician and engineers, when working together can design on AI. Health professors and medical researchers can find new and efficient ways of treating diseases. Digital computers can assist in analyzing robotic system can also create to do some critical medical procedures [5].

2. AI AND SOCIETY

The anticipated arrival of this AI technology has brought a short, medium and long term changes in our society. Entry of AI in the society has brought in major implications for professionals who are used to deal with modern technologies, to the legal practitioners. At this stage, it's important to think about the possible impact of AI in terms of increased inequality, unemployment and unethical behaviors. AI can analyze different collected information of various types. This has brought in great concerns over data protection, cyber security and data privacy.

It is a fact that every technological innovation invites effective potential for advancement as well as for damages to the society. AI can analyze and can process data. This capability of AI is expected to help for alleviating several pressing problems of the world. In this way AI can do good to the society.

2.1 Labor market forecasting

Governments of many countries are now using AI technology to improve the efficiency of their employees working in all levels. Governments of various countries also are taking help of AI to enhance their financial allotment mechanisms and to assist to optimize their budgets. There are other instances through which society is being benefited by the grace of AI [6].

AI could cause significant economic benefits: across sectors, AI technologies offer the promise of boosting productivity and creating new products and services. This potential raises questions on the impact of AI on employment and dealing life. AI will likely have a substantial disruptive effect on work,

with certain jobs being lost, others being created, and are changing. In the longer-term, technologies contribute to increased population-level productivity and wealth. However, these benefits can take time to come out, and there can be periods in the temporary where parts of the population experience disabilities. This suggests there could also be significant transitional effects causing disruption for a few people or places, and potentially widening societal inequalities within the short term. There is clearly a need for research anticipating the economic and taking into account liability of jobs to automation. It will be easier to analyze the impact of AI systems on various kinds of jobs, those requiring lower skilled workers and those needing highly trained professionals, than to predict the roles which will be created within the future under various policies. There are a number of probable future paths along which AI technologies might develop. A variety of factors will play a vital role in shaping the impact of AI on employment, including political, economic, and cultural elements, as well as the capabilities of AI technologies [7].

2.2 AI and Education

AI will have a decisive impact on a variety of sectors in society, augmenting or replacing human work. Education is very important both in driving AI adoption and in combating inequality. Basic understanding of the utilization of knowledge and AI technologies is required across all ages, not only of producers and professional users of AI except for all citizens. Introducing key concepts in schools can help ensure this. Adopting a broad and balanced curriculum for educating children in sciences, mathematics, computing, arts and humanities could equip them with a variety of skills and supply a stronger basis for lifelong learning. There is also high-demand for highly skilled employees [8].

AI is key driver of growth and innovation across all industries and education sector. However, the pandemic drastically shifted the landscape, forcing educators to believe technology for virtual learning. Now, educators say technology should be a core part of education. AI has the facility to optimize both learning and teaching, helping the education sector evolves to raise benefit to students and teachers. AI can make a big impact on the students' educational journey. Personalization is one among the most important trends in education. With the utilization of AI, students now have a customized approach to learning programs supported their own unique experiences and preferences. AI can adapt to every student's level of data, speed of learning and desired goals so they're getting the foremost out of their education. While it's not uncommon for learners to need extra help outside of the classroom, many teachers don't have the free time for college kids after hours. AI tutors and chat bots are a perfect solution in these scenarios. AI tools can help students sharpen their skills and improve weak spots outside of the classrooms.

AI-powered tools make learning accessible for all students, anytime and anywhere. Each student learns at their own pace, and 24/7 access makes it easier learners to explore what works for them without waiting on a teacher. Educators want to spend more time educating students one-on-one, diving into research and continuing their own education, but don't have the availability to do so. AI can help free up educators' time by automating tasks, analyzing student performance and closing the educational gap [9].

2.3 AI and Agriculture

Every day, farms produce thousands of knowledge points on temperature, soil, usage of water, weather, etc. AI systems are helping to enhance the general harvest quality and accuracy – referred to as precision agriculture. AI technology helps in detecting disease in plants, pests and poor nutrition of farms. AI sensor can detect and target weeds and then decide which herbicide to apply within the region. This helps in reduced usage of herbicides and cost savings [10].

The difference between a profitable year and a failed harvest is simply the timely information on an easy datum of timing of sowing the seed. For many farmers, the biggest worry is the price variation of the crop. Due to unstable prices, farmers are never ready to plan a particular production pattern. Companies are using satellite imagery and weather data to assess the acreage and monitor crop health on a real-time basis [11]. With the help of technologies like big data, AI and machine learning, companies can detect pest and disease infestations, estimate the output and yield, and forecast prices of the crop. They can guide the farmers and governments on the future price patterns, demand level, type of crop to sow for maximum benefit, pesticide usage etc. [12][13].

Artificial intelligence makes it possible for farmers to assemble great deal of knowledge from government also as public websites, analyze all of it and supply farmers with solutions to many

ambiguous issues also because it provides us with a better way of irrigation which ends up in higher yield to the farmers. Due to AI, farming are going to be found to be a mixture of technological also as biological skills within the near future which can not only function a better outcome in the matter of quality for all the farmers but also minimize their losses and workloads [14].

2.4 AI and Climate change

The ability of AI to process massive amounts of non-structured, multi-dimensional data using sophisticated optimization techniques is already facilitating the understanding of high-dimensional climate datasets and forecasting of future trends. AI techniques have been used to forecast global mean temperature changes predict climactic and oceanic phenomena, cloud systems etc. AI tools can also help anticipate the extreme weather events that are more common as a result of global climate change, for example heavy rain damage and wildfires, and other downstream consequences, like patterns of human migration. In many cases, AI techniques can help to enhance or expedite existing forecasting and prediction systems, for instance by automatically labeling climate modeling data, improving approximations for simulating the atmosphere, and separating signals from noise in climate observations[15].

2.5 AI and Industry

Artificial intelligence offers tremendous potential for industry. It's already making production more efficient, flexible, and reliable. Industry is becoming increasingly digitalized; the digital enterprise is already a reality. Data is continuously generated, processed, and analyzed. During this point, major advances are made during this area of technology, such as, more powerful hardware, software, improved computing power and data transmission. Using AI creates entirely new opportunities for flexible, efficient production [16][17].

2.6 AI is helpful for healthcare industry

There has been vast progress for diagnosis and treatment of diseases by the help of AI. In rural areas there are problems of accessibilities of the doctors or health-care staff. As a result, people living in those remote areas feel insecure regarding treatment of their health hazard. AI has come to rescue this problem. AI can predict outbreaks of diseases well ahead so that the healthcare staff can have a scope to take preventing steps well ahead before the actual outbreaks take place. By the help of AI, instruments are there for image recognition. This is helping the diseased people who are visually impaired.

Artificial intelligence make simpler the lives of patients, doctors and hospital administrators by performing tasks that are typically done by humans, but in less time and at a fraction of the cost. Buoy Health is an AI-based symptom and cure checker that uses algorithms to diagnose and treat illness. PathAI is developing machine learning technology to assist pathologists in making more accurate diagnoses. The company's current goals include reducing error in cancer diagnosis and developing methods for individualized medical treatment. There are number of apps available for each disease. [18][19].

3. CONCLUSION

Throughout the world peoples are depending on use of AI. It is expected, this trend will increase with passage of your time. Development of AI for the societal benefits are going to be vulnerable if the concerns covering privacy and security protection for personal data are not properly addressed by formulating appropriate policy, laws and regulations. Those are required to be consistently implemented with good governance. The authority should be vigilant to stick to the ethical standard in structuring AI program. In India, there is no AI-policy and absence of this might impede progress because the society wants to take the help of AI and at the same time expects to keep data privacy duly protected. This balance will be ensured by strict adherence to the policy of AI which should be, consistent, reasonable and executable. AI is a reality of the world. We can take note of what Joseph Weizenbaum, a pioneer of AI, said that we must not let computers make important decisions for us because AI as a machine will never possess human qualities such as compassion and wisdom to morally discern and judge[20][21][22][23].

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DEVELOPMENT OF MOBILE APPLICATION USING ANDROID STUDIO FOR RATINGS & REVIEWS

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ABSTRACT

This paper describes about the Ratings & Reviews Android App developed using Android Studio new version. It also includes about the Cross Platforms on which development of android and IOS both platforms application can be done. Cross platforms Paper also includes an example of application which will show its working and its uses. Ratings & Reviews Application is an Android Application which is built in Android Studio 8.0.1. Android Studio is an official integrated development tool or environment for Google's Android operating system. It is built on JetBrains' IntelliJ IDEA software. The main motive of Ratings & Reviews is to provides a platform for students to share their experiences and to support in decision making for the college. the college has many contents to review. In this Application The opinion mining of student review is very important to improve the service, which the model is compared between decision tree and naive bayes

Keywords: College Ratings, Ratings & Reviews Application.

INTRODUCTION

Now a day's everyone is in a need of smart phones majorly people use androids' phones for day-to-day communication. Many applications are developed for unlimited fun for people lives and the android system has become popular in the market of smart phones. Paper includes all about the application development and difference between cross platform apps and native apps. Android is an operating system used for the smart phones based on android and for development of android application, android studio tool is used. It is developed by Google. On other hand Cross-platform mobile development refers to the development of mobile apps that can be used on multiple mobile platforms with a single coding. There are lots of cross-platform tools which are available online nowadays being the major challenge understand which one is the best to achieve the goals of a certain user or company.

CROSS PLATFORM APPS AND NATIVE APPS

Now days 99.6% of phones runs on either IOS or Android. Companies now treat mobile apps as a channel for raising their brand and advertise more for the marketing purpose about the apps. A native mobile app is an application which only looks for particular operating system by using their IDE and SDK. Native apps have the ability to use device-specific hardware and software and can provide quality with huge performance rates. The advantages of native mobile apps include – High performance, Ultimate user experience and Greater app store visibility. A cross platform application is a mobile app which is compatible with multiple operating systems and can therefore run on any smart phones or tablets. The advantages of cross platform mobile app include:

	Native	Cross-Platform
Multiple OS Support	No	Yes
User Interface Quality	High	Medium to High
Cost Of Ownership	High	Medium
Application Update	Native Market	Native Market
Application Maintenance	High	Medium
Development Language	Java, C, C++,	Java, HTML, CSS,
	Objective C,	JavaScript
	Objective C++	

Table No.	1
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- Shorter Development time: It will need development or coding for one time and it will support the entire applications platform.
- Cost- effectiveness.

METHOD

The application which is discussed in this paper is Ratings & Reviews Application. For development of the Ratings & Reviews Application the platform used is 8 - 10, Android Studio

4.2.2 and the language used is JAVA and XML. SQLite is used at the backend side.

The first step is to download the new version of android studio that is 4.2.2 with its android SDK and android Virtual Device. After installing the studio and it's setting up its environment, API level setting has been done. The procedure of setting API level is New click on file>new>New project to create a new project. In the Create, click on new project window, and enter the below given values-

Application name: Ratings & Reviews"

Company domain: 'vogce.com"

These all data will be used to create the package name for example- com.vogce.ratings&reviews. This will include all the data of the development of android, it is said to be android package file which is needed to upload on the google play store. At the last, enter the path to save the file of application.

If developer wants to create a new application with another new requirements, then developer need to choose Empty Activity for the project template. Click on Next. Accept the Default Activity name (Main Activity). Click Finish. These all are said to be android package file which you need to be uploaded to the Google play store.

In the last field you will enter the path where you want to save. If you want to create your application according to you, so you need to select the blank activity from the activity module. Like this Activity you will add more things to your application which you want to show. When you open your application in Android Studio you have to See two files, first one is 'activity_main.xml' and the other one is 'content_main. xml'.Basically both do the same Thing, but the activity_main.xml contains the basic layout when you selected Basic Activity. In content_main.xml you can edit the content.

In Android there is a bunch of option called 'Widgets' in which you can drag and drop things. In Android Studio, it is not showing XML code, but rather a rendering how the layout will appear on the screen. If you want to define the behavior of your application then you need to open MainActivy.java. You have found those tabs under Application>Java. After setting your code or layout design you need to run your application. First, you test your application you can run on Android Virtual Device called Emulator. After successful testing you need to test your application on a real device. So first you connect your device to your development machine with USB cable. Open Developer option and then enable USB debugging option on your device. After that, In Android Studio, you can click the application module in the project window and then click on Run in the toolbar. In the Select Deployment Target window, you will select your device and then click OK button. Android Studio installs the application on your connected device and starts it. Now you will see the application running which you have created on your device.

Android Activity Lifecycle is controlled by 7 methods of Android App Activity class.

- **OnCreate:** Called when activity is first created.
- **OnStart:** Called when activity is becoming visible to the user.
- **OnResume:** Called when activity will start interacting with the user.
- **OnPause:** Called when activity is not visible to the user.
- **OnStop:** Called when activity is no longer visible to the user.
- **OnRestart:** Called after your activity is stopped, prior to start.
- **OnDestroy:** Called before the activity is destroyed.



Figure1. Activity lifecycle

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Intent is used as a message to move from one Activity to Another in a proper way.



Figure 2. Android Intent to navigate from one activity to another



Figure 2. Process to build an Android app

DESIGN MODULES OF APPLICATION

Application divided into two phases one is USER and another is ADMIN:

A. USER SIDE:

User side includes splash screen, registration screen, home screen with menu bar, payment gateways. Below are the details of the categories.

SPLASH SCREEN

Initially, when android application is started, at a very first splash screen has been opened, which will blink for 30 Sec. Splash screen includes application names with its logo. Basically, android studio tool has inbuilt feature of the splash screen and after selecting the splash screen module it directly opens the inbuilt design of the screen which can be changed according to the requirements.

REGISTRATION SCREEN

After splash screen, the next screen will be a registration screen. The user has to register himself for the further process, registration screen includes full name, email Id, Mobile number and full address. Then after clicking on Proceed button, the next screen will open which is a search screen. If the user forgets the password, then he will get forget password link on the registered email id by which user can update the password.

HOME SCREEN/ MENU SCREEN

Home screen will open from the left side of the application, which includes different options for the users to open. Home screen contains registered logo and user name with his contact number which user can edit as per the need. It also includes My bookings, Booking Rides, Support, About, Update, Share.

B. ADMIN SIDE:

Admin can manage the Students and Faculty Members database. Admin can review, change roles and update access rights of all members. Addition of external members/parents.

LOGIN SCREEN

The first screen will be a login screen. Admin login with Email ID and Password.

MANAGEMENT

Admin can manage the Students and Faculty Members database. Admin can review, change roles and update access rights of all members



USER SIDE SCREEN

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CONCLUSION

Reviews & Ratings android application for college will help the students to share their experiences and to support in decision making for the college.

The student review is important to improve the service for college, which have both close opinion and open opinion. The open opinion means the comment directly from the students. However, the college has many contents to evaluation themselves by rating and total rating for a type of services which there are many students who needs to review.

The opinion mining of student review is very important to improve the service.

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ZEMO: AN INTERFACE TO IMPROVE VIDEO INTERVIEW EXPERIENCE

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ABSTRACT

Advances in communication technologies offer new opportunities for the conduct of qualitative research. Among these, ZEMO—an innovative video conferencing platform—has a number of unique features that enhance its potential appeal to qualitative and mixed-methods researchers. Although studies have explored the use of information and communication technologies for conducting research, few have explored both researcher and participant perspectives on the use of web and videoconferencing platforms. Further, data are lacking on the benefits and challenges of using ZEMO as a data collection method. In this study, we explore the feasibility and acceptability of using ZEMO to collect qualitative interview data within a health research context in order to better understand its suitability for qualitative and mixed-methods researchers. Although several participants experienced technical difficulties, most described their interview experience as highly satisfactory and generally rated ZEMO above alternative interviewing mediums such as face-to-face, telephone, also GitHub profile and other video conferencing services, platforms, and products. Findings suggest the ZEMO as a tool for collection of qualitative data because of its relative ease of use, cost-effectiveness, data management features, and security options. Further research exploring the utility of ZEMO is recommended in order to critically assess and advance innovations in online methods.

Index Terms: - Communication, Video Conferencing, Feasibility, Innovations, Online Methods.

INTRODUCTION

Zemo is an Online Interviewing tool that makes the interviewer and interviewees' task extremely easy. There are multiple hassles whenever we join an online meet for presentations or interviews. With this site, we are trying to cut short these hassles so that the interviewer and interviewee both can direct their complete focus towards the interview. Screen Sharing, Profile Review(Github),live-video sharing, chat and whiteboard are some of the main features that we will combine together in this site.

I. PRODUCED SYSTEM

As we all know that due to covid-19 the world affairs have all shifted online and although everything now is functional it is nowhere close to perfection.

There are many issues we face while we have to present something or give interviews through online meets like:

- Having to share a screen.
- Sending GitHub links in the chat.
- Different website for whiteboard.
- Video and voice on a different site.

Because of all these tasks we came up with the idea to integrate these tasks in a single interface to make everyone's online interviewing experience better. Also, if we look at a post-covid world these online meets are still very reliant, economical, and time-efficient.

II. PROBLEM STATEMENT

COVID-19 has affected the entire world. Online interviews are the only option for recruiters to hire talent. Traditional hiring is tedious, so the average cost spent in hiring is high which often leads to no result. The hiring process expenditure became much lesser with online interviewing. Earlier, we used third-party apps to write code, save it on the cloud and then share that link with the person who wants to review it. We had to open Multiple tabs to go through the candidate's GitHub profile. The average time consumed in Traditional hiring is very long compared to Modern Web Based Hiring

"To develop a web-based application to enhance the online interview experience with multiple features like video and audio chat, Whiteboard, notepad editor, etc. using React, NodeJS, Socket.io and webRTC."

III. PROJECT OBJECTIVE

To create a domain-specific virtual environment hosted on the cloud for testing of any technical skills which is accessible by both the parties and the candidate doesn't have to share the screen. Let's take an example, for a

graphic designer, an instance of photoshop can be set up, or consider another situation where a candidate has to

be tested on a programming language or databases, the respective environment will be set up.

- To enable Sharing screen or provide remote access, as this is an invasion of privacy, so our virtual environment is hosted on the cloud. Each user can control the environment simultaneously.
- To bring online interviews as close to offline interviews, an important component is to invigilate or monitor the testing environment.
- To enable written proof which is always better and more convincing. A glimpse of the interviewee's resume and works of the interviewee will be provided to the interviewer to gauge the level of expertise better, Interviewers and interviewees can be connected from all around the world, thereby eliminating the physical presence of the interviewee at the location of the interview.

IV. PROJECT IMPORTANCE

- Creating a website is a complex process, full of layers and steps in which different team members should contribute to the final product in order to be appreciated by the public.
- To control the steps and maintain everything guided towards the same objective throughout the entire development there are several frameworks that help in the organisation during the creation flow of the website.
- A website design framework is a group of techniques to be applied at each stage of the project, depending on the needs of the web designer.
- The purpose of this project is to identify and review academic and scientific papers regarding the elaboration, creation or application of website design tools for interview purposes.

V. SCOPE OF PROJECT WORK

- Through Zemo, we plan to enhance the online interview experience of the users by integrating various modules in a single interface.
- If this is successful we can further improve our system to provide module electability(where a user can select or remove any modules that they require or don't require during their meetings).
- Considering the current scenario, a lot of meetings and important conferences are held online and this won't stop soon, so a project like ours could have tremendous scope.

VI. ORGANIZATION OF THE REPORT

This is useful for every citizen who is eligible for vaccination or wants to know more about vacancy of doses and it will also help organisations to update the information.

VII. LITERATURE REVIEW

• Survey of Existing System

While there are a few studies showing the potential of video conferencing in academia and how certain aspects of it make it a good tool for online interview and how certain aspects 15 hinder the same, there is very little information available on how the user interface of a particular video conferencing platform may affect its acceptability by a how the user interface for those video conferencing platforms can be made more interview-friendly. We now use multiple video conferencing platforms in our everyday academic life, each having different layouts, features, and implementation. interviewers face numerous challenges when using these platforms, further complicating this pandemic's hindrances to the overall system. Every platform uses a different approach to their ultimate goal of providing a video conferencing alternative to in-person sessions, leaving gaping holes in the overall user experience and the need to propose a video conferencing platform that is not only interview-friendly but also used in a simple manner . We can also utilize the general principles of user interface design and propose an interface that caters to interviewer needs instead of being business-first. Aspects of user interface like design, usability, learnability, efficiency, etc., can be researched to better understand how video conferencing can be a more helpful tool for every organising system.

• Problem with Present System

There are so many interview platforms like Zoom, google meet. But as I can see, the interviewer faced so many problems like suppose he wanted to know the GitHub profile. The interviewer is supposed to ask separately from other sources like Gmail. But in our project we give all of the facilities like GitHub ,live chat in a single
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platform as interviewer not to ask separately he can see interviewee GitHub profile when interviewee login system.

VIII. LIMITATION OF EXISTING SYSTEM

- Participants on the iOS or Android mobile app can use polling, but hosts need to be using the desktop client to manage polling.
- Only the original meeting host can edit or add polls during a meeting. If the host or co-host role is transferred to another user, that user will only be able to launch polls already created.
- If a poll is relaunched in a meeting, the poll report will only display the last poll occurrence. If you know you will need to launch the same poll twice and want both sets of data, consider creating a second poll with the same questions as the original to avoid re-launching.

IX. REQUIREMENT ANALYSIS





X. ARCHITECTURE



Fig:2

XI. DATA FLOW DIAGRAMS

a. Level 0



b. Level 1



c. Level 2



XII. DETAIL OF SOFTWARE REQUIREMENT Software Details:



Table-1-1- Software Composition

Hardware Detail:

Any type of PC can support this program and work.

	Windows requirements	Mac requirements	Linux requirements				
Operating system	Windows 8 or later	macOS Sierra 10.12 or later	64-bit Ubuntu 14.04+, Debian 8+, openSUSE 13.3+, or Fedora Linux 24+				
Processor	Intel Pentium 4 or later	Intel	Intel Pentium 4 or later				
Memory	2 GB minimum, 4 GB rec	ommended					
Screen resolution	1280x1024 or larger						
Application window size	1024x680 or larger						
Internet connection	Required	Required					

Table-1-2-detail of software architecture

XIII. CONCLUSION & FUTURE WORK

- We are striving to build an online system that consists of modules to make the interview process easier for both the interviewer and interviewee.
- The finished product will consist of modules for live chat, whiteboard, code-editor, GitHub profile viewer, video-chat, etc.
- Basically, we are trying to build an environment similar to Google Meet but with notable extensions that we hope would revolutionise the online interview industry.

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ACCURATE OPTOACOUSTIC TRACKING OF MOVING OBJECT WITH PRACTICAL FILTERING

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ABSTRACT

Object identification as well as tracking is the process of assessing video frames, estimating the twodimensional position of objects, and eventually obtaining the trajectories of all objects to track objects in every frame during tracking, video frames must be examined. Model- based tracking, region-based tracking, featurebased tracking, and contour-based tracking are some of the several types of tracking technologies available. The majority of these object tracking methods require previous knowledge on the object of interest to be tracked, such as the object's size, shape, color, or position in the initial frame Accurate Optoacoustic analysis and various contrast experimental results show that the proposed moving object with practical filtering strategy is feasible and has fast convergence.

Keywords: Convolutional Neural Networks, motion detection correlation filter

1. INTRODUCTION

The key task involved in the algorithm for motion tracking is to measure object motion as correctly and effectively as possible. Of any monitoring applications, such as video processing, video communication, traffic control, medical imaging, and military operation, moving object identification is an important aspect [1] [9][10] Video frames typically include foreground as well as background information, of which the foreground information is the feature points in the area of interest and the remaining feature points are called background information.

The growing demand for real-time video processing that includes real-time detection and tracking, is attributable to this development. A self-driving car is one that can interpret and respond to its surroundings without any of the assistance or participation of a human The object detection and recognition are considered to be one of the most important tasks as this is what helps the vehicle detect obstacles and set the future courses of the vehicle [14]. Therefore, it is necessary for the object detection algorithms to be highly accurate. In comparison to the background modeling, the mobile item represents a significant shift in the region [15] [16]

The startup or object attributes have no bearing on a real-time surveillance system [22] [23]., however, may reenter the scene in a relatively distant frame. Therefore, if only two frames are considered each time, occlusion handling might not be possible. Though there are many machines learning and deep learning algorithms for object detection and recognition, such as Support vector machine (SVM), Convolutional Neural Networks (CNNs), Regional Convolutional Neural Networks (R-CNNs), You Only Look Once (YOLO) model etc., it is important to choose the right algorithm for autonomous driving as it requires real-time object detection and recognition. Since machines cannot detect the objects in an image instantly like humans, it is really necessary for the algorithms to be fast and accurate and to detect the objects in real-time [8], so that the vehicle controllers solve optimization problems at least at a frequency of one per second [14].

2. LITERATURE REVIEW

In 2020, Thenmozhi *et al.* [1] have suggested two methodologies for the identification of separate moving objects from indoor and outdoor genuine video datasets, such as consolidating context subtraction and enhanced sequential outline separating techniques. The primary consideration was the realization of this sort of system in general public places such as shopping centers, air terminals and train stations, or the protection of any private premises.

In 2020, Elhoseny *et al.* [3] have launchesh a new approach for MODT to monitor moving objects in video frames via the use of efficient Kalman filtering technique. Based on the number of frames, the video clips were translated to morphological operations using the region-growing model. Using the probability-based grasshopper algorithm, Kalman filtering was implemented for parameter optimization after separating the artifacts. The chosen objects were monitored by a similarity measure in each frame using the optimal parameters. Finally, the proposed MODT system was introduced, and the conclusions were analyzed. The tests revealed that the MODT structure achieved optimum accuracy of identification and tracking

In 2019, Ahn *et al.* [4] have propose a framework for image processing with a knowledge- based deep learning software for multi-object identification and enhancement monitoring. Algorithms for object recognition was

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developed using current convolution neural network (CNN) classifiers in real time because. Therefore, they have suggested an algorithm that integrates optical flow while preserving the performance of recognition through a CNN dependent on information. Based on the location of objects in the current frame, an optical flow-based tracker will predict the position of objects in the next frame. Via a knowledge-based mining process between the two images, a CNN-based detector can detect the location of objects. CNN-based detectors also conduct mining procedures on current frame files. To more reliably predict the position of the tracked objectives and targets, this detector will pick more capability characteristics depending on the context. The tracker and detector fusion compensates for cumulative errors that could occur in the tracker and for detector drift. The experimental findings demonstrate that, also in a complicated setting, the proposed algorithm incorporating CNN and optical flow can detect and trace several artifacts in a video stream, and can achieve robust detection and tracing.

Analysis	Provocation				
Less complexity	• Higher error rate				
Improved detection accuracy, specificity as well as sensitivity	• Lower average PSNR values				
Lower localization error	• Higher computational complexity in terms of cost as well as time				
Higher tracking accuracies (86.78%)	Low detection rate				
Improved precision, recall and F- measure scores	• Higher object detection failure				
 Detects and traces objects reliably even in dynamic environments Can easily track different objects and predict motion. 	• Number of tracking fail frames is higher				
The detection rate and precision are improved.					

2.1 Review work on Comparison form:

In the realm of computer vision, object moves detection is a technologically difficult and practically easy subject. Object Moves detection is the process of determining the existence of several specific items in a photocopy The experiments shows that the Multi-object Detection and Tracking (MODT) process has a few that are examined in this section. Object move tracking can be a tedious procedure because of the measurement of the data contained in the video.

Algorithm requires an 'object Move location arrangement'—either in each fixture or whenever a new item appears in a frame. It is demanding to track moving targets due to feeling with something g and interference in the object's vicinity such as image as background and surrounding bad voice. These factors reduce the fixture of movement vector fields that utilize fuzzy sets to achieve better follow productivity [9]. Most detection techniques use information from a single frame to detect a moving object. The location-based object was models work by tracking objects using their colour distributions, and they represent objects based on their them [1]. In contour-based tracking algorithms [3] [21], objects are tracked by considering their outlines as boundary contours. Although numerous detection methods have been proposed, only a few have addressed the multiple objects tracking problem. To overcome the limitations of the existing versions of detection techniques, this study attempted to devise a new MODT framework to improve the detection rate. Table I furnishes the features and challenges of the existing works discussed in the literature section.

3. METHODOLOGY

Determine and tracking future are among the most ordinary and testing tasks that system has to accomplish in order to learn condition events and suspicious activities, and impulsively annotate and recover video content.

In this research work, novel object detection as well as tracking model will be introduced by following four major phases: (a) pre-processing, (b) object segmentation and (b) Feature Extraction and (d) object detection and tracking phase. The block diagram of the proposed

- **Pre-processing Phase:** Initially, from the collected raw video sequences, the individual video frames will be extracted in the pre-processing phase. Then, to remove the noise as well as other artefacts from each of the individual frames (Video-to-Frame Conversion), the **filtering operation and contrast enhancement** will be undergone. At the end of pre- processing noiseless video frames will be acquired.
- Object Segmentation: Onto the noiseless video frames, the Improved Entropy based Fuzzy C-Means

model will be implied to segment the object from the rest of the scenes. The segmentation outcomes give the objects in the frames. Then, the background segregate images (i.e. object region alone) will be passed into the feature extraction phase

• Feature Extraction: The Multi-features such as the size, colour, texture, shape and improved shape local binary texture (SLBT) feature will be extracted from the segmented images. These extracted features will be utilized for training the deep learning model that will be designed in the object detection and tracking phase.

Object detection and tracking phase: The object will be detection via the **optimized Deep Belief Network** (**DBN**), and its trajectory will be marked using the **Gaussian Mixture Model (GMM) based Kalman filtering technique**. Moreover, the object trajectory could be marked precisely, only when the object is identified accurately. Therefore, we'll be introducing a new optimized DBN model, whose **weight function** will be **fine-tuned using a new hybrid meta-heuristic optimization algorithm**. The proposed new hybrid meta-heuristic optimization algorithm (MPA) [34] and **Bird mating optimizer (BMO)**[35]. In fact, the main inspiration of MPA is the widespread foraging strategy namely Lévy and Brownian movements in ocean predators along with optimal encounter rate policy in biological interaction between predator and prey. BMO imitates the behavior of bird species metaphorically to breed broods with superior genes for designing optimum searching techniques.



Figure 1: Architecture of the proposed work

Object detection and tracking phase

Object tracking via Gaussian Mixture Model (GMM) based kalman filtering technique

Object detection via DBN

Weight optimized via new hybrid optimization

(MPA+BMO)

4. CONCLUSION:

The proposed model will be simulated in **MATLAB and DATA SCIENCE** and the experimental investigation will be carried out. The performance analysis will be done by comparing the proposed model over several stateof-the-art models with respect to **accuracy, recall, precision, F1-score, and so on.**

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UNIFY – CONNECTING STUDENTS

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ABSTRACT

It is observed that the social networking sites are virtual communities where users can create individual public profiles, interact with real-life friends, and meet other people based on shared interests. The abundance of easy availability, accessibility and rapid development in social networking websites has proven that the whole world is small and within everyone's reach. In today's era we have different social media platforms for various different purposes. For example, we have applications like Facebook, Instagram, twitter which are basically made for online photo, videos sharing and networking purpose. We have application like LinkedIn which is solely made for different corporate working professionals who is looking to advance their career. But we were not able to find any such kind of social networking sites which is completely based on student community. So, we decided to make a social networking website for student community called Unify- connecting students.

Keywords—social media, student community

INTRODUCTION

Considering the potentiality of the social networking sites the application will be allowing the student to interact with the wider audience not within the class but also outside the classroom. User will be coming across the posts in their feed section according to post they had previously viewed or liked, this had done using recommendation engine. Apart from this their chatting feature is also provide to interact with each other and stay connected. User can add friends and will be getting friends suggestion within that. They can create group/forum by simply adding participants from their list. We will be going through each and every aspect as we move further.

Social media has been enjoying a superb deal of success in recent years, with plenty of users visiting social sites like LinkedIn, Instagram, Facebook, WhatsApp, for social networking, WordPress for blogging, Twitter for micro- blogging, Netflix, Flickr, mythical being radio, and YouTube for image and video sharing, respectively, a giant quantity of social news reading, and distinctive for social bookmarking. This social media networking depends primarily on their users to make and contribute content to annotate others' content with tagging, item ratings, and comments to form online relationships and to affix online communities to beat data overload.

Recommender systems became a key tool for providing users with personalized recommendations on things like movies, music, books, news, and sites. Intrigued by several sensible applications, researchers have developed algorithms and systems over the last decade. variety of them are commercial by on-line net services like Alibaba.com, Flipcart.com, Amazon.com, Netflix.com, and IMDb.com. Over the years, social networking among school students has become a lot of and more popular. It could be a thanks to build connections, not solely on campus, however with friends outside of school. Social networking is a means that helps many of us feel as though they belong to a community. thanks to the inflated quality of it, economists and professors are questioning whether or not grades of students are being littered with what quantity time is being spent on these sites (Choney, 2010). For the aim of this study, social networking is outlined because the use of Facebook, YouTube, blogs, Twitter, or LinkedIn. With good phones having the ability to access the net and have applications of social networking, several are involved concerning however smart phones with social networking applications can have an effect on students' grades.

Social networking became in style between 2004 and 2006, once Facebook were created. Facebook has over five hundred million members and it's still growing. some "85% of undergraduate students are Facebook users (Schneider, 2009)." These numbers are only expected to grow since the number of members continues to grow. And this is not only true for Facebook. Numbers for YouTube closely follow as well (University of New Hampshire, 2009).

It can be very cost-effective communication medium and is usually free for the end-user. Not only can you use it to communicate, but it is also an excellent promotional tool for things like events, new courses and research advances.

Unify is a social media platform to connect the students, alumni, teachers and institutes altogether across the entire globe. It is majorly made for the student-based community. Unify strives for creating a platform where

the student can get enough of opportunities, exposure to enhance themselves through interacting with other fellows and with alumni.

LITERATURE REVIEW

Here we will review some recent search and application social media, recommendation systems and Django framework.

Reference paper	Authors	Journal/Conference Year	Remarks
A Django	Adamya Shyam	Journal of Scientific	A website model with the help of which
Based	Nitin Mukesh	Research	Students can be able to access class
Educational		Volume 64, Issue 1, 2020.	notes, previous year question papers,
Resource			syllabus, and can sell their old books
Sharing			from the same digital platform as well.
Website: Shreic	_		
Social media: An	Gitanjali Kalia	Issues and Ideas in	It concludes that our education system
Innovative	-	Education	needs change and social media should be
Educational Tool		Vol. 1, No. 1, July 2013.	widely utilized for the educational
			purposes.
Exploring the role of	Jamal Abdul Nasir	Springer open 2020.	Applications and usefulness of the social
social media	Ansari Nawab Ali		media in transferring the resource
in	Khan		materials, collaborative learning and
collaborative			interaction with the colleagues as well as
learning			teachers would facilitate students to be
the new			more enthusiastic and dynamic.
domain of learning			
Effectiveness of	1. Trisha Dowerah	International Journal of	It showed that online sharing of
Social Media as a	Baruah	Scientific and Research	information also promotes the increase in
tool of		Publications, Volume 2,	the communication skills among the
communication and		Issue 5, May 2012 1	people especially among the
its potential for		ISSN 2250-3153.	learners/students of educational
technology enabled			institutions.
connections: A			
micro-level study			
Toward Social	Zeinab Shahbazi	Symmetry 2020.	For recommendations, a Reinforcement
Media Content	Yung Cheol Byun		learning model with optimization was
Recommendation			employed, which utilizes the learners'
Integrated with Data			local context, learners' profile available
Science and			in the e- learning system, and the
Machine Learning			learners' historical views.
Approach for E-			
Learners			
Application of	Belfin R. V	Recent Advances in	A machine needs to understand human
Machine Learning in	E. Grace Mary	Hybrid Metaheuristics for	slang and language to analyze the text
the Social Network	Kanaga	Data Clustering.	content. Natural language processing
	Suman Kundu		(NLP) helps machines understand human
			slang and language in the text content
			generated on social media.

PROPOSED SYSTEM SYSTEM ARCHITECTURE



Fig 3.1. System Architecture diagram

This is the basic architecture proposed for our project. We are using the Django framework for our project. We are using Oauth an inbuilt system of Django for the third-party acceptance to login with much ease rather than remembering the login credentials. The user needs to sign up with the required details. Once the details are stored they would be getting a verification mail. The user logins to the system. The credentials are checked through the MongoDB database where data is stored in user models. If the credential is right, we check if the user is verified or not, if not, the user is sent a verification email. Without verification, the user will have no access to the web application. Once the user is verified, he or she can look at the home feed of his page. We are using HTML, CSS, and JavaScript for the frontend part and the responsiveness to maintain the stability of the web page with any screen size.

We are using a recommendation system for the add friend section as it is the need of time. We have seen how Instagram, Facebook, and LinkedIn how much these social media have been trying to update their apps with algorithms according to their user's specific.

We have tried to use a collaborative filtering technique along with the k-means clustering and KNN algorithms too. The web app also consists of a chat feature. We will be using the socket.io of python for the use

IMPLEMENTATION

Sometimes there are tasks that are said to be "write- once, read-many" but that is not the case with Django. If you want to create an app for social media, this doesn't mean it has to be boring. There are tons of modules and extensions which make writing these apps a breeze, something which hasn't been previously possible.

Most existing Django applications that address the issue of social verification center around that. You commonly need to coordinate another application to help verification through a neighborhood account.

This methodology isolates the universes of nearby and social validation. Not with standing, there are normal situations to be managed in the two universes. For instance, an email address passed along by an OpenID supplier isn't destined to be checked. In this way, prior to connecting an OpenID record to a neighborhood account the email address should be confirmed. In this way, email confirmation should be available in the two universes. We are planning to implement google and github Oauth as a third party email authentication.

Friends' advice is also fairly popular on social networking platforms. For instance, on Facebook, there is a section called People you may know, which is a really useful function that displays a list of people who can be added as friends. This system educates and estimates missing edges based on social connection data, for example, if you are friends with the tenth out of eleven tightly related persons, you must befriend with the eleventh. The algorithms of collaborative Filtering are used to create social relationships. As the group of people becomes more diversified, the publicized stories will show a better community interest.

Facebook is one of the most popular social media websites in the world. It has been around for more than a decade, and since its inception, the site has added many updates and new features. The user's account is managed with two main components: an email address and a password.Similarly, we will also be using same pattern.

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The user first logs into their account by entering their email address and password chosen during the registrant email address and a password that was choosen by the user during the registration. Incase user forgets the password by clicking on the "Forgot Password" option a reset link will be sent to their inbox which will allow them to change it.

The chat system design is something like this:

Users logged in: Users will login and be able to chat with each other and send messages, etc.

Members: People who just want to browse the site and not do any chatting will go into members page where they can see who is online and send messages, etc. Admin: This is for administrators to add users, remove users, add chat rooms (or groups), etc.



Fig 4.1. Flow of system

CONCLUSION

Unify helps student to get connected with same like- minded people. User will always come across the posts depending upon likes on previous types of posts. It has made easy to interact with other student and alumni's through chat. People with similar interest will be able add each other on their friend list. To allow students share their thought, ideas and queries and get useful insights on the same.

Our project can be further improved by making it an android application, better user interfaces. It can also be improved by adding unique feature. Hence, using Django as a backend will be helpful for future endeavors as we know it has been used for big social media platforms too. Until then, the proposed system is certain to supply a pleasant comprehensive working and would transform existing needs' prospects. However, the social network recommendations that promote user participation can alter dramatically over time. As a result, in the not-too-distant future, this

work will focus on the dynamic learning of changing user behavior.

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PROPOSED SYSTEM FOR AUTOMATIC PEOPLE COUNTING

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ABSTRACT

This paper presents a method to count people who pass a confined space using the latest Time- of-Flight (ToF) sensor technology

Keywords—Time-of-Flight, Sensor, System, (keywords)

INTRODUCTION

The world is at a crucial phase, and experts from many fields are striving to develop solutions, or at the very least, measures to minimize the transmission of COVID-19 infection with its current ferocity. As a precaution, people are being compelled to remain in isolation [1]. At any given moment, it is critical to have relevant data on customers in a particular location such as a shopping mall, market, department store, customer service center, and pedestrian traffic management. This data may be used to study visitors' traffic patterns and activities in a specific location [2]. In this circumstance, manual counting by employing a person will raise costs and increase health risks [1]. Person counting and conversion rate should be utilized to evaluate the store's performance daily to spot areas for improvement [3]. Managers can benefit from an accurate and real-time estimate of the number of people in a retail mall. For health and city planning, automatic monitoring of the number of people in public places is also necessary [4]. The goal of human counting systems is to estimate the open closed spaces automatically, and they might be used number of participants in or for a variety of things, including public transit planning and video monitoring [5]. In our paper, we are using Time of Flight (ToF) sensor technology to get people to count. This technique has the potential to advance the state-of-the-art in personnel detection and tracking [6]. The ToF sensor determines the distance between the sensor and the subject or the environmental elements using the ToF measuring concept (ToF image sensor), and creates depth pictures or 3D images using the measured points [7].

EASE OF USE

Sign in: It is primarily worried about the client's login, which clears a path for any remaining exercises that can be performed through the application.

Controls: It comprises all the controlling rationale parts. Measurements: Statistics will show the number of individuals at various hours at the store or the important insights as indicated by the use of the gadget.

PROPOSED SYSTEM

During the ongoing Covid-19 Pandemic, when we need to operate any public facility like the shopping mall, restaurants, or public dealing organizations, we need to keep the operations going and ensure preventive measures to ascertain their safety. As per all SOPs (Standard Operating Procedures), it is advisable to restrict the number of visitors inside these enclosed spaces, most likely to be weather controlled. Automatic safety compliance thus becomes imperative in such situations. Even though absolute compliance and alert signaling will require scrutiny and cross-checking at several levels, a beginning towards automation of compliance monitoring seems mandatory in the neo-normal era. Hence, in this project, we have designed a, implementable design to monitor visitors.

In this project, we have designed a, rapidly implementable design to monitor the number of visitors the system will the visitor population at a given time. We are monitoring the optimal population of enforcing visitors. Here we will use TOF Sensor for Accuracy. The Shop community is passing through a financial crisis as they were closed for visitors due to a pandemic. Hence neither we can afford a costly system nor a system designed with the ideal condition. This provided Motivation to us to develop a new system according to our criteria. Here we have re-invented the available solution for implementation in a real-world environment using minimum hardware infrastructure requirements to work in real-time with maximum possible efficiency. This system is not only useful for the COVID-19 Situation but also its use can be extended beyond the boundary of museums for visitor density monitoring systems for the large public.

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The fundamental goal of the Human Counter venture is to give Admin a capacity to keep a watch on the number of individuals in the reason cleverly and distantly with only two or three contacts.

The expanded Requirement for an inheritance, including innovation, immediately became obvious in this pandemic with developing concentration to make inheritance counting innovation effectively open. The Human Counter venture permits the Admin to construct and keep a count of individuals.

On the off chance that these frameworks are conveyed in public restrooms, sanitation personnel can be dispatched once a specific number of people have utilized the offices.

This task may likewise be applied in neighborliness, like lodgings and other business structures, to oversee and control clients.

METHODOLOGY

Client-Side:

It will have two physical devices, i.e., Local Machine and Sensor

The Local Machine

The Sensor

Services:

Services Module contains the Logics which will Help us to Operate the count and report Generation

It Contains Two parts:

Sensor API

Database

ARCHITECTURE

The Model-View-Controller (MVC) is an architectural pattern that separates an application into three logical components: The Model, the View, and the controller. Each of these components is built to handle specific development aspects of an application. MVC is one of the most frequently used industry-standard web development frameworks to create scalable and extensible projects.

Model

The Model component corresponds to all the data-related logic that the user works with. It can represent the data transferred between the View and Controller components or any other business logic-related data.

View

The View component is used for all the UI logic of the application.

Controller

Controllers act as an interface between Model and View components to process all the business logic and incoming requests, manipulate data using the Model component, and interact with the Views to render the final output.

CONCLUSION AND FUTURE WORK

The structure that allows an individual or an organization to bear ultimate responsibility for a group of people for a specified cause is known as the Human Counter Task. The framework is introduced in order to operate at its best in terms of energy conservation. Aside from merely counting people, the job also provides the Admin with additional information such as real statistics on the number of people and graphical analysis, which can notify the Admin to the Count so that appropriate steps can be done.

The Human Count project's main purpose is to offer Admin the ability to keep track of the number of people in the reason intelligently and remotely with only two or three connections. With expanding concentration to make inhabitance counting innovation effectively open, the enlarged Requirement for lodgings, including innovation, became instantly apparent in this pandemic. The Human Counter project allows the Admin to create and keep track of people.

If these systems are installed in public toilets, sanitation professionals can be deployed after a certain number of individuals have used the facilities.

This duty may also be used in neighborliness, such as hotels and other business buildings, to supervise and manage customers.

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REALTIME E-MILK DAIRY WEB APPLICATION

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ABSTRACT

Technological evolution has completely changed the entire scenario of the Dairy industry. It has uplifted the usage of online Milk delivery services and enabled us to order dairy product's at the comfort of our home, compare prices and conveniently access these services. These online dairy products delivery services are boosting the option of choosing dairy products from a wide variety of with a single tap of our smartphones. Realtime E-milk Dairy web application made by using MongoDB, Express.JS framework, tailwindCss, Node.JS platform and socket.io.ThisRealtime E- milk web application lets the users to browse and buy milk and dairy products, tracks the milk and its milk products through its delivery path using realtime communication and deliver quality milk to people at their convenience.

Keywords-Web Application, Real-Time, MERN

I. INTRODUCTION

Nowday's technology has become an essential tool for online marketing these days. If we see all over the world most of the people are showing interest to buy things in online. However, one can see that there are many small shops and grocery stores are selling their things offline. With this type of selling most of us will face bad experience. for instance, in some shops seller has the product to sell in the offer but the buyer may not know about it, or the customer may need the product urgently then he will go to the shop, but the product is out of stock, in that case, he will face bad experience. Moreover, in online shopping customers can select a wide range of products based upon their interests and their price also, one can compare prices also from one store to another by using online shopping. By encountering the all problems and weaknesses of the offline shopping system, creating an E-commerce web application is necessary for searching and shopping in each shop.

These days we have seen so many e-commerce websites are created like Flipkart, Amazon, Myntra one can easily buy their necessary products by using these websites. By using these types of websites one can buy their products by staying in their home. Eventually, we can see the difference between the prices of products also as if we see the cost of the product will be slightly high in offline shopping when compared to online shopping. For creating these types of E-commerce web applications MERN stack will be the best option that can help us for creating the most effective and powerful web

applications.Realtime E-milk dairy Web application tracks the milk and milk products through its delivery path and ensure safe delivery.We will be able to order milk and product and will get realtime notification about delivery products.User can buy essential milk products for daily basic morning needs they have to first register and login themselves to make a individual account.Realtime communication is done using socket.ioand all required data will be stored in MongoDBdatabase.

Survey of Existing System

Online Milk delivery websites/apps are the media through which Dairy shops parcel dairy products directly at the doorsteps of the customers. This idea of Milk delivery is quickly spreading due to the increase in the number of the working population and their hectic work- life culture in metro cities. There is no human intervention involved in the process of online Dairy products ordering, which makes it errorfree and more private. At present, the Indian dairy business contributes 4% to the GDP of India, and this sector is coming up with innovative

Problems with Present system

Online milk delivery market is not mature yet and possesses various challenges. These problems can only be solved by taking law as the criterion, along with the joined efforts of the Milk delivery apps, the dairy shops, consumers, thereby creating an excellent online takeaway environment .Efficient inventory management is essential for dairy shops to avoid going out-of-stock or having wastages. Thus proper inventory control is crucial. Inventory control ideas every day to provide better customer satisfaction and retain customers in the long run. This scenario might result in a massive competition between online Milk delivery websites/apps and particular dairy shops providing free home delivery services. Technology has a hidden impact on the dairy

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industry and has changed its entire frame. People across the globe are enjoying a new comfort zone as a result of these technically developed online dairy products delivery services.

Refers to a strategic practice of purchasing and storing materials at a low price without affecting the manufacturing and distribution of materials. Inventory control is a method of examining what, when, and how much to have in stock for a given period regarded the problem of dynamic pricing and lot-sizing for a reseller who sells perishable goods, and the price of the product can be varied within the inventory cycle taking in consideration the age of the goods and the value drop associated with it.

LIMITATION EXISTING SYSTEM

Even though E-commerce providing more benefits to customers. People are having fear about giving their data to website owners, so it will give security issues when we use e-commerce websites for shopping. If user order a product in e-commerce, the order may or may not reach you on time, this is one of the common problems in e-commerce, it will take time-based upon your distance between you and the organization from where you ordered, there are no status tracking option available to user.

PROPOSED SYSTEM



Above diagram is the Architecture of this application. The architecture basically has three parts: frontend, backend and database. This application consist of following modules such as user and admin module, pricecatlog, payment, status tracking etc. Here if user is new they have to register themselves else they they can sign in. Same way admin can also login into the application. here admin can add, modify the price catlog, check customer received orders, thet can update status of shipping. here for realtime communication we

are using socket.io .In user module ,home is price catlog is used to view the price of the product.My order is used to view the number of order that user have placed.After selecting any product user can see their product on cart page and here payment will be carried out.

All these three parts are interacting with each other with the help of a server which is created using the backend. Front end is designed using css,tailwind CSS and in the backend part there are router, controller and models in which router is used to route to desired part or function and controller is used to make changes within database and frontend and model is used to define the schema of the data which will be stored in the database. MongoDB database is used which is a nosql database very useful to store object type of data.

VI GUI IMPLEMENTATION

In this section we give user interface images which our project will have.

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Fig 1.Registration Page

We have the Registration page here. Using this page,the users and admins can register and move towards the final login page to use the Real-Time E- Milk Web Application .



Fig 2..Login Page

Once the user is registered, he or she can finally login into the Real-Time E-Milk Web Application page where they can view all the necessary milk and milk realted products.



.Fig 3. .Front Web Page

Once the users enter into this web page, they can search for their need products and add it to the cart, then they can go for the payment option and confirm their products and finally they will get their confirmation soon with real time tracking of their products.

VII. CONCLUSION

Realtime E-Milk Dairy Web Application is the best way to purchase any milk related products with an assurance of healthy and quality milk and milk products. So more people will prefer the ease and comfort of milk delivery system hence this will allow customers to place order without even visiting the shop being able to buy any time, any place, anywhere. Site enables them to browse before they shop, and to research the product so they have more confidence in what they are buying. Hence, this web app will be beneficial for all types of users providing an efficient and easier way to shop.

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ECOMMERCE SHOPPING WEBSITE

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ABSTRACT

The main aim of an E-commerce website is to make shopping easy. Users can browse, compare the price and select the product according to their availability. This is online shopping website comprises of different categories such as Women, Men, kids, Accessories. It even focuses on new arrival of products. The goal of the project is to create a software application that will lessen manual work in the areas of product management, customer service, sales, and shipping. It allows user to create an account, login, view product as per category, add the product to the cart. Because the project is entirely created at the admin level, only the admin has access and can add new product. Ecommerce, or electronic commerce, is a product idea in which sales activities such as buying, selling of products are recorded via the internet. This format is followed by nearly every single ecommerce site, big or little. An eCommerce website allows you to buy and sell information over the internet.

Keywords— Ecommerce, customer service, selling products.

I. INTRODUCTION

It is made up of the development process, which begins with defining the use case, database modeling, and web application organizational pattern. The entire project plan is split into two sections: front-end development and back-end development. This website is designed in a way that can use without login Id can't access the website. for that, he needs toregister. Once the user registers his data is saved in the database. Once data is saved the user can log in. This is a user-friendly website Which will help user to go from one page to another.

II. EASE OF USE

A. Features

The main feature of our website is the user can get the benefit of different products and website should be user friendly. From the user-end, can perform Registration, which takes him to a login page where he can log in and redirect to his account on the main page of our website. There he can explore different categories such as women, men, kids, accessories, brands, new arrival. If the user likes any product, he can explore the product's price and even add it to the cart. he can add several products to the cart. He can even contactus, learn more about us. On the other hand, the admin can add products, brands, category. Admin can even edit, update, delete brand, category, image.

B. The palnning process

Our goal is to develop an e-commerce website that wouldcatch the eye of the user and this website is designed in such a way that users of any age group i.e., old or young can access this website. This website comprises of following features:

- 1. **Register page** allows user to create an account due to which user can **login** once data is saved in database.
- 2. Later user gets an access to the e-commerce website. Where user can avail **different categories**.
- 3. **Carousel** which informs about upcoming offers.
- 4. **New Arrival** helps user to know abut new products and on clicking that product he can explore more such products of that category.
- 5. Category where user can explore different categoriessuch as women, men, kids, Accessories.
- 6. Later user can **know more about "Stop & Shop"** and on clicking "click here" he can move on the next page where he can explore inadept about our team members.
- 7. In the end user can **contact us** if he has any quires.
- 8. At the **admin side** admin can Add new product, Brand, Category
- 9. More than that he can even **update data in database**.

III. TECHNOLOGY USED

A. Front End Development

Front end is design using Html5, CSS, Bootstrap4, It comprises of buttons which links user to next page such as About us, New Arrival, Category. The user can select the category as per his requirements and go to next page

where he can explore different products as per category and add them to cart. With the help of contact us user can even ask their question.

HTML (Hypertext Markup Language) code. The language used to construct a software's websites is known as hypertext mark-up language (HTML). A static page is an Assessed attitudes that should not alter and is kept on the web application. It is then mixed with JavaScript to perform client-side scripting in such a way that it would attract users as well as help users to explore different categories.

This was performed by Cascading Style Sheet (CSS). CSS is a style sheet language which is used to make user page attractive. JavaScript helps to interact with user and controls the browser and communicates with user.

Our program is made up of dynamic web pages that werebuilt using both client - server scripts. A dynamic web site isone that is created by a database script or software.

B. Backend Development

The backend is designed in such a way that admin can perform various task such as adding new product, category, brand. Even he can perform update operation. The followingare the technology used in backend-

- 1. **Flask Framework** is a Python-based microweb framework. It is referred to as a microframework since it does not necessitate the usage of any specific tools or modules. It doesn't have a database runtime environment, report generation, or any other elements that rely on 3rd-party libraries to do basic tasks.
- 2. **JavaScript** helps to interact with user and controls the browser and communicates with user. Our program is made up of dynamic web pages that werebuilt using both client server scripts. A dynamic web site is one that is created by a database script or software.
- 3. **SQLAlchemy** allows you to interface with rdbms in a "Pythonic" manner. Instead of just grappling with the variations amongst regional languages of conventional SQL, such as MySQL, and Oracle, you may use SQLAlchemy's Pythonic foundation to expedite your productivity and query your information more easily.
- IV. RESULT
- A. Front-End
- 1. Register page-
- 2. Login Page-
- 3. Main page-
- 4. New Arrival-
- 5. Category-
- a) Women-
- b) Men-
- c) Kids-
- d) Accessories-
- 6. About Us page on main section
- 7. About us page on click-
- 8. Contact Us-
- B. Backend
- 1. Register Admin side
- 2. Login admin side
- 3. Register user side
- 4. Login user side
- 5. Add to database
- 6. Update
- V. FUTURE WORK

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Now we have our Ecommerce website ready but they arefew, more things to be added in future such as payment method. We are successfully able to login from user as well as from admin side but we need to implement logout. Moreover, we have to implement search option due to which user can easily navigate the product.

- 1. Logout session
- 2. Place order
- 3. Search product
- 4. Payment

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GEOGRAPHIC LOCATION-BASED MOST SECURED AUTHENTICATED SYSTEM AND REMEDIES FOR MOBILE DEVICES SECURITY AT MOUNTAIN AREAS

Borse Yogeshwari Suklal¹ and Prof. Dr. Umesh S. Bhadade²

¹Research Scholar, Computer Science & Engineering, SSSUTMS, Sehore, M.P. India ²I/C Principal L. R. Tiwari C.O.E. Mumbai

ABSTRACT

A geographic location-based password system is an emerging scheme for user authentication purpose. Authentication is extremely vital as per security concerns. Several traditional authentication techniques are available. such as, text password, alternative techniques for se are image password, biometrics password, mapbased password also GeoPass technique is available this is easily memorable. To provide more security for authentication complex passwords are a need and which is not convenient to remember. One of the techniques to provide authentication is located on the map using coordinates longitude and latitudes. so users can use the desired location for authentication of the system. But one can guess this location if the selected location is well known, this may lead to problems in the authentication of a system. This paper study is on location-based authentication schemes addressed like digital map-based system where location is used as a password, here two cities are selected rather than single and GPS based system for location authentication schemes to make sure that clients are really in locations that claim to be at are discussed. Various location-based authentication systems associated challenges are discussed that may affect its performance and suggested some measures to prevent or remedies fix those problems to some extends. So it inspires to development of a more secure and efficient system.

Keywords: Geographic, Authentication, Digital Map. GPS, longitude, latitude.

I. INTRODUCTION

Nowadays internet is most widely used for communication. Every day people are working on an internet application. security and authentication are vital terms while using internet applications. Location-Based Authentication is a technique that will take into account the geographical location of the user; which is the latitude, longitude of the person who is trying to authenticate his/her identity. Location information is captured at that instance when he is trying to access his account. Online map locations are an emerging topic in authentication research [2]. GeoPass is a promising scheme, as it provides satisfactory resilience against online guessing and showed high memorability in the present era increased use of wireless technologies in areas like the army, aviation, banking applications, security press, web applications etc, are is a need to determine the authenticity of a legitimate. Location- based authentication is a relatively new direction in information security. It becomes more significant in the present days due to mobile devices coming to the wireless scenario.

II. RELATED WORK

S. Fox , (2014) Very first a digital map was introduced by Cheswick [2] for authenticating the user. After that, some digital map-based authentication schemes have been implemented.

J. Shin (2015) Another location password system is a SmartPass[07] with a near design to GeoPass that was developed for mobile phones. A study was carried out on 20 users, and login tests on days 1, 2, 3, 4, 7, and 31, it came to know that in all attempts, all users are able to recall within 3 login attempts of user location password. Login times are still higher, with an average of 30-35 seconds depending on day. Denning and Macdorman(1996), [8] here authors to perform research studies on location-based authentication and to focus its importance for enhancing network security. The author states that location information can be used for both preventing network rift and also for investigations in cases when breaches occur. In a virtual environment where physical borders are blurred, location determination during authentication can be helpful in many scenarios e.g. remote access to critical systems, authenticating financial transactions, enforcing export controls on software, and so on. YounSun et al.(2006) [12] propose a location-aware access control mechanism (LAAC) based on a WLAN structure of wireless APs and wireless mobile devices, such as PDAs and wireless laptops. Access is permitted to a device located inside a region formed by overlapping coverage of multiple access points. Each access points timely broadcasts a random nonce which is captured and used by the device to generate a location key. Devices outside the range of APs not capable to receive random nonces and do not succeed to get a valid location. IDs. In this way, access is granted only within specified locations.

M. N. Al-Ameen et al., (2015) in [13], In Multiple- Password Interference in GeoPass User Authentication scheme users can select more than one location in an online map as a password. This technique has potential in

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terms of usability and security. This scheme can further focus on different types and keywords, and figure out correlation, if any, between predictability of a location-password and category of the corresponding story. This may enable to make useful suggestions for users to build a mental story. Jansen and Kolore, et. al., (2009) [20] designed a location-based authentication mechanism that involves policy beacons and mobile devices. Policy beacons broadcast and communicate location data to mobile devices using Bluetooth. Mobile devices determine their proximity to beacons and calculate their location relative to m. Based on this location certain functionalities in mobile devices are enabled or disabled accordingly. Policy beacons establish a perimeter with a distinct organization policy. Devices within this perimeter inherit this policy. setup, however, focuses only on controlling use of mobile devices, especially in an environment such as in an organization and it requires a significant costly infrastructure setup and synchronization of policy beacons.

Brent MacRae et al., in (2016) [1], Geopass-Note scheme is an extension to Geopass where users select location as password similarly but with the extension of annotation. Annotation is nothing but an annotated location password. In this user can authenticate by using a Geographic location on the map by placing an'X' marker on a digital map and latitude and longitude of the location get selected for the user as password which is a highly memorable and secure way to authenticate users.

III. METHODS TO LOCATE SMART MOBILE DEVICES

Three localization techniques are commonly used to establish the location of Smartphones [3]. These techniques vary in the provided location accuracy how surely can the method determine the Smartphone's location? and the availability does the scheme cover the whole earth or only urban areas? Is the technique available indoors or does the client have to be outdoors to determine position? Following are some of the location position system are described.

a. Wi-Fi-based Positioning system

Wi-Fi-based positioning uses Wi-Fi access points (Wi-Fi APs) to determine the position of the Smartphone. Wi-Fi APs continuously transmit beacons, including an AP identifier, to their surrounding area to inform potential Wi-Fi clients, such as a Smartphone, about their existence. Over the last years, several databases of APs and their corresponding geographical locations were collected by companies like Skyhook [4].

b. Cellular Network-Based Positioning

Cellular network-based positioning use trilateration techniques to calculate the current Smartphone location [5]. The cellular network is divided into cells, in which each cell has a unique identifier (cell- ID).

c. Global Positioning System (GPS)

GPS-based positioning [9] has become the positioning technique mostly used on Smartphones. All newly developed Smartphones feature a GPS receiver. GPS positioning is based on the reception of signals continuously transmitted from satellites.

IV. LOCATION ION-BASED AUTHENTICATION USING DIGITAL MAP

Location-based authentication using google Maps from where location coordinates can be selected.

The following procedure based on geopass is applied. A study conducted for 40 users who are un- authenticated attempted to access the system[21].

For User registration

- Input user detail (like a user name) and store them in the database.
- Select two locations and store information like longitude and latitude.
- Select annotation and store it in the database.

For User access (Log in)

- Read user name
- Validate user name with registered data.
- If not valid access denies.
- Else
- Select two locations and their annotation from the map.
- Match selected location stored in a database.

- Validation of location and annotation.
- If a match, access is granted.
- Else
- If not match (not valid) access denied (login fail).

When an unfamiliar intruder tries to access the system 40 out of 40 attempts failed means the system is 100 % secure for an unknown intruder. If considering experimental results on familiar especially indoors or in places where mountains and no clear view of the sky or proposed methods, applicable only to certain scenarios or need specific devices. A common and flexible way that can be applied in different situations is still incomplete [14].

IV. SOLUTIONS TO OVERCOME DIFFERENT CHALLENGES

Some of the solutions that help to overcome earlier addressed challenges.

a. Wi-Fi-based positioning

In this system no. of Wi-Fi, spots need to increase especially in the hilly region or indoors where signals are not reached. So if increases no. of. access points transmitted beacons (Pilot frequency) reach intruders 40 out of 35 logins failed as it provides 87.5% the smartphone or mobile device. As APs are used to security level. If we consider local familiar intruders 40 out of 26 logins failed 65% security level for local familiar attackers. so the system is quite more effective when we used it with multifactor authentication.



Figure:1 System safety in percentage on attack models.

V. CHALLENGES TO VARIOUS LOCATION- BASED AUTHENTICATION SYSTEMS

As described in section II related work, some of the existing solutions have been focused on designing and constructing general conceptual security models. Few of them have exhibited and compelling use of location in improving existing security mechanisms. With security characteristics that offer, most of the solutions yet have experienced problems such as feasibility, usability, reliability. In some system location signature used which depends on GPS, mechanism suffers a lot of reliability issues transport need aiding information to GPS devices onboard smartphones. Which help GPS device to restore faster.

- GPS are many times not that useful in indoor conditions, tall buildings glass-covered walls.
- Tall buildings.
- Hilly geographic area.

As radio waves will be obstructed by physical barriers. Satellites GPS track exact reference points to locate various positions, which are precise to a few meters. But comparing its altitude compromises its performance in the above conditions obtained geographical position data is converted to a file that can be used by Geographic Information Systems that can plot or map it to show the location of definite coordinates. This satellite is about 20,200 km high. So, if comparing other navigation systems.



Figure: 2. The segment in GPS System

Other Global navigation satellite systems.

In table no1. Shows comparisons GNSS constellations on basis of their altitude, coverage, operators.

- a Galileo is a global navigation satellite system (GNSS) [5] created by the European Union through the European Space Agency (ESA). 23,222 Km and 22,000 miles above the earth's surface. EGNOS gives additional precision to US GPS signals delivering an average precision of 1.5 meters over European territory [16]. European satellite offers higher positioning as compared to GPS and GLONASS.
- b. GLONASS is a global navigation satellite system, providing real-time position and velocity determination for military and civilian users. The satellites are located in a middle circular orbit at 19,100 km (11,900 mi) altitude with a 64.8 inclination.[17].
- c. Indian Regional Navigation Satellite System (IRNSS), with an operational name of NavIC (Navigation with Indian Constellation) The IRNSS system comprises a space segment and a support ground segment. The constellation consists of 8 satellites. Three of the eight satellites are located in geostationary orbit (GEO) at 32.5° E, 83° E, and 131.5° E longitude, approximately 36,000 km (22,000 mi) above the earth's surface. The remaining five satellites are in inclined geosynchronous orbit (GSO). Two of them cross the equator at 55° E and two at 111.75° E.[9] The four GSO satellites will appear to be moving in the NavIC signals will consist of a Standard Positioning Service and a Precision Service. Both will be carried on L5 (1176.45 MHz) and S-band (2492.028 MHz).

Accuracy of NavIC

The system is intended to provide an absolute position accuracy of better than 10 meters (33 ft) throughout the Indian landmass and better than 20 meters (66 ft) in the Indian Ocean as well as a region extending approximately 1,500 km (930 mi) around India.[14] it always maintains a line-of-sight INDIA which protects highly precise geolocation, faster latching, and more penetration specifically in the dense geographic area also. As NavIC is much above the earth's surface signals can't be blocked by mountains as NavIC altitude is up to 35000 Kms.

NavIC has been designed to work across the length and breadth of INDIA without any obstructions. Be the Himalayan mountains or terrestrial area.

So if considering regional coverage for users in India NavIC is best regarding accuracy.

Department of Space (DoS) is working on expanding the coverage of NavIC from regional to global that will be independent of another such system currently operational namely GPS, GLONASS, BeiDou and Galileo while remaining interoperable and free for global public use.[13]

Some other factors that affect the ability of any device to obtain good positioning data include:

a. Poor Hardware

If your device is older or does not have good GPS reception capabilities it will struggle to receive satellite or cell phone tower signals.

- b. Low Battery on GPS devices
- c. Multipath signals

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- d. Lost GPS signal
- e. Radio interference or jamming
- To enhance at receiver side GPS Accuracy[8].
- a. Keep the GPS application active on your device.
- b. Consider connecting to third-party Bluetooth GPS receivers for good signals.
- c. Restart your device or turn GPS on/off several times.

Global navigation satellite system	Operator	Coverage	Altitude	First launch year
GPS	US Space Force	Global	20,180km (12,540 m i)	1978
GLONASS	Roscosmos	Global	19,130km (11,890 mi)	1982
Galileo	GSA and ESA	Global	23,222km (22,000 m i)	2011
IRNSS/NavIC	ISRO	Regional	36,000km (22,000 m i)	2006
QZSS	JAXA	Regional	32,000 (perigee) 40,000 (apogee)	2010

Fable:1. Comparisons	GNSS	constellations
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VI. CONCLUSION

In this paper, location-based authentication schemes for mobile smartphones are described. The proposed system provides comprehensive authentication, authorization, and verification using location factors. More than one location (multimodal) is provided to prevent guessing attacks which improves system security, it makes more secured authentication. Several methods are discussed which are useful to locate smartphones. After studying various location- based authentication schemes some challenges are noted and remedies are provided to overcome these challenges.

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SMART HEALTH MONITORING SYSTEM IN IOT USING ML

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ABSTRACT

Healthcare is given the extreme importance now a- days by each country with the advent of the novel corona virus. IoT in healthcare is the key player in providing better medical facilities to the patients and facilitates the doctors and hospitals as well. The proposed system here consists of various medical devices such as sensors and web based or mobile based applications which communicate via network connected devices and helps to monitor and record patients' health data and medical information. IoT monitoring of health helps in preventing the spread of disease as well as to get a proper diagnosis of the state of health, even if the doctor is at far distance. The main objective of this framework is to give immediate necessary services where cardiac patient can measure body temperature, heart rate in bpm and body position by themselves and promote hygienic environment. With the work of AI calculations and classification. Initially, the dataset is dissected, watched and screened, at that point the obtained information is handled in python programming utilizing Machine Learning Algorithm to be specific Decision Tree Algorithm and Random backwoods classifier Algorithm. It will be helpful for mass screening system in villages where hospital facilities are not available, i.e., rural areas.

Keywords— Health Care System, IOT, Machine Learning Techniques, Smart Health Monitoring

INTRODUCTION

In current years, wireless technology has to amplify for the need to prolong various sectors EASE OF USE. The Internet of Things (IoT) has transformed from being an interconnection of embedded computing devices to an interconnection of smart sensor devices. The Internet of things is the inter-connection of devices, apps, sensors and network connectivity that enhances these entities to gather and exchange data. Remote Patient Monitoring arrangement empowers observation of patients outside of customary clinical settings (e.g. at home), which expands access to human services offices at bring down expenses. The IoT technology opens not only in hospitals but also in private health care facilities. So encompass an automatic system; various stricture is observed that consume power, expenditure, and enhance efficiency. y. The data such as temperature and humidity are collected and transmitted for data analysis. The uploaded data will be sent to the physicians / Care takers. It provides necessary services near the patient if any problems in breathing due to the harsh environments. Expectation is one of the regions where this AI is utilized, our subject is about forecast of coronary illness by handling patient's dataset and an information of patients to whom we have to anticipate the opportunity of presence of a coronary illness.

The major aim of the paper can be summarized as following:

- To obtain the real-time medical information about a patient via IoT.
- Processing and classification of information gathered about the patient.
- To interpret and predict any disease or disorder in preliminary stage itself using the data mining techniques that will also provide the approach advantageous for decision making.
- To provide Internet of Things based healthcare solutions at anytime and anywhere.

PROBLEM STATEMENT

In the absence of the doctors, the patient cannot consult the doctors due to which emergency situation may also be created. The personal health monitoring of each individual is considered very important because of the rise in health problems in today's world. The increasing stressful lifestyle is taking a maximum toll on public health. With the ever increasing queues at hospitals and an increasing number of patients, the doctor fees have skyrocketed which is affecting especially those patients who cannot afford the fee or who are not suffering from major ailments but get to know so only after paying a hefty fee to the doctor.

MATERIALS AND METHODS

A. Arduino Uno

It is an open source electronic platform, which is microcontroller-based as well as programmed with Arduino IDE. It comprises of following components: USB connector, Power port, Microcontroller, Analog input pins, Digital I/O pins, Reset switch, Crystal oscillator, USB interface chip, and TX - RX LEDs. The power source for this board can be provided by AC - DC adapter or batteries, even USB ports can be used. Through the USB
port, program can be uploaded from Arduino IDE to the board. The board can be operated with a supply voltage of about 5 v through a power jack. The board can withstand a maximum of 20 volts. Voltage regulator comes into play at the time of high supply voltage in order to prevent it from burning.



Fig1: Arduino Uno

B. ESP32 Processor

ESP32 is one of the main IoT learning tools. This offers a full Linux system on a small platform at a very low price. ESP32 connects device sensors and actuators through GPIO pins. ESP32 and IoT merge to be a new technology for creativity in the healthcare system. ESP32 is designed extremely with integrated antenna switches, RF-balun, control amplification, low-noise amplifier, and filters as well as power management modules. It can function as a complete stand-alone scheme or as a slave to a host MCU, decreasing overhead interaction within the main application processor. EPS32 can communicate with other Wi-Fi and Bluetooth devices via its SPI/SDIO, or I2C/UART interfaces.



Fig2:ESP32 Processor

C. Heart Beat Sensor

The heartbeat sensor is developed based on the plethysmography theory. It measures the change in blood volume through anybody's organ that causes the light intensity to move through that organ. The timing of the pulses is more critical in systems where the heart pulse rate is to be tracked. The rate of heartbeats determines the distribution of blood volume, and the signal pulses are equal to the pulses of heartbeat when light is consumed by the blood.



Fig3: Heart Beat Sensor

D. Body Temperature Sensor

The sensor are accurate optimized temperature circuits with output voltage, which is linearly relative to the temperature in centigrade. The LM35 has a vantage point over Kelvin's linear temperature sensors, as a realistic centigrade scaling does not allow the consumer to delete the huge constant voltage from the display.



Fig4: Body Temperature sensor

E. Blood Pressure Sensor

For measuring the blood pressure, we have used here a manual blood pressure monitor instead of a digital one as it is cheaper. It is commonly known as a sphygmomanometer and the kit consists of an arm cuff, a squeeze bulb to inflate the cuff, stethoscope and a sensor to read the pressure. Blood pressure is measure using an air pressure sensor. The readings are in the form of electrical signals.



Fig6: Blood pressure sensor

PROPOSED SYSTEM

We have anticipated a robust health monitoring system that is smart enough to watch the patient automatically using IoT that gathers the information status through these systems which would comprise patient's heart rate, blood pressure, and body temperature and sends an urgent situation alert to patient's physician with his recent status and full medical information. The various sensors are placed on the patient's body and they take the readings and send the corresponding signal to the Arduino Uno. The programming in Arduino Uno is done in python language and it sends the data related to the patients' health to the server connected via Internet. The details can be easily accessed online by proper authentication and health status of the patient can be monitored. The system uses smart sensors that produce raw data information collected from every sensor and send it to a database server where the data can be further evaluated and statistically maintained to be used by the medical specialists. Preserving a database server is obliged to so that there is even track of earlier medical record of the patient provided that a better and improved examination detail.

- Machine learning classifiers
- 1. Naive Bayes: The Naïve's Bayes is a grouping regulated learning calculation. It depends on restrictive likelihood hypothesis to decide the class of another component vector. The NB utilizes the preparation dataset to discover the restrictive likelihood esteem of vectors for a given class. In the wake processing the likelihood restrictive estimation of every vector, the new vectors class is made sense of dependent on its contingency likelihood. NB is utilized for content concerned issue characterization.
- 2. Decision Tree Classifier: A Decision tree is an overseen AI computation. A Decision tree shape is just a tree where every handle is a leaf center point or decision center point. The techniques for the Decision tree are immediate and suitably reasonable for how to take the decision. A decision tree contained inside and outer focus focuses related with one another.



Algorithm of Proposed Model

Input: Environmental data and patient data.

Output: Visualize the current status of patient data and environmental conditions.

Step 1: Begin.

Step 2: When slave circuit is switched on. The wireless sensors capture the environmental data of patient room and patient's vital data.

Step 3: Transform the sensed data to the open source microcontroller via wireless network.

Step 4: Monitor both the data continuously on the display screen of LCD in regular intervals.

Step 5: Analysis of observed data at the slave circuit.

Step 6: Enable self-care service according to the output data observed.

Step 7: Analysis of observed data at the Master Circuit.

Step7.1: If data value reaches the abnormal

Then Patient Status = Unstable. Go To Step 8

Step 7.2: Else Patient Status = Stable.

Step 7.3: Return Step 4.

Step 8: Transform data to the processor of master circuit for processing and transmit to the cloud database for analysis.

Step 9: Create alert notification to client 1 (patient).

Step 9.1: Deliver the required emergency services.

Step 10: End



RESULTS

As the title says, the result of Smart Health Monitoring system is of extreme use to patients and doctors as well. The patient can check their health status anytime from the comfort of their homes and visit hospitals only when

they really need to. This can be done by using our system whose result are brought online and can be seen from anywhere around the world.

Thus, health disease which is the death cause all around the world can be reduced by the proper treatment and early diagnosis. This project deals with internet of things which helps to record the real time (patient) data using pulse rate sensor and Arduino and is recorded using thing speak. Thus, machine learning algorithms were used to make prediction of heart disease in humans.

CONCLUSION

In this paper, we have presented a low-power wearable IoT system for active and assisted living healthcare applications. We have outline the main components of the proposed system and explained their implementation details. Human services field contains a tremendous measure of information, for handling those information certain methods are utilized. Handling or processing is one in all methods regularly utilized. Thus, this paper focuses on the real time data for more accurate prediction and accuracy using IOT & machine learning. d. The system monitored body temperature, pulse rate and room humidity and temperature using sensors, which are also displayed on a LCD. These sensor values are then sent to a medical server using wireless communication. These data are then received in an authorized personals smart phone with IoT platform. With the values received the doctor then diagnose the disease and the state of health of the patient. The proposed hardware as well as software system helps patient to predict heart disease in early stages. It will be helpful for mass screening system in villages where hospital facilities are not available, i.e., rural areas.

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IDENTIFY THE USE CASES OF BLOCKCHAIN TECHNOLOGY CASE STUDY OF ETHEREUM VIRTUAL MACHINE

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ABSTRACT

Blockchain is an emerging technology that provides a robust alternative to the traditional centralized system. It was first put to use by Satoshi Nakamoto who implemented the Blockchain in Bitcoin. The data in the Blockchain is immutable due to its features consensus algorithm and unique hash. Smart contracts are deployed on the system which is autonomous, self-sufficient and automatic. It is defined and enforced by the code hence it has no discretion in itself. Blockchain apart from currency(like bitcoin) is useful in many other sectors. In this paper, we provide some examples of how Blockchain can be implemented in various sectors to make them more efficient. In this paper, we demonstrate how a smart contract works and some of its applications in sectors apart from currency.

Index Terms—Blockchain Technology, Bitcoin, Ethereum, De- centralized

I. INTRODUCTION

When the idea of digital cash was envisaged, the first issue raised with it was the double-spend problem. Since digital cash was infinitely copiable anyone could use the same money an infinite amount of times. The need for a third-party intermediary(Banks, PayPal) which kept a ledger confirming that the same cash was not spent twice. Blockchain solves this problem by combining BitTorrent peer-to-peer file- sharing technology with public-key cryptography. It rules out the need for third-party intervention. The transaction ledger is automatically updated by the miners and the system. The user does not need to trust the other person or a third party(there is none), it is a trust-less system Blocks consist of transactions that are grouped together to form a chain. Some systems are Bitcoin Blockchain ledger, Ethereum virtual machine.Bitcoin and Blockchain are often used simultaneously but it is like calling the Facebook entire internet. There are three layers to Blockchain technology : 1) Blockchain 1.0: Currency, it's the deployment of Blockchain technology in monetary applications. 2) Blockchain 2.0: Smart contracts, similar to traditional contract but it is defined and executed entirely by code auto- matically without discretion. 3) Blockchain 3.0: Applications beyond finance, for instance in real estate or health care. In this paper, we are going to demonstrate how Blockchain 2.0 works and Blockchain 3.0.



Fig. 1. Blockchain when a data is not changed

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Fig. 2. Blockchain when a data is changed

II. BLOCKCHAIN 2.0

A. Smart Property

Blockchain can be used for any kind of asset registry, exchange and inventory in every sector. Any kind of assets whether hard assets(property, vehicle, etc) or intangible as- sets(votes, ideas, data, etc) could be encoded in the Blockchain blocks which becomes a smart property traceable via smart contracts. Any asset can be encoded in the Blockchain whose owner has the private key. This smart property is controlled via another Blockchain-based contract working on a prespecified condition. Hard properties could be controlled on the basis of the Blockchain based contract. For instance, having access

to the property only when the code confirms the software or hardware presented by the user, the contract sends a token access mechanism to the hard asset confirming the user's identity. There is no possibility of data manipulation since the database is decentralized the data is not tampered with, without the consensus of all the nodes in the network. The contract is self-enforced by the code and cannot work at its discretion. Smart property equates to the decentralized trust-less asset management system.

B. Smart contracts

Smart contracts refer to a piece of code that has more extensive instruction embedded in them. For instance, when the loan payment for a property is completed, a smart contract is invoked which transfers the ownership of the property from a bank or NBFC to the person. Traditional contracts are documented when two parties agree to do something in exchange for money. Smart contracts retain the agreement element of traditional contracts but do not retain the trust element as the smart contract is executed automatically by the code. The other two factors of a smart contract are that it is self-sufficient(able to collect the requisite resources in order to raise funds) and it's decentralized(available on every node in the network). Smart contracts are stored in the distributed ledger so they cannot be deleted or modified. Smart contracts. There are various platforms such as Ethereum, hyper ledger fabric, NEM, Stellar and so on to write a smart contract for specific use cases. 1) Ethereum: It is a general-purpose cryptocurrency platform that is Turing complete. It runs all the Blockchains and protocols. Ethereum also has its own distributed ecosystem and a cryptocurrency called Ether. 2) Hyperledger fabric: It is an open-source Linux project. It sup- ports the collaborative development of a blockchain distributed ledger. Hyperledger fabric developed Javascript-based tools and hyper ledger compiler to develop smart contracts. It has emerged as an alternative to Ethereum smart contract platform.

3) NEM: It has both the private and public blockchain added. It allows third parties to build applications on their platform. It uses a proof-of-importance consensus mechanism which distinguishes it from other smart contract platforms. 4) Steller: Contracts provided by steller are Turing incomplete and hence it is used to develop basic applications is cost-effective and time-effective[1]. As we shall see later, smart contracts can be deployed using a language called solidity which is compiled on Ethereum Virtual Machine and distributed across the entire Ethereum network

C. Decentralized Applications

Ethereum defines Dapps as a transaction protocol that executes as the terms of the contract or a group of contracts dictate on a cryptographic Blockchain. It can be thought of as an application that runs over a network in a decentralized manner with the operation executed across all the network nodes(computers). There are many examples of such decen- tralized apps which provide services over a large network without the intervention of a third party. Any Dapps must have

the following criteria: 1) It must be completely open-source, it should be able to operate in an autonomous way with no entity controlling it while its data must be stored cryptographically on a decentralized platform. 2) It must generate tokens(proof of work or computational energy spent) adhering to some standard algorithm and distribute them during the beginning of its operations. A token is like a monetary incentive for a user to keep the application's economy running. The users of the network could be awarded these tokens for rendering a service to the application. 3) The application should take feedback according to the consensus algorithm and make improvements in the application[2]. This includes, for in- stance, LaZooZ(decentralized uber) which provides services to the customer over a network without any intervention of a third party(like uber), it generates tokens as 'zooz'(proof-of- movement) which the rider can spend for a ride or driver can earn[3]. Another example is Edgence which is a Blockchain- based computing platform to manage massive Dapps in IoT applications. It introduces a masternode technology to propose IoT users in a blockchain[4].

D. Decentralized Autonomous Organisations/Corporations

It can be perceived as a complex form of Dapps. In order to become an organization, it adopts a constitution that provides a mechanism that would be reflected publicly in a Blockchain. A network of agents perform tasks

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that could be perceived as a model of a corporation running without any human involvement, under a set of

business algorithms. Smart contracts running on the blockchains enforce a preapproved task and start defining the model of autonomous business. DAC's/DAO's are concepts derived from Artificial Intelli- gence. Functions of real-world economies could be mimicked on the blockchain. The complicated globalized trade networks which are perceived as impossible due to the local bureaucratic paperwork might be possible as registration, taxation, etc might be reinvented in an efficient way or classify as redun- dant when moved on the Blockchain. Smart contracts could automatically comply with the agencies like the government to set up a business in its jurisdiction[2].

E. Decentralized Autonomous Societies

Eventually, we can see the rise of the ecosystem of Dapps, DAC'S and DAO's bundled in Decentralized autonomous so- cieties. The concept of self bootstrapping is worth discussing. A project idea as an entity along with a smart contract and self bootstrapped organization could ask potential investors to invest in the idea, operate, make profits, pay investors, gener- ate feedback through a consensus algorithm. Smart contracts might emerge as a dominant feature in economies.

III. ETHEREUM VIRTUAL MACHINE

A. Introduction

Ethereum is a platform and programming for developing and distributing Dapps. It is a Turing complete platform as in it can execute any instruction that a Turing machine can. It is an infrastructure that runs all the Blockchain and protocols.

But Ethereum is not decentralized across all the axis. It is only decentralized across the architectural axis where if some nodes are removed it will still function well and political axis as Ethereum itself cannot force everyone to follow protocol. However, Ethereum is centralized across the logical axis since it can only work as a single protocol and if we were to split Ethereum's function it can no longer function. Ethereum acts like a single computer.

B. Ethereum Virtual Machine

It is a stack-based interpreter which has an array of memory bytes and key-value storage. It works on the principle of stack structure(Last-in-first-out) to perform the push() and pop() operation. Smart contracts which are deployed on the Blockchain are written in high-level languages like solidity through Ethereum virtual machine. It generates opcode during runtime. The opcodes have access to three levels of space to store the data(stack memory, short term - memory and long term- key-value storage). Based on their functionality, the op- codes are segregated into different groups. While the Ethereum Virtual Machine is running a program, its full computational state can be defined by the list of (blockstate, message, code, memory, transaction, stack, gas, and pc). Ethereum Virtual Ma- chine permits untrusted code to run on its network, however, it imposes the following security restrictions: 1) Execution state is paid upfront which prevents denial of service attacks. 2) Codes interact with each other only through a single arbitrary length array.3) Program execution is isolated. Add operation pops two top items from the stack and computes its sum while a store operation stores the top two items into the contract's storage at a specified index.

C. Results



Fig. 3. Compiling the program

IV. BLOCKCHAIN 3.0

A. Bank and payments

The banking system has a lot of regulations and charges hefty fees to transfer currency across the border. This problem could be solved by Blockchain technology as cryptocurren- cies like Bitcoin are making transborder transactions within seconds on a low fee. Since private remittances are one of the factors that influence our GDP in a positive way, the

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Fig. 4. Deploying a smart contract

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Fig. 5. Putting smart contract in use

Indian diaspora can transfer currency within seconds thus impacting the demand-supply chain in India. Another use is that investors in developing countries could invest in the manpower developing countries. Hence blockchain technology can fuel globalization.[5]

B. Energy management

The energy industry is highly centralized. Both the buyer and the seller has to through public grids and channels to sell and receive their products. This problem could be solved by a distributed energy management system. One model proposes a distributed energy management system using Blockchain and Alternating direction method of multiplier(ADMM)[6]. Blockchain is compatible with distributed optimization[7] so it is implemented using Blockchain technology. RWE collab- orated with Ethereum based blockchain startup to decentralize charging ports for electric cars.

C. Digital art and music

Illegal art piracy could end as blockchain technology helps to digitally encode an art with a unique hash which helps it preserve its identity. Artchain, a trading system is based on blockchain technology. It provides a transaction history by registering and tracing the digital art. It establishes proof of authority- which is well suited to regulate industries where a smart contract maintains the network - as a trust model of artchain network.[8]. Mycelia is an online music platform that pays artists - without a third party- directly from consumers.[5]

D. Real Estate

The land is a very expensive asset hence care must be taken to precisely store the name of the owner to verify his ownership. Recently there has been an increase in property- related frauds in India. Blockchain technology can reduce the traditional paper records to replace them with smart contracts which automatically on the basis of programmable code veri- fies the document and the ownership and transfers the property to lease. One system proposes a distributed blockchain nodes which can be used to store and secure the data. It encompasses all the details of the land but since it is immutable it executes the dual goal of traceability and immutability. It derives the concept of peer-to-peer file sharing from BitTorrent to transfer the land which is cryptographically secured by a private key.

[9] Government of Andra Pradesh recently collaborated with a Swedish-based startup to build a blockchain system for land registry.[10]

E. Cybersecurity

Cryptography is an imperative element of Blockchain tech- nology. The CIA triad secures the data from manipulation as Blockchain encompasses a distributed processing system which makes it difficult for a hacker to

manipulate the data(consensus will never agree) as compared to a centralized database which has a single entry point. Other than that it also protects the availability factor of the CIA triad where data is available easily in the nodes of the network and the user can easily access the data locally instead of asking from a centralized database[11].Quantum computing could easily break the RSA algorithm by using Shor's algorithm. Iota.org is a next-generation, graph-based, distributed ledger startup that claims to overcome this quantum threat. [12]

F. Other uses of Blockchain 3.0

Blockchain technology can be used to remove intricacies from many other sectors like trade finance, securities, ac- counts, digital identity, loan and mortgages, supply chains, health care, decentralized micro-blogging, Administrative and security constraints, etc

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E-MENU WITH MINI MANAGEMENT SYSTEM FOR RESTAURANT

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ABSTRACT

There are numerous ways in which the customer experience can be improved in the hotel industry. One good way to try and do this is often through a E-menu with management system. rather than the present system of ordering food through written menu cards, customers are going to be able to order their alternative of meal through associate degree app within the restaurants. this offers the client complete freedom to flick through the menu and place their order, which might then be sent to the room for preparation. The app can have a really straightforward and simple nevertheless effective interface for the shoppers. The ordered things are updated within the information and this can usually avoid the misunderstanding between the client and therefore the waiter just in case he gets served one thing totally different or eliminating false orders. The expected outcome of the analysis is to develop a completely machine-controlled building management system with the mentioned options moreover on avoid confusions between orders, give higher read of food and permit the client to decide on the menu in keeping with their style in a very minimum time. this can scale back the necessity for printing multiple copies of the menu cards.

Keywords— Restaurant Management; Menu; Data Retrieving; Tasks Allocate; Sentiment Analysis; Unique menu.

INTRODUCTION

Food and beverage industry is a fast growing industry nowadays. Because food is a basic need, the industry never runs out of customers. However, because of the large number of customer's restaurants sometimes face huge difficulties when satisfying the customers because of the rush. Also, the customers face a lot of difficulties when reserving a table and ordering food. Because of the rush, wrong orders can be served to the customers and there is a high possibility of losing the customer base because of the poor customer service (1). Our system is the solution to minimize these problems and maximize the efficiency of the restaurants. Though there are systems like Zomato, and Pizza Hut website, they do

not address the problem completely.

The proposed system goal is to order the food from outlets using this mobile communication. During the food order in restaurants, users need to wait in a queue in the peak hours (2). If suppose, one waiter is available in the restaurants that leads to human error due to the more number of users. This can be avoided by an E-menu with a management system. Now the customer can fix the order to one or more outlets just by sitting at their table. According to the present scenario people don't have the time and want connection to anything from anywhere. This has raised the demand for distributed computing to provide remote storage. This system is using cloud storage devices to provide remote storage or network attached storage over cloud.

LITERATURE SURVEY

- [1] SMART MENU CARD SYSTEM. In this Project, the restaurants with a tablet menu that would recommend dishes based on a recommendation algorithm, which has not been implemented elsewhere.
- [2] DIGITAL RESTAURANTS AND INTER RESTAURANT NAVIGATION. The paper gives the comparison between of traditional method and new method that we are preparing for, the second flowchart actually gives the idea that how the waiters eliminated.
- [3] SMART RESTAURANT MANAGEMENT AND ORDERING SYSTEM. Once the user logs in, he/she has to select the restaurant they are in. Then they can browse through the menu easily through a simple interface and select their choice of dish. The available dishes can be updated easily by the restaurant staff unlike the paper menu cards. This greatly improves efficiency and removes confusion. Once the food is delivered clients can choose to pay through mobile API.
- [4] CLOUD COMPUTING: SOFTWARE AS A SERVICE. From this paper it was understood that with the help of cloud the restaurant manager will just low specification laptop and the application can work in tablets too.
- [5] A DETAILED STUDY OF AZURE PLATFORM AND ITS COGNITIVE SERVICES. Microsoft Azure provide application developer with environment, tools. So it gives us the building block which we need and establish new cloud services quickly.

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PROPOSED SYSTEM

The app will have a very simple and easy yet effective user interface for the customers. This will reduce the need for printing multiple copies of the menu card. The menu can be easily updated and maintained by the restaurant staff as well unlike in the case of printed menu cards.

E-MENU SYSTEM FLOWCHART

The flowchart gives the explanation of the digital E-menu

Where different users with different roles can log in use the application.

MANAGING(ADMIN)

This section contains the management part that is to view order, track order, manage the payment, waiter login etc.

Proposed architecture



E-menu system Flowchart

Fig.1.Flowchart Diagram of Implementation



Management(Admin)

Fig.2.Diagram of Management (Admin)

V. ALGORITHM

A. Role based access control and jwt authentication

Three primary rules are defined for RBAC:

• Role assignment: A subject can exercise a permission only if the subject has selected or been assigned a role.

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• Role authorization: A subject's active role must be authorized for the subject. With rule 1 above, this rule ensures that users can take on only roles for which they are authorized.

- Permission authorization: A subject can exercise a permission only if the permission is authorized for the subject's active role. With rules 1 and 2, this rule ensures that users can exercise only permissions for which they are authorized.
- JWT (JSON web token) has become more and more popular in web development. It is an open standard which allows transmitting data between parties as a JSON object in a secure and compact way. The data transmitting using JWT between parties are digitally signed so that it can be easily verified and trusted. In its compact form, JSON Web Tokens consist of three parts separated by dots (.), which are:
- Header.Payload.Signature
- Therefore, a JWT typically looks like the following. xxxxx.yyyyy.zzzz
- This algorithm required for Waiter, Chef and Administrator access.

B. ORDER CREATION

- Customer create the order and confirm the order. When user confirm the order, the data goes to serving_order_detail table. The chef gets the Order details in big display.
- When food get served to the customer then the detail removed from the serving table and goes to pending order table.
- The pending order details seen by Waiter on waiters side access. If the customer is done then payment must be done and getting the payment details and giving input to table and then submit.
- Now After that the data from this table will removed and goes to Audit order details.

VI. RESULT AND DISCUSSIONS

We fed multiple inputs with different roles computed the output as shown below.

A. Output for Role based Access control and JWT authentication.



Figure 6.A. login page for different roles using Role base access control and JWT authentication.

B. Output for Order creation



Figure 6.B.1 Selected order digital menu page.



Figure 6.B.2 Customer Order List table.

After the propose model implement. We will deploy this to cloud. As you know, User uses any software from SaaS using PAYG(Pay As You Go) model[4].

Software as a service (SaaS) allows clients to associate with and make use of cloud-based applications over the Internet. Basic models are email, calendaring and office instruments, (for example, Microsoft Office 365). SaaS gives a whole programming association which you buy on a compensation as-you-go premise from a cloud specialist co-op[5].

User is supplied with remote access, based on IAM(Identification and Authentication Management) credentials. User, whereas mistreatment SaaS needn't compelled to store his add cloud; it's usually keep by user on his personal storage devices. Storing work on sure cloud storage is safer than storing it on native device. This frees user from keeping the memory device continually with him, and allow remote access to figure from anyplace and anytime simply by login into users' cloud account. As the package in use, isn't on users' machine, user did not need to trouble regarding maintaining it. This helps software developers and industries in cut on packaging a package on multiple medias. This frees user from worrying about the protection of package at his machine.

Now the best and reliable platform is Microsoft Azure. As Microsoft azure is 5 to 6% cheaper than Amazon AWS.

VII. CONCLUSION

This project is a big leap for the hotel industry into modern 21st century tech. This will greatly improve and simplify the task of ordering food through the app. So basically we are mainly applying the methods from Implementing Digital Restaurants and Inter-Restaurant Navigation Using Smart Phones project.

VIII. FUTURE SCOPE

- Currently this application is capable of having the menu and management system of a particular brand of restaurants. But it can be made to encompass a digital menu and management system of all the hotels and restaurants of owned by one person, all in one place.
- This way the owner can easily browse through the different menus of a variety of hotels and choose the right decision for growth of business. This expansion to hold the menu details for all the hotels is the true potential of this application.

IX. ACKNOWLEDGMENT

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SOCIAL DISTANCING AND ALERT SYSTEM

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ABSTRACT

In recent times, the whole world is going through a pandemic of covid-19 which is a dangerous and life-taking viral disease caused by a virus called Coronavirus. Studies say that there are almost more than 3 crore people affected all over the world COVID19 has become the top priority for the health sector worldwide.[1] Numerous efforts were made to battle this pandemic and flatten the infection rate. Social distancing is a recommended solution by the World Health Organization (WHO) to minimize the spread of COVID-19 in public places. The majority of governments and national health authorities have set the 2-meter physical distance as a compulsory precaution in malls, shopping centers, schools, and other covered areas. To ensure social distancing protocol publicly places and workplace, the social distancing detection tool which will monitor if people are keeping a secure distance from one another by analyzing real-time video streams from the camera, we can integrate this tool into their security camera systems and can monitor whether people are keeping a safe distance from each other or not. Correct facemask wearing is valuable in infectious disease control, but the effectiveness of facemasks has been diminished mostly due to improper wearing.[2] The CCTV captures the images of people not following social distancing or not wearing masks and sends a notification to the authorities alerting them to take necessary action against them. With the help of Artificial Intelligence and Image Processing technologies, the social distancing detection tool will alert the public to follow the protocols.[1]

Keywords: Covid19, Social Distancing, Artificial Intelligence, Image Processing, Mask Detection, CCTV.

I. INTRODUCTION

Social Distancing is a recommended solution by the World Health Organisation (WHO) to minimise the spread of covid-19 in public places. The majority of governments and national health authorities have set the 2-meter physical distancing as a mandatory safety measure in malls, shopping centres, schools and other covered areas[3]. To ensure social distancing protocol in public places and workplace, the social distancing detection tool that can monitor if people are keeping a safe distance from each other by analyzing real time video streams from the camera, monitoring people at malls workplaces, factories, shops we can integrate this tool to their security camera systems and can monitor whether people are keeping a safe distance from each other or not[4]. Close interaction with a person infected or through touching a contaminated surface and object can spread the virus rapidly.rapid worldwide spread of coronavirus disease 2019 (Covid 19) has resulted in a global pandemic. correct facemask wearing is valuable in infectious disease control, but the effectiveness of facemasks has been diminished mostly due to improper wearing. CCTV captures the images of people not following social distancing or not wearing masks and sends an alarm to them through speakers alerting them to follow the rules and protocols. [2]With the help of Artificial Intelligence and Image processing technologies the social distancing detection tool will alert the public to follow the protocols.

II. LITERATURE SURVEY

[1] SMART MONITORING SYSTEM FOR PHYSICAL DISTANCING. The proposed system detects the number of people available in a specific waiting zone and calculates the distance among them. The system shows a warning message to alert the person who is not respecting the distance.

[2] VISUAL SOCIAL DISTANCE ALERT SYSTEM USING COMPUTER VISION & DEEP LEARNING. The proposed system discusses different methods used to detect the people and measure the distance between people.

[3] PERSON DETECTION FOR SOCIAL DISTANCING AND SAFETY VIOLATION ALERT BASED ON SEGMENTED ROI. According to the performed studies, most existing object detection applications are using pre-trained CNN-based models. Therefore, this study aimed to use a similar approach, so further exploration has been done to determine the most suitable pre-trained model for this project.

[4] REAL-TIME FACE MASK AND SOCIAL DISTANCING VIOLATION DETECTION SYSTEM USING YOLO This paper focuses on a solution to help enforce proper social distancing and wearing masks in public using YOLO object detection on video footage and images in real time. The experimental results shown in this paper infer that the detection of masked faces and human subjects based on YOLO has stronger robustness and faster detection speed as compared to its competitors.

[5] A DEEP LEARNING APPROACH FOR FACE DETECTION USING YOLO. The paper compares the accuracy of detecting the face in an efficient manner with respect to the traditional approach. The proposed model uses the convolutional neural network as an approach to deep learning for detecting faces from videos.

[2] VISUAL SOCIAL DISTANCE ALERT SYSTEM USING COMPUTER VISION & DEEP LEARNING. The proposed system discusses different methods used to detect people and measure the distance between people.

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[5] A DEEP LEARNING APPROACH FOR FACE DETECTION USING YOLO. The paper compares the accuracy of detecting the face in an efficient manner with respect to the traditional approach. The proposed model uses the convolutional neural network as an approach of deep learning for detecting faces from videos.

III. PROPOSED SYSTEM

The proposed system focuses on how to identify the person on an image or video stream. To ensure whether social distancing is maintained or not with the help of computer vision and deep learning algorithms AND with the help of CCTV BY providing alerts through speakers ...the main advantage here is that CCTV cameras and speakers are already pre-installed in supermarkets which makes this system cost-effective as well. Along with social distance alert, the program also includes mask detection As well With the help of image processing and computational capacities.

A. SOCIAL DISTANCE DETECTION

Social Distance discovery will describe that two or further persons in a single frame are walking and maintain social distance with at least 2 measures of range with each other. By using the Euclidean Distance system, it'll describe that persons maintaining or following social distancing under the guidance of WHO. If they maintain it, it'll be shown in Green Blockish-box with a safety alert communication where if they don't follow social distancing also the system will display an alert communication with Red Blockish-box [4].

B. MASK DETECTION

Face Mask Detection Platform uses Artificial Network to understand if an individual does or doesn't wear a mask. This technology can be associated with any present or new IP cameras to identify individuals with or without a mask. The face mask detection process begins from the image acquisition using a CCTV camera. The imaging device and the modules are developed using Tensor Flow and OpenCV programming to detect the face and evaluate all faces point that to detect is that face wear mask or not. If a person wears a mask they will be in a safe zone. The detection is displayed as a green rectangle box with a safety alert where if a person doesn't wear a mask then it will be displayed in a red rectangle box and with the message of Alert as well[5].

IV. PROPOSED ARCHITECTURE



Start

Capture Image

Fig.1.Flowchart Diagram of Implementation

V. ALGORITHM A. YOLO

You Only Look Once, Version 3 (YOLOv3) is a real-time object detection system that concedes distinct things in video streams, live feeds, and images. To detect an item, YOLO uses features learned by a deep convolutional neural network. The Keras or OpenCV deep learning libraries are used to implement YOLO. Artificial Intelligence (AI) algorithms use object classification systems to recognize certain objects in a class as subjects of interest. YOLO has the benefit of being significantly faster than other networks while maintaining accuracy.

B. EUCLIDEAN DISTANCE

To detect and calculate total persons in a frame and who maintains the social distance at a time there are at least two people detections (required in order to compute our pairwise distance maps). Extract all centroids from the results and compute the Euclidean distances between all pairs of the centroids. To evaluate the distance between two or more persons we have used the distance differentiate method i.e., Euclidean Distance Method, and find the centroid of each detected person to match the safe distance as well.

$$D(Q, P) = \sqrt{\sum_{i=1}^{n} (Q_i - P_i)^2}$$

VI. RESULT AND DISCUSSION

We fed multiple inputs with scenarios such as people wearing and not wearing facemasks. People wearing face masks but violating social distancing rules. People not wearing facemasks and also violating social distancing rules and people wearing facemasks as well as following social distancing into our Social Distancing Detection and Alert System and computed the output as shown below.

A. Output for Mask Detection



Figure 6.A.1 Detection Result of a person without wearing a facemask



Figure 6.A.2Detection Result of a person wearing a facemask



Figure 6.A.3 Detection Result of persons with and without wearing a facemask

B. Output for Social Distancing Detection



Figure 6.B.1 Detection Result of people Violating Social Distancing and not wearing Facemask.



Figure 6.B.2 Detection Result of people Violating Social Distancing and not wearing Facemask.



Fig 6.B.3 Detection Result of people following Social Distancing and wearing Facemasks.

VII. CONCLUSION

CCTV systems are able to conduct different processing styles, such as target recognition and motion monitoring, due to recent developments. This system is a novel social distancing detector that can possibly contribute to public healthcare [2]. It focuses on detecting the observation of social distancing between persons and also detects the face mask-wearing and face mask not wearing in real-time with an alarm system. This system performs very high accuracy in identifying the social distance between the people and generating the alert that can be handled and monitored.

VIII. FUTURE SCOPE

- Fire Detection System
- Offices Manufacturing Units and corporate giants
- Coughing and Sneezing Detection
- Temperature Screening
- Public Places like schools, colleges, airports, railways stations, etc.
- Entertainment and hospitality industry
- Restricted Zones/Areas
- Hospitals/healthcare organizations

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I am extremely grateful to the celebrated authors whose previous works have been consulted and referred to in my project work. I also wish to convey my appreciation to my friends who provided encouragement and timely support in the hour of need.

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SELF-DRIVING CAR USING DEEP LEARNING AND OPENCV

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ABSTRACT

In the modern era, the vehicles are focused to be automated to give human drivers stress-free driving experience. In the field of automobiles various aspects have been considered which makes a vehicle automated. Tesla, the biggest world leader in electric cars, has been working on self-driving cars for a long time and is still developing new changes to give a whole new level to the automated vehicles. Our self driving car project is based on image recognition by using an optical sensor device. This vehicle will capture the image in front of it, detect elements like traffic signals, other vehicles, road signs, etc and take appropriate action based on logic provided. This optical image recognition system is very crucial for self-driving cars since sensors cannot detect traffic signals and therefore leads to dependency on the driver defeating the purpose of autonomy. By using this technology, we can teach cars what sign boards and signals mean which will let them make intelligent decisions when it detects one of the learned signs and will help to achieve autonomy on a greater scale.

Keywords: Autonomy, Image Detection and Recognition, Optical sensors, Optical input.

I. INTRODUCTION

So we all know one thing about self-driving cars is that they don't require any human input to operate. This is because self- driving cars are combined with various different sensors to perceive their surroundings which helps the system to make better decisions. Our self driving car project is based on image recognition by using an optical sensor device. This vehicle will capture the image in front of it, detect elements like traffic signals, other vehicles, road signs, etc (machine learning) and take appropriate action based on logic provided.

II. PROBLEM STATEMENT

Our problem is to look at the implications of utilizing autonomous vehicles in everyday use to reduce negative impacts on society caused by manual transportation. People often indulge in rash driving which according to government data is the biggest reason for accidents. They also cause unnecessary traffic and parking problems are not to be ignored. So with the help of self-driving cars we can reduce all these problems to a minimum. So, the task was to design an automated car system that can detect its surroundings and take appropriate measures to avoid any accidents using arduino, raspberry Pi and a camera.

III. LITERATURE SURVEY

We reviewed seven research papers and selected five research papers that helped us improve our project. From the paper written by Zhilu Chen and Xinming Huang we used the concept of lane detection using image input. The next paper was about the visual perception of self-driving cars. The importance of camera systems and obstacle detection was highlighted in the paper. In the paper, 'The key technology toward the self-driving car', concepts like environment perception and path planning were discussed. The next paper by Trimalapudi Raviteja and Rajay Vedaraj I.S. briefed about the sensory system used in self-driving cars. In the last paper researched by us, we read about the challenges faced during the localization and mapping of self-driving cars. The social impact of it along with the details about the detection and the human machine interaction.

VI. ALGORITHM



Figure 1: Overview of system

Step 1: Through a raspi camera attached to the car, the system will take an image input.

Step 2: The raspi camera is connected to the Raspberry Pi microcontroller through a cable. The captured image is then detected by the Raspberry Pi microcontroller which is connected to the computer via WiFi.

Step 3: The image recognition is carried out with the help of OpenCV. The image is then recognized by the Raspberry Pi microcontroller.

Step 4: The Raspberry Pi microcontroller which is attached to the Arduino UNO microcontroller, sends a command to it.

Step 5: The Arduino UNO microcontroller then sends the same command to the L298 dual channel H-bridge, which is responsible for moving the motors. Steering action will be performed in this step. Based on the parameters relayed the steering algorithm takes action.

VII. DISCUSSION



Figure 2: Flowchart

Camera is initialized first. Setup(argc, argv, Camera); *cout*<<"*Connecting to camera*"<<*endl;* if (!Camera.open()) cout<<"Failed to Connect"<<endl; ł *cout*<<"*Camera Id* = "<<*Camera.getId*()<<*endl*; After the camera is initialized, we adjust camera settings. void Setup (int argc, char **argv, RaspiCam_Cv &Camera) { *Camera.set* (*CAP PROP FRAME WIDTH*, ("-w", argc, argv, 400)); *Camera.set* (*CAP_PROP_FRAME_HEIGHT*, ("-h",argc,argv,240)); *Camera.set* (*CAP_PROP_BRIGHTNESS*, (*"-br",argc,argv,50*)); Camera.set (CAP_PROP_CONTRAST, ("-co", argc, argv, 50)); *Camera.set* (*CAP_PROP_SATURATION*, ("-sa", argc, argv, 50)); *Camera.set* (*CAP_PROP_GAIN*, ("-g", argc, argv, 50)); *Camera.set* (*CAP_PROP_FPS*, (*"-fps",argc,argv,0*));

}

Now, we capture a frame using camera.grab() command and retrieve the last captured frame using camera.retrieve(frame) command.

Now we will draw a trapezium on the captured frame by using coordinates. The non-parallel sides will represent the lane markers at the edge of the lane while the parallel ones will determine the area under consideration.

Now we skew the trapezium into a rectangle to get a perspective frame. This makes the perspective image look as if the frame was captured from a bird eye view.

void Perspective()

```
{
```

line(frame,Source[0], Source[1], Scalar(0,0,255), 2);

line(frame,Source[1], Source[3], Scalar(0,0,255), 2);

line(frame,Source[3], Source[2], Scalar(0,0,255), 2);

line(frame,Source[2], Source[0], Scalar(0,0,255), 2);

Matrix = getPerspectiveTransform(Source, Destination);

warpPerspective(frame, framePers, Matrix, Size(400,240));

}

Now after getting a perspective frame, we will carry out the following: Threshold; Edge Detection and Image Gray scaling.

void Threshold()

```
{
```

cvtColor(framePers, frameGray, COLOR_RGB2GRAY); inRange(frameGray, 230, 255, frameThresh);

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void LaneCenter()

```
Canny(frameGray,frameEdge, 900, 900, 3, false);
add(frameThresh, frameEdge, frameFinal);
cvtColor(frameFinal, frameFinal, COLOR_GRAY2RGB);
cvtColor(frameFinal, frameFinalDuplicate, COLOR_RGB2BGR);
cvtColor(frameFinal, frameFinalDuplicate1, COLOR_RGB2BGR);
Now, we will create an histogram and use it to find the lane as well as lane centre.
void Histrogram()
{
histrogramLane.resize(400);
histrogramLane.clear();
for(int i=0; i<400; i++)
                           //frame.size().width = 400
{
ROILane = frameFinalDuplicate(Rect(i,140,1,100));
divide(255, ROILane, ROILane);
histrogramLane.push_back((int)(sum(ROILane)[0]));
}
histrogramLaneEnd.resize(400);
histrogramLaneEnd.clear();
for (int i = 0; i < 400; i + +)
{
ROILaneEnd = frameFinalDuplicate1(Rect(i, 0, 1, 240));
divide(255, ROILaneEnd, ROILaneEnd);
histrogramLaneEnd.push_back((int)(sum(ROILaneEnd)[0]));
}
laneEnd = sum(histrogramLaneEnd)[0];
cout<<"Lane END = "<<laneEnd<<endl;</pre>
}
void LaneFinder()
ł
vector<int>:: iterator LeftPtr;
LeftPtr = max_element(histrogramLane.begin(), histrogramLane.begin() + 150);
LeftLanePos = distance(histrogramLane.begin(), LeftPtr);
vector<int>:: iterator RightPtr;
RightPtr = max_element(histrogramLane.begin() +250, histrogramLane.end());
RightLanePos = distance(histrogramLane.begin(), RightPtr);
line(frameFinal, Point2f(LeftLanePos, 0), Point2f(LeftLanePos, 240), Scalar(0, 255,0), 2);
line(frameFinal, Point2f(RightLanePos, 0), Point2f(RightLanePos, 240), Scalar(0,255,0), 2);
}
```

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{

laneCenter = (RightLanePos-LeftLanePos)/2 +LeftLanePos;

frameCenter = 188;

line(frameFinal, Point2f(laneCenter,0), Point2f(laneCenter,240), Scalar(0,255,0), 3);

line(frameFinal, Point2f(frameCenter,0), Point2f(frameCenter,240), Scalar(255,0,0), 3);

Result = laneCenter-frameCenter;

}

Based on the analysis above, the main function will generate three frames (the main frame, perspective frame and the final grayscale frame), and send the Arduino the appropriate command in binary form. We will calculate FPS as well as display it on the output screen.

VIII.Conclusion and Future Work

We used OpenCV and microcontrollers such as Arduino and Raspberry Pi to make the self-driving car prototype. Through the project we can conclude that driverless cars will minimize accidents by addressing the main causes such as: the errors caused by drinking, drowsiness, distraction. Driverless cars may become the next important step in transportation as the technology progresses. Since these vehicles are electric, there will be reduction in greenhouse gases, thus reducing global warming. Upon large-scale implementation in the future, there will be a reduction in road accidents and mishaps, deliveries will be quicker due to efficient traffic management, etc. This technology can be fused with advanced AI bots and these machines can be sent to various planets for exploration and research. Space exploration can become easier.

As for future work, we are going to integrate Ultrasonic sensors and try to implement obstacle detection.

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ONLINE TEST PROCTORING USING AI

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ABSTRACT

There is a rise in e-learning for the past few years across countries due to its flexibility, availability and user friendliness. With its certain benefits in condemning situations like natural disasters (e.g. COVID-19 pandemic etc.) and war circumstances, E-learning in higher education has exponentially increased. On campus, the students are generally tested on the basis of oral and written examination. In times of COVID-19, however, a new form of education is called for students as they are unable to be physically present on campus. Due to this the education and assessments need to take place at a distance. With online examinations in picture the major challenge to be faced is the use of proctoring techniques. An online examination system that has the ability to address academic malpractice is the main concern to be able to trim down those acts to some degree. Online exams are conducted with the physical absence of students and instructors on E-learning platforms. This leads to several issues like security and integrity during online exams. For the fair assessment of students' performance in E-learning we know online examination plays a very crucial role. That is why we introduce a proctoring method to detect and reduce cheating.

Keywords: E-learning, Online proctoring, Face Detection, Head Pose Estimation, Inference system, Multimedia, Complexity.

I. INTRODUCTION

An exam is one of the important components in a learning program, likewise in an online learning program, it's not an exception. During an online exam, the occurrence of cheating will always exist. Therefore, the prevention and detection of its occurrence are tremendously needed. On conventional exam held in a proctored class environment, the exam participant is being proctored by a human proctor who monitors the classes during the exam, while on the online exam, a reliable and inexpensive proctoring ability is needed to make the education provider have the assurance of the student's learning outcome.

Proctors are approved persons who are supposed to monitor an exam. The presence of a physical proctor is necessary in a traditional classroom setup. Requirement of having a proctor holds good even in an online classroom examination scenario. The creation of a system that can detect the malicious activities that might possibly happen in an automated manner will be helpful for the instructor.

There are several proctoring softwares that help the instructor to conduct exams online. Usual requirements they ask for taking tests from anywhere is the system with a webcam along with internet connection. But they ensure the integrity only with the certification of trained proctors they have. That indicates that they still rely on the human exam monitoring process. So, automating the monitoring process without compromising the reliability and inexpensiveness is challenging which is addressed in this paper. The system proposed here uses a single webcam with a microphone along with an internet connection. With this minimum requirements, our idea plans to develop a system which is

- 1. Fully automated
- 2. Multi modal i.e., incorporates video, audio and active window details
- 3. Having no use of any expensive and user inconvenient external hardware
- 4. Any physical proctor is not required throughout the examination.

II. RELATED WORK

Methods had been proposed to overcome the need in online exam proctoring. In [1], they proposed a method to enhance the robustness for pose and lighting variations by doing an incremental training process using the training data set obtained from m-learning online lecture sessions. To train the image dataset a Convolutional Neural Networks (CNN) machine learning was performed. CNN is one type of artificial neural network commonly used in image data.

In [2], they present a method to avoid the physical presence of a proctor throughout the exam by creating a comprehensive multi modal system. They used hardware such as web-cams to capture audio and video along with active window capture.

The main three modules included were the active window capture, video input processing and audio capture.

Active window capture enables the auto capture of all running processes in the system at the time of examination. With the video input it is possible for monitoring the face of the student throughout the exam. Audio capture is useful if you are seeking answers to someone by talking to the person. The variations of the audio in the examination surroundings are detected. The face detection was performed by using a tree structured model with a shared pool of parts. The Head pose estimation was done by using Yaw angle.

In [3], the paper focuses on video summarization of abnormal behavior for remote invigilation of online exams. Even in this paper, head pose estimation was used which falls in the category of appearance template methods, which compare a new image of a head to a set of examples to find the most similar view. Sequential Importance Resampling (SIR)algorithm was used as the particle filter algorithm. The general principle of SIR is to calculate for each frame the position of the head (coordinates of the region center), its velocity, and its scale. The post-processing step was carried out by implementing the Hidden Markov Model to reduce random errors, modeling each of the head pose angles as individual states, and yielding a highly complex model.

In [4],present a multimedia system analytics system that performs automatic on-line test proctoring. The system hardware includes one digital camera, one wear cam, and an electro-acoustic transducer, for the aim of observing the visual and acoustic surroundings of the testing location. The system includes six basic parts that unceasingly estimate the key behavior that area unit user verification, text detection, voice detection, active window detection, gaze estimation, and phone detection.

In [5], the proposed system focused on reducing the complexity of the group face recognition process by finding a suitable scenario that will improve the accuracy and reduce the time complexity.

In [6], eight constraint procedures are proposed to minimize the cheating, a method is proposed by sending a real-time image of every classroom to a streaming media server. A monitor data consisting of video and audio streaming also screen snapshot capture continuously and the participant is verified with the data captured during sign in. A desktop robot with a 3600 camera and movement sensor attached sends video recording to a monitoring center when compromising events are detected.

Then recently in [7], a fully automated online and continuous proctoring was proposed to detect some cheating behavior of online exam participants, including impostor, where the valid participant is being replaced by others to complete the exam.

In [8], User verification type mostly used is knowledge-based such as the use of ID, password and challenge question. The other approach often used in user verification is token-based verification, but due to its lack of security and privacy, a third approach is becoming increasingly used. The approaches are an identity based on the use of biometrics features that offer more accurate and effective identification methods.

III. PROPOSED DESIGN



Figure 1 : Flowchart for User Registration Using Device

system specifically in an online exam that is robust against pose and lighting variations.

The proposed continuous verification system aims to provide an inexpensive and high accuracy verification

This flowchart explains the process of User Registration. In this first stage, a user will register his identity through the user's mobile device together with the initial user's face capturing as described in Fig. 8.

The user will be asked to provide a certain face pose to accomplish the registration process. The different poses provided by the user are a) frontal view; b) left and right view; c) half left and right view; d) half-bow view; e) half lookup view. The image capturing will be executed two times for each pose. The first image is captured using the standard camera setting while the second one is captured by decreasing the camera brightness setting. This is done in order to acquire a dataset with various pose and lighting conditions.



Fig. 2: Continuous User Verification Architecture

The whole automatic online exam proctoring system will consist of two-part. The first part is the Online Lecture Sessions part that consists of three modules:

- 1) User Registration
- 2) Dataset Collecting, and
- 3) Dataset Training.

While the second part is the Online Exam Part that consists of two modules:

- 1) Face Detection; and
- 2) Face Verification.

In the proposed method an incremental training of the user's face image is applied. The incremental states describe the training process which is executed each time the user's lecture session ends. This method is expected to reduce the server's load on the training process and also increase the accuracy of the detection and verification process under various pose and lighting conditions. The verification

The process will be using CNN method for face recognition and hopefully works for different user pictures and illumination variations.

The verification process will be executed directly after a user login into the exam system. The continuous user verification will be terminated when the exam is finished or a certain condition considered as cheating is found. As depicted in Fig. 7, the condition considered as cheating is when one of the following criteria is satisfied: a) multiple faces detected, b) user not available in front of the computer for a period of time, c) impostor detected, is when the verification decision results in false/invalid user.

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Figure 3: Flowchart for Working of Online Exam Proctoring System

The continuous face detection and verification process will be done by applying a CNN method by using the weight resulting from the incremental training when the user took the online exam on his mobile device. If no-face is detected, the no-face period will be measured. When multiple faces are detected, then a cheating condition is concluded. Then if a single face is detected the user's face will be verified based on the CNN method. The model for continuous user verification applied to online exam proctoring is described in Fig.

IV. SOLUTION APPROACH

The online examination system is fully automatic which makes it highly accurate and time proffective. It completely eliminates the dependency on paper-based tests. It comes with in-built cheat-proof and proctoring features because of which online tests are safe to be conducted in any setting. The workload on various resources/teachers automatically gets minimal because the entire test creating, conducting, and evaluating methods get automated. Students don't have to come to a specific place which is the case with paper-based tests. Online tests are not restricted by geographical boundaries and students can attempt tests from any part of the world.

A. Face Detection

Face detection could be a technology getting used in an exceedingly form of applications that identifies human faces in digital pictures. Face detection applications use algorithms and ML to search out human faces inside larger pictures, which regularly incorporate alternative non-face objects like landscapes, buildings, and alternative figure elements like feet or hands. Face discoverion algorithms generally begin by finding out human eyes, one of all the best options to detect. The rule would possibly then conceive to discover eyebrows, the mouth, nose, nostrils, and also the iris. Once the rule concludes that it's found a facial region, it applies extra tests to verify that it's, in fact, detected a face.

Haar Cascade Face Algorithm

The algorithm can be explained in four steps:

• Calculating Haar Features

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- Creating Integral Images
- Using Adaboost
- Implementing Cascading Classifiers
- Step 1:-Calculating Haar Features

The first step is to gather the Haar options. A Haar feature is actually calculations that area units performed on adjacent rectangular regions at a particular location in an exceedingly detection window. The calculation involves summing the pixel intensities in every region and hard the variations between the sums.

Step:-2 Integral Images

The collected Haar options will be tough to work out for a large image. this is often wherever integral pictures inherit play because the quantity of operations reduces victimisation of the integral image. integral pictures primarily speed up the calculation of these Haar options rather than computing at each pixel, it instead creates sub-rectangles and creates array references for each of these sub-rectangles. These area unit then wont to compute the Haar options.

Step:-3 Using Adaboost

Adaboost primarily chooses the simplest options and trains the classifiers to use them. It uses a mix of "weak classifiers" to form a "strong classifier" that the formula will use to find objects.

Step 4:- Implementing Cascading Classifiers

The classifier either decides to point to an Associate in Nursing object that was found (positive) or go on to the future region (negative). Stages are an area unit designed to reject negative samples as quick as attainable, as a result a majority of the windows don't contain something of interest.



Figure 4: Face Detection

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Portuine Deenso Deenso Deenso	20		2			-	P.C.		3	3	20	20
E Dans E Dans E Dans E person Brooreau	1	25		3	10	3				E	e e	3
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Destano Di Destano di Destano di Destano di Destano	1	1	3	C.	10	1	3	No.	e de	00	p d	C.
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	A	1	110	1	1.0	1.1	1	1	1.3	1.	1.3	1.

Figure 5: Database Collection

B. Face Recognition

LBPH Face Recognizer

Local Binary Pattern Histogram(LBPH) could be an easy, but also very efficient texture operator that labels the elements of a picture by thresholding the neighborhood of every pixel and considers the result as a binary

variety. It does not check out the image as an entire, however instead tries to seek out its native structure by scrutinizing every element to its neighboring pixels.

LBPH uses 4 parameters

- Radius To build the circular local binary pattern and represent the radius around the central pixel. It is usually set to 1.
- Neighbors The more sample points you include, the higher the computational cost. It is usually set to 8.
- X Grid The number of cells in the horizontal direction.
- Y Grid The number of cells in the vertical direction



Fig.6: Working of Face Recognition



Figure 7: Face Verification and recognition

C. Voice Recognition

Voice recognition, or speech-to-text, is the ability for a machine or program to identify words spoken aloud and convert them into some form(e.g. text).

CONVOLUTIONAL NEURAL NETWORK(CNN)

CNN's are the popular variants of deep learning that are widely adopted in Automatic Speech Recognition (ASR) systems. CNN's have many attractive advancements, i.e., weight sharing, convolutional filters, and pooling. Therefore, CNNs have achieved an impressive performance in ASR. CNNs are composed of multiple convolutional layers.

Dataset: https://www.kaggle.com/c/tensorflow-speech-recognition-challenge/data?select=train.7z



Fig 8: Speech to text Conversion

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D. Tab Switching Detector

Tab Switching Detection is the method for a machine to identify whether a user is changing their tab or not.

Al Proctoring × E New tab	× +
C 💿 file C/Users/mansi/Desktop/CPS/lockdown	nbrowser.html
Proctoring System	This page says Warning: Your test will be terminated
	ox

V. FUTURE SCOPE

In time, technology, larger information sets, and user confidence can increase so AI are going to be ready to build autonomous judgments on the severity of a state of affairs then take applicable freelance action, like ending or pausing associate degree assessment.

Technological advancements in on-line proctoring mean that your assessments will be delivered remotely while not sacrificing security or privacy. And by increasing the potential of rising technologies, our ability to discover fraud is merely improving so you'll be able to schedule your exams to fulfill the requirements of your candidates while not compromising take a look at integrity and security.

VI. CONCLUSION

The system is affordable and convenient to use from the text taker's perspective, since it only requires having two inexpensive cameras and a microphone.

It is one of the most cost-effective and flexible online proctoring services. It has an algorithm that helps analyze online user behavior.

It is compatible with Linux, Mac and Windows operating systems and can be used by candidates to give tests while using their own devices.

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CRYPTOCURRENCY PRICE ANALYSIS USING MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE

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ABSTRACT

The role of Cryptocurrency has been very vital in reshaping the financial set-up thanks to its increasing common attractiveness and worldwide acceptance. loads of individuals have begun to create investments in Cryptocurrency, however the resurgent options, uncertainty, and foregone conclusion of Cryptocurrency square measure still largely unknown, that dramatically risks the investments. it's a matter of making an attempt to know the factors that influence the worth formation. During this study, we have a tendency to use advanced computing frameworks of Long Short Term Memory (LSTM) and perennial Neural Network (RNN) to predict the worth of various cryptocurrencies. Analysis of those algorithms is dispensed to work out higher predictions to research the worth dynamics of various cryptocurrencies together with Bitcoin, Ethereum, and Ripple. However, the reason for the foregone conclusion may vary betting on the planning of the machine-learning model that is enforced.

Keywords—Long Short Term Memory, perennial Neural Network, Cryptocurrency, Machine Learning

I. INTRODUCTION

The first suburbanised digital currency or cryptocurrency, introduced in 2008 during a paper by author Satoshi Nakamoto, was Bitcoin [2]. Bitcoin is one among the foremost valuable cryptocurrency within the world. A cryptocurrency in essence may be a digital quality which means it exists during a binary format and comes with the proper to use and also the information that don't possess that right don't seem to be thought of assets, and it's designed to figure as a way of exchange that uses strong cryptography to make sure reliable monetary transactions, and substantiate the transfer of assets. When the discharge of Bitcoin in 2009, over 4000 various variants of Bitcoin that square measure spoken as "altcoins" are created [6].

Over the past few months, the cryptocurrency market has undergone monumental volatility [6]. Volatility as a proportion of useful fluctuations, it considerably affects exchange processes and investment selections even as on various determinatives and proportions of basic risk [4]. the price of all totally different cryptocurrencies fluctuates merely sort of a stock although in AN sudden approach. There square measure numerous calculations used on monetary exchange info for price forecasts. with all, the parameters influencing cryptocurrencies square measure extraordinary. During this manner it's vital to forecast the estimation of various cryptocurrencies that the right call may be created [1]. The value of those cryptocurrencies does not rely on business occasions or mediating the govt., not in any respect like securities exchanges. Hence, to predict the price we have a tendency to feel it's important to use AI innovation to foresee the value of various cryptocurrencies [3].

II. LITERATURE REVIEW

A. Related Work

[1] A Research On Bitcoin Price Prediction Using Machine Learning Algorithms, Lekkala Sreekanth Reddy, Dr. P. Sriramya, 2020.

This paper compares all the various algorithmic rules which may be accustomed to create and implement the model and conjointly offers the benefits and downsides of every algorithm.

[2] Bitcoin Price Forecasting using LSTM and 10-Fold Cross validation, Sakshi Tandon, Shreya Tripathi, Pragya Saraswat, Chetna Dabas, 2019.

This analysis paper reports the planned model for prediction of the popular Bitcoin crypto currency while applying totally different neural network approaches, specifically Recurrent Neural networks (RNN) and Long Short Term Memory (LSTM) together with 10-fold cross validation.

[3] Bitcoin price prediction using Deep Learning Algorithm, Muhammad Rizwan, Dr. Sanam Narejo, Dr. Moazzam Javed, 2019.

It explains the utilization of Bayesian perennial hierarchical neural network (RNN) and an extended Short Term Memory (LSTM) network with the assistance of Autoregressive integrated moving average (ARIMA) for prediction of Bitcoin costs. The deep learning methodology of the Gated perennial Network model (GRU) was conjointly employed in place of ARIMA and it claimed to administer higher potency.

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[4] Crypto-Currency price prediction using Decision Tree and Regression techniques, Karunya Rathan, Somarouthu Venkat Sai, Tubati Sai Manikanta, 2019.

It identifies {the worth|the worth The value} trend on day by day changes within Bitcoin whereas it offers data regarding future price trends. It derives the accuracy of Bitcoin prediction employing a call tree and regression model.

[5] Cryptocurrency Price Analysis With Artificial Intelligence, Wang Yiying, Zang Yeze, 2019.

We find that ANN tends to trust a lot on semipermanent history whereas LSTM tends to trust a lot on short-run dynamics, which indicates the potency of LSTM to utilize helpful info hidden in historical memory is stronger than ANN.

[6] Performance Evaluation of Machine Learning Algorithms for Bitcoin Price Prediction, Kavitha H, Uttam Kumar Sinha, Surbhi S Jain, 2020.

To decrease the risks, this project mentioned during this paper has been devised to predict the worth of Bitcoin exploitation Perennial Neural Network(RNN), Long Short Term Memory (LSTM) and Linear Regression(LR).

[7] Dataset-https://finance.yahoo.com/cryptocurrencies.

The historical costs of all doable cryptocurrencies within the market is obtainable here to be downloaded. The information is updated here everyday for the adjusted shut, volume, highest, lowest, gap and shutting worth of the cryptocurrency. the information is obtainable to be downloaded from the year 2014.

B. Existing System

Cryptocurrency is doubtless one among the foremost advanced and volatile types of investments. However, the reason for the certainty might vary looking at the character of the concerned machine-learning model. luckily, due to growth within the development towards cryptocurrency, folks square measure currently able to create their portfolio varied and new investors square measure rising. Moreover, folks will use not solely computers however conjointly numerous varieties of hand-held devices, e.g., smartphones and tablets, to surf websites and numerous applications thus on get simply as info technology advances recently.

The developed system permits predicting a cryptocurrency rate. Machine learning and data processing is employed for prognostication at this rate. LSTM, RNN, call tree, ANN and regression square measure accustomed enable coaching of bitcoin costs as statistical information with efficiency. During this system, it's doable to predict the course of a cryptocurrency for numerous time intervals. The time taken for compilation of the model and their prediction accuracy is completely different for various algorithms.

C. Comparative Study

Parameter	Linear Regression	Artificial Neural Network(ANN)	Long Short Term Memory (LSTM)	Recurrent Neural Network(RNN)	Decision Tree Splitting dataset into at at least two sets. 95.88% Moderate Fast	
Method used	Model the relationship between dependent and independent variables.	Pattern Recognition	Pattern Recognition	Pattern Recognition		
Accuracy	97.59%	84.80%	92.30%	85.40%		
Complexity	Simple	Very High	Moderate	Very High		
Speed	Fastest	Slow	Moderate	Slow		
Advantage & Disadvantage	<u>Adv</u> - Fast training. <u>Disadv</u> - Low capability in recognizing longer term dependencies.	<u>Adv</u> - Can approximate any continuous function. <u>Disadv</u> - Requires heavy computation	Adv - LSTM could best forecast next day price prediction. Disadv - Requires more memory to train	<u>Ady</u> - RNN is ideal for sequence or time series data. <u>Disady</u> - Training of RNN is tough	<u>Ady</u> - Generates understandable rules <u>Disady</u> - Computationally expensive	

Figure 1. Comparative study of various algorithms

III. ALGORITHMS

Neural Networks is one among the foremost in style machine learning and deep learning algorithms. {they square measure|they're} galvanized by human neurons that are capable of constructing human-like choices with the assistance of computations. in a very Neural specification there square measure 3 varieties of layers:

1. Input Layers: It's the layer within which we have a tendency to offer input to our model. variety|the amount|the quantity} of neurons during this layer that square measure adequate to the entire number of options in our information.

2. Hidden Layer: The input from the Input layer is then fed into the hidden layer. There will be several hidden layers relying upon our model and information size. Every hidden layer will have completely different numbers of neurons that square measure, usually bigger than the quantity of options. The output from every layer is computed by matrix operation of output of the previous layer with learnable weights of that layer and so by addition of learnable biases followed by activation performance that makes the network nonlinear.

3. Output Layer: The output from the hidden layer is then fed into associate degree Activation perform like sigmoid, SoftMax or ReLU that then provides the ultimate output.

The data is then fed into the model and output from every layer is obtained. This step is termed feedforward, we have a tendency to then calculate the error victimisation a blunder performs.

A. Recurrent Neural Network (RNN)

Recurrent Neural Network could be a generalization of a feedforward neural network that has an interior memory. RNN is perennial in nature because it performs identical performance for each input of information whereas the output of this input depends on the past one computation. when manufacturing the output, it's traced and sent into the perennial network. for creating a call, it considers this input and therefore the output that it's learned from the previous input.

Unlike feedforward neural networks, RNNs will use their internal state (memory) to method sequences of inputs. This makes them applicable to tasks like united, connected handwriting recognition or speech recognition. In different neural networks, all the inputs square measure freelance of every different. But in RNN, all the input square measure are associated with one another.

The image below illustrates associate degree unrolled RNN. On the left, the RNN is unrolled with the equal sign. Note there's no cycle when the equal sign since the various time steps square measure visualised and knowledge is passed from just once step to ensuing. This illustration conjointly shows why a RNN will be seen as a sequence of neural networks.



Figure 2. Unrolled RNN

RNN takes associate degree input x at a time step t. RNN takes the hidden state worth at time step t-1 to calculate the hidden state h at time step t and applies a tanh activation. We have a tendency to use tanh or ReLU for non dimensionality within the output y at time t.

Hidden state connects the data from the previous state and so acts like memory for the RNN. The output at any time step depends on this input likewise because the previous states.

Unlike different deep neural networks that use a special parameter for every hidden layer, RNN shares identical weight parameters at every step.

We willy-nilly initialize the load matrices, and through the coaching we'd like to search out the values of the matrices that offer U.S. fascinating behaviour. to cut back the loss, we have a tendency to use back propagation however in contrast to ancient neural nets, RNN's share weights across multiple layers or in different words it shares weight across all the time steps. In this fashion the gradient of error at every step is additionally smitten by the loss at previous steps.

$$h^{(t)} = g_h \left(w_i x^{(t)} + w_R h^{(t-1)} + b_h \right)$$
$y^{(t)} = g_y (w_y h^{(t)} + b_y)$

Figure 3. Formulas for calculating RNN output

Exploding Gradients

Exploding gradients square measure once the rule, while not a lot of reason, assigns without thinking high importance to the weights. luckily, this downside will be simply resolved by truncating or squashing the gradients.

Vanishing Gradients

Vanishing gradients occur once the values of a gradient square measure are too tiny and therefore the model stops learning or takes method too long as a result. This was a serious downside within the Nineties and far more durable to resolve than the exploding gradients. Luckily, it had been resolved through the construction of LSTM by Sepp Hochreiter and Juergen Schmidhuber.

B. Long Short Term Memory (LSTM)

Associate degree LSTM incorporates a similar management flow as a perennial neural network. It processes information passing on info because it propagates forward. The variations square measure the operations among the LSTM's cells.



Figure 4. LSTM cell

The core thought of LSTM is the cell state, and it's numerous gates. The cell state acts as a transport route that transfers relative data by all the means down the sequence chain. you'll be able to consider it because of the "memory" of the network. The cell state, in theory, will carry relevant data throughout the process of the sequence. Thus even data from the sooner time steps will build its thanks to later time steps, reducing the consequences of remembering. because the cell state goes on its journey, data gets additional or removed to the cell state via gates. The gates are completely different neural networks that decide that data is allowed on the cell state. The gates will learn what data has relevance to stay or forget throughout coaching.

The internal cells of LSTM are often divided into four components.

Forget Gate: Initially, we've the forget gate. This gate decides what data ought to be thrown away or unbroken. data from the previous hidden state and knowledge from the present input is felt by the sigmoid perform. Values embark between zero and one. The nearer to zero suggests that to forget, and therefore the nearer to one suggests that to stay.

$$f_t = \sigma(W_f h_{t-1} + U_f x_t + b_f)$$

Figure 5. Formula for calculating forget gate

Input Gate: To update the cell state, we've the input gate. First, we tend to pass the previous hidden state and current input into a sigmoid perform. That decides that values are going to be updated by reworking the values to be between zero and one. zero suggests that it is not necessary, and one suggests that it is necessary. you furthermore might pass the hidden state and current input into the tanh to squish values between -1 and one to assist regulate the network. Then you multiply the tanh output with the sigmoid output. The sigmoid output can decide that data is vital to stay from the tanh output.

$$i_t = \sigma(W_i h_{t-1} + U_i x_t + b_i)$$
$$\widetilde{c}_t = tanh(W h_{t-1} + U x_t + b)$$

Figure 6. Formula for calculating input gate

Cell State: Currently we must always have enough data to calculate the cell state. First, the cell state gets pointwise increased by the forget vector. This incorporates a chance of dropping values within the cell state if it gets increased by values close to zero. Then we tend to take the output from the input gate and do a pointwise addition that updates the cell state to new values that the neural network finds relevant. that provides the US our new cell state.

$$c_t = f_t \circ c_{t-1} + i_t \circ \widetilde{c}_t$$

Figure 7. Formula for calculating cell state

Output Gate: Last we've the output gate. The output gate decides what the succeeding hidden state ought to be. bear in mind that the hidden state contains data on previous inputs. The hidden state is additionally used for predictions. First, we tend to pass the previous hidden state and therefore the current input into a sigmoid. Then we tend to pass the recently changed cell state to the tanh perform. We tend to multiply the tanh output with the sigmoid output to choose what data the hidden state ought to carry. The output is the hidden state. The new cell state and therefore the new hidden state is then carried over to the succeeding time step.

$$o_t = \sigma(W_o h_{t-1} + U_o x_t + b_o)$$
$$h_t = o_t \circ tanh(c_t) :$$

Figure 8. Formula for calculating output gate

IV. RESULTS AND DISCUSSION

We fed the check dataset of bitcoin cryptocurrency into our 2 Machine learning models viz repeated Neural Network(RNN) and Long Short Term Memory(LSTM) and computed the output as shown below.

A. Output for RNN

We fed our normalized check dataset into the RNN model within the style of associate array to urge the output from it. The model came with an associate array of foretold values for the check dataset. The figure below compares the anticipated values with the particular values.



Figure 9. Output of RNN prediction

B. Output for LSTM

We fed our normalized check dataset into the LSTM model within the style of associate array to urge the output from it. The model came with an associate array of foretold values for the check dataset. The figure below compares the anticipated values with the particular values.

The set of the set of

Figure 10. Output of LSTM prediction

v. CONCLUSION

In this project, we tend to use 2 distinct AI frameworks, namely, Long Short Term Memory and repeated Neural Network to analyse and predict the worth dynamics of Bitcoin, Ethereum, Ripple and lots of additional cryptocurrencies. We tend to show that the LSTM and RNN models are comparable and each moderately to an adequate degree in value prediction, though the interior structures are completely different. However, the reason for the foregone conclusion might vary betting on the character of the concerned machine-learning model.

VI. FUTURE WORK

Future work would be to implement both the algorithms on all the dataset of different Cryptocurrencies and to create a GUI for the user to see predictions of all cryptocurrencies. We will also try to improve performance and accuracy of our model for better efficiency in predictions.

We will consider different aspects to which our system should justify and fine tune its functionality and work to give the user the best experience.

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All the thanks are, however, only a fraction of what is due to the Almighty for granting us an opportunity and the divine grace to successfully accomplish this assignment.

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GEO-LOCATION BASED ACCOMMODATIONS FINDER USING COMPARATIVE STUDY

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ABSTRACT

In a youth dominant country like India, education is the key aspect of every individual and so is the quality and availability of resources in terms of education research and infrastructure. People in villages tend to move to urban and developed cities for resources, education, and jobs. People like to reside in the nearby locality of the office space or the education centers. People with diversified cultures tend to have different priorities in terms of accommodation like nearest availability of their cultural departmental stores, libraries, sports complexes, easiest transportation, and cuisine priority. Solving the problem with exploratory analysis of geolocational data seems to be a viable option with a GUI interface. So the proposed method to fetch the data from relevant location (nearest priorities), to diversify the data set to prepare them for the analysis as per the priorities fetching the geolocational data from best variable map API's using the REST API method, to cluster the priorities using machine learning algorithm method by using comparative study methodology, i.e. K-medoid Clustering, Haversine algorithm finally providing the optimal solution by filtering the data as per the priorities using optimized and appropriate searching and sorting algorithms to display the result.

Keywords— K-medoid Clustering, Haversine algorithm, Map API, GUI, searching Algorithm, datasets, UTM coordinates, recommendations.

INTRODUCTION

In the effort-intense and hectic environment that the average person inhabits, It's commonly seen that one is too tired to get oneself a home-cooked meal. And of course, even if one gets home-cooked meals every day, it is usual to go out for a good meal every once in a while for social/recreational purposes. Either way, it's a commonly understood idea that wherever one lives, the food one eats is an important aspect of the lifestyle one leads. This project involves the use of K-Medoid Clustering and graph algorithms to find the best accommodation for students in a particular city by classifying accommodation for incoming individuals on the basis of their preferences on amenities, proximity to the location.

The paper can be summarized as follows:

- \cdot to save the time of the migrants (especially students) in finding rooms for rent.
- \cdot Also in our system, we provide them with alternative places where they can go.

 \cdot to find the nearest place where they should find a home to rent or live, which has all the amenities in the surrounding vicinity.

PROBLEM STATEMENT

In India 1 out of every 100 migrants in India move in search of education. These migrants come from different cultural backgrounds, have different cuisine, variety in lifestyle and as a diverse country, India has a plethora of variety of people living in the society.

As a migrant, each one of them has their cultural aspect as their secondary demand, due to which they tend to spend a lot of time finding these places and locating their home location nearby to these places. Not all colleges and universities have hostels for their students, So the student migrants have to rent a place. To solve this problem, we have taken the initiative to solve the problem

LITERATURE SURVEY

[1] This paper aims to develop a location-based service for accommodation purposes, which considers two major variables: travel distance and time. This system is using the Haversine algorithm to find accommodation services around us within a certain radius. Then using Google Map API to findout the travel distance and time. The TOPSIS algorithm was used to showcase the best results. By using this method, the whole system shows this research result gives a better method in decision making over previous studies.

[2] This paper uses a heuristic search and then clubs it with a genetic algorithm for k-medoid clustering of the large data set. The heuristic search finds k-medoid from the data set and then efficiently minimizes the total dissimilarity within every cluster.

[3] This paper presents the use of google maps and universal Transverse Mercator to determine the measurement of land area in two or four different zones of UTM coordinates based on the model proposed. A rectangular method is proposed to determine the regional area for regencies in Central Kalimantan etc.

[5]A paper takes a survey of people migrating from rural areas to urban cities over a few decades and predicts the future population of cities would contain 70 percent population. As traveling between cities will be time-consuming, it used haversine and Dijkstra algorithm to find the shortest route

[6]Text mining is a technique for analyzing text data or unstructured data using data mining algorithms. When the output is predictable that approach comes under supervised learning and when it isn't predictable it is called unsupervised learning. This paper includes a comparison between text mining using similar clustering i.e. K-Mean and K-Medoid.

METHODOLOGY AND ALGORITHM

• Universal Transverse Mercator (UTM) Co-ordinate

UTM coordinate is a projection system for defining point co-ordinates on the locality of the earth's map. The old standard method of latitude and longitude is a horizontal position representation, which means it eliminates the altitude and depicts the earth as a full ellipsoid. But, it's different from earth longitude and latitude in which it divides the earth into different projects and 60 zones each to the plane as a basis for its coordinates. Pointing to a location means pointing the zone and therefore x, y coordinate therein plane. The projection from a spheroid to a UTM co-ordinate zone is some kind of parameterization of the transverse Mercator projection. The features are different for the different countries, regions, s or for the different mapping systems.

The conversion of latitude and longitude to UTM conversions can be done using the built-in function of UTM in different programming language packages

- Dataset
- The dataset for recommendations is for rental locations, hospitals, restaurants, ATMs which was collected by web scraping google maps and other rental websites. The dataset contains many features which include Name, address, latitude, and longitude, etc. The data which was having irregularities were removed in the data preprocessing step. The dataset for house recommendation was taken by web scraping the rental websites like make my trip and no brokers. This dataset contains different features like Name, address, latitude and longitude, type of house, rent amount, area of the house, and other particular values of these features

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	8,500	19.39451207	72.85050388	43	274244.8486	2145587.03	Neera Avenue, Vasal East	1 BHK Apartment	New untouched flat, Modular kitchen, Tube ligt Va
6	13,000	19.39282425	72.82557542	43	271641.4169	2145732.812	Galaxy Apartment, Vasai	1 BHK Apartment	23 rd floor1 km from metro station Va
8	6,500	19.07232981	72.82257151	43	271297.1945	2143407.74	Dosti Diamond, Vasai West	1 BHK Apartment	1bhk flat available in reputed society, closed to Va
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									147

A] HAVERSINE ALGORITHM

The haversine algorithm is a very precise way of finding the distances between different locations on the map of the world by using the latitude and longitude of the given locations. The algorithm is a redraft of the spherical law of cosines, but the equation of haversines is appropriate for small angles and distances.

Hence, The Haversine algorithm must be the first mathematical equation to select when required to calculate distances on a world map. The word "Haversine" comes from the mathematical equation

 $haversine(\theta) = sin^2(\theta/2)$

R is earth's radius (mean = 6,371km), angles in radiant

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$$a = \sin^{2}\left(\frac{\Delta lat}{2}\right) + \cos(lat_{1}) \times \cos(lat_{2}) \times \sin^{2}\left(\frac{\Delta long}{2}\right)$$
$$c = 2 \times \arctan\left(\frac{\sqrt{a}}{\sqrt{1-a}}\right)$$
$$d = R \times c$$

In this, Methodology we have taken the filtered data set of each category i.e. Restaurant, Hospital, Atm, Rental Area along with latitude and longitude.



For each category we are prioritizing the rental list based on aggregation sum based on the distance between 2 coordinates using haversine formula, constraining the limit to 2 Kilometers



Now for each priority list, a value is assigned to the rental location and after calculating the final score the one with the least score is the most recommended place, the system suggests.

B] K-MEDOID ALGORITHM

[4]The K-Medoids algorithm is used to find Medoids in a cluster which is the center located point of a cluster. K-Medoids are more robust as compared to K-Means as in K-Medoids we discover k as a representative object to attenuate the sum of dissimilarities of data objects whereas, K-Means used the sum of squared Euclidean distances for data objects. And this distance metric reduces noise and outliers.

We are using the K-Medoids algorithm that supported object representative techniques to scale back the drawbacks of the K-Means algorithm. Medoids are the data object of a cluster that is most centrally located. Medoidss are selected randomly from the Key data objects to make the Ky cluster and other remaining data objects are placed near Medoids during the clustering. Then process all data objects to seek out clusters to find new Medoids during a repeated fashion to represent the new cluster in a better way. After finding the new Medoids bind all the data objects to the cluster. The location of Medoids changes accordingly with each iteration. So ky clusters are formed representing n data objects [4].

This method is quite different from k-medoid, but the functioning remains the same, we are tweaking it to predefine the k values i.e. we are taking location's UTM coordinates as K clustering centroids.

Now iterating over the UTM coordinates of the rest category, the distance is being calculated from all k points, the one closest to that particular point will form the cluster with that centroid.

[4]

Input : Ky: the number of clusters, Dy: a data set containing n objects.
Output: A set of key clusters.
Algorithm:
 x select ky as the Medoids for n data points. Find the closest Medoids by calculating the distance between data points n and Medoids k and map data objects to that. For each Medoids m and each data point o associated to m do the following: Swap m and o to compute the total cost of the configuration then Select the Medoids o with the lowest cost of the configuration. Swap m and o to compute the total cost of the configuration then Select the Medoids o with the lowest cost of the configuration.

Drawbacks of K-Medoid algorithm:

1) To seek out K-Value would be a difficult task.

2) It is not effective when used with global clusters.

3) The different initial partitions are selected then it's going to vary the result for clusters.

4) Different sizes and different density clusters are not handled by the algorithm [4].



RESULTS

K-medoids Algorithm	Haversian Algorithm
It's much efficient for large datasets	It's less efficient for large datasets
K-Medoid Algorithm is fast and converges in a fixed number of steps.	The Haversine algorithm is faster for small datasets
It may obtain different results for different runs on the same dataset	The result is the same for different runs on the same datasets

After comparing k-medoids and Haversian algorithms, it's found that k-medoid is the most preferable algorithm because it is a machine learning algorithm that can analyze a dataset, find k Value, and a set of key clusters as an output. This algorithm can be used for large datasets. But in the case of the Haversian Algorithm, it will be much slower as compared to K-medoid for large datasets. Also, the K-Medoids algorithm might be a good option for the algorithm as compared to K-Mean and Haversine as in K-Medoids we find the k as a representative data to attenuate the sum of dissimilarities of data.

CONCLUSION

The proposed system takes Latitude and Longitude into consideration and determines which are the best accommodations for students in a particular city by classifying accommodation for incoming students on the basis of their preferences on amenities, proximity to the location.

The present work aimed to compare the K-medoids algorithm and Haversine algorithm to check the improved efficiency and scalability of each of these based on the result selection of the best algorithm and solution of the problem. prove K-Medoids are better as compared to Haversine algorithm. The data obtained using K-medoids was compared with the Haversian algorithm using real samples. In K-Medoids we find k as a representative data to reduce the sum of dissimilarities of data object to its lowest whereas, in haversine algorithm For each category we are prioritizing the rental list based on aggregation sum based on the distance between 2 coordinates using haversine formula, constraining the limit to 2 Kilometers Now for each priority list, a value is assigned to the location and after calculating the final score the one with the least score is the most recommended place, the system suggests.

FUTURE SCOPE

In the future, we can use some better algorithms to develop a model with higher accuracy. This project can be expanded by adding a new dataset of different cities in India. As we had made this project prototype on a small dataset and considering a few parameters, in the future the data set can also be improvised with additional parameters along with their preferences. This project can be scaled up on a country level including major institutes, corporate cities, and moving one step ahead. If real-time data of rental rooms are available then it will definitely improve the accuracy of the algorithm.

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BLOCKCHAIN TECHNOLOGY BASED ELECTION SYSTEM

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ABSTRACT

Blockchain may be a system of recording info in a very means that produces it troublesome or not possible to vary, hack, or cheat the system. A blockchain is essentially a digital ledger of transactions that is duplicated and distributed across the total network of laptop systems on the blockchain. Using blockchain, instead of a centralized data, all the human activity data that is shared across the nodes at intervals the blockchain is contained in bundles of records referred to as blocks, that area unit bound along to create the overall public ledger. option methods are often created safer, clear, immutable, and reliable. Using traditional net portals are often led in tamper of information however blockchain stores everything as a transaction. The identification of the voters will be done using smart contracts. We will be using Ganache throughout the procedure which will enable us to test our system. Hence, we are proposing this method wherever whole voting procedures are done securely. Convenient to everyone staying away from their homelands and taking part in the Democratic elections by voting. A true case of democracy can be seen here.

Keywords—Blockchain, ledger, centralized data, immutable, smart contract, ganache

I. INTRODUCTION

Due to the recent pandemic, there is an increasing surge in contactless systems. One such field is, the administrative services of the Democratic Republics all around the world. For instance, the chaos created in Bengal and Bihar elections led to the second wave and also due to carelessness. We have seen how the USA struggled with the recent Presidential Elections held during the Pandemic.

With countries going digital in fields of banking eg: The Chinese Digital Yuan which is currently in testing phase and pioneering the path of Digitization of national currencies, there should be Digitization of other administrative structures of a democracy. One such thing is Electing a Leader digitally.

E-Election System Using Blockchain is implemented by using Algorithms which is SHA 256 and Hash algorithm. A blockchain could be a peer-to-peer network of computers, called nodes, that share all the info and therefore the code within the network. Nodes that share all the info and therefore the code within the network. There are not any additional central servers.

Blockchain could be a system of recording info during a manner that makes it troublesome or not possible to alter, hack, or cheat system A blockchain is actually a digital ledger of transactions that's duplicated and distributed across the complete network of pc systems on the blockchain.

Instead of a centralized info, all the dealings information that is shared across the nodes within the blockchain is contained in bundles of records known as blocks, that are enchained together to form the general public ledger.

II. LITERATURE REVIEW

The authors of the Paper [1], N. Aditya Sundar, M.V. Kishore and Prof. Ch. Suresh present an algorithm based on RSA and MD5 which can be used to implement the voting system or can be used for hashing in the system for securing the data. In this paper we proposed that E-Voting system, for the registration phase we will use the RSA algorithm which encrypts and decrypts the data Proposes e-voting system and digital signature system. System uses high confidentiality of voter, secrecy of paper machine, voter secrecy and no computation cost and communication overhead. Proposed e-voting system based on public key encryption algorithm RSA [1] Proposed system contains three parts: login, voting and election administrator server for display Paper [2] presents the basics of blockchain. In this paper we got a few basic details of blocks by authors S. Banupriya and G. Renuka Devi. We got some introduction on the Merkle Tree which is basically used to enable secure verification of large amounts of data in an efficient manner. In this paper, the overall working principles and the algorithms used to subdue the above mentioned limitations in the blockchain technology are discussed and analysed. As in case of security, Elliptical Curve Cryptography (ECC) is used. For non repudiation, a hashing algorithm in which SHA 256 is used. For consistency, a consensus algorithm is used. In real time various consensus algorithms are used but only Proof of Work (PoW) and Proof of Stake (PoS) algorithms are used widely.

In paper [3], the author Suvarna K. Kadam presents knowledge about the data regarding few additional ideas square measure provided like Distributed Ledgers square measure one amongst key technologies responsible for

transfer the openness of the net back while not compromising its security. The industrial & amp; legal transactions will currently be handled fully on the net as DLTs offer a safer and responsible setting. This paper reviews advances in DLTs to clarify the present capabilities, limitations and challenges. It additionally reviews some of the outstanding applications of DLTs as well as digital currency.

The paper [4], the author Min Xu, Xingtong Chen and Gang Kou presents us some study about the Blockchain. This study reviews the present tutorial research on blockchain, particularly within the discipline of business and political economy This study can conduct a scientific and objective review that's supported knowledge statistics and analysis we tend to ought to understand the present applications like health care, provide chain management, market observance and smart energy. There was a section of good contract here too which we'll be needing for our project.

In paper [5], the authors of the paper, Gabriel Nyame, Zhinguang Qin, Kwame Opuni-Boachie Obour Agyekum and Emmanuel Boateng Sifah introduced many works like RBAC models for data security and protection. ECDSA algorithmic program was employed in this paper and totally different examples wherever we will use ECDSA was given. data of KMS was given that is a task-centric data system that allows users to create, store and use data to extend task performance. In the RBAC model the KMS was used, which is extremely crucial.

III. PROPOSED SYSTEM

For implementing E-Election System Using Blockchain System, the software requirements are Ganache, Metamask chrome extension, NPM package manager, Truffle Framework , Hashing algorithms like SHA-256. For programming languages like Solidity, HTML, CSS, Javascript are used.

Now when all of these things are arranged and installed, the user will open the ganache and then user can see 10 fake ether accounts. Since it is not feasible to arrange real ether Ganache will give us accounts having fake ethers for the transaction. The user will import the account to the wallet which is present in the chrome extension called as Metamask. Once Metamask wallet is connected we will have 100 or 1 ether given by the Ganache. Now Metamask is connected to the network on

which the system is running and hence the user can carry out the transaction of voting into the system. The moment the user votes, ethers will be deducted from the account and then user cannot vote for the second time so we can say duplicacy of votes can be avoided and hence the true voting transaction can be attained.



Fig.1 Overview of System

IV. METHODOLOGY A. Working Of Blockchain

Blockchain is a system that's engineered around a peer to peer system that can be shared openly among the users to generate records of transactions that are immutable. In order to generate a block, a transaction needs to occur, after that the legitimacy of the transaction needs to be verified. The transaction can then be kept within the block and a hash worth should tend to the block for the protection. Thus, a block is created and sealed.



Fig.2 Blockchain

B. Ethereum

Complex legal and financial applications like sensible contract is designed associated deployed victimization Ethereum as an open platform. Ethereum can be imagined as a programmable Bitcoin in which the underlying blockchain can be used by developers to build markets, mutual ledgers, digital associations and different endless potentialities involving unchanging data and agreements, all without the need for a middleman. Released in 2015, Ethereum is the brainchild of prodigious Vitalik Buterin who saw the attainable applications of Bitcoins by Blockchain technologies as the next move in furthering the growth of the Blockchain culture.

C. Hashing

Hashing is that the methodology of adjusting the arbitrary andvariable input size to a hard and fast output size. There area unit numerous functions that perform completely different levels of hashing. We have implemented security by victimisation SHA-256. SHA-256 is one in all the SHA-1 (collectively noted as SHA-2) successor hash functions and is one in all the strongest hash functions obtainable. SHA-256 isn't rather more troublesome to code than SHA-1 and is in no manner corrupted nonetheless. [3] The 256-bit key makes AES a good partner feature that could be a symmetrical key encoding cipher, that means that a similar key's used for encoding and decryption. in contrast to its alternative predecessors, the algorithm's versatility is that it embraces Associate in input length and produces an arbitrary output length, while all alternative algorithms generate a set output length.

D. SHA 256

SHA-256 is one in every of the successor hash functions to SHA-1 (collectively stated as SHA-2), and is one in every of the strongest hash functions out there. SHA-256 isn't far more complicated to code than SHA-1, and has not however been compromised in any means. The 256-bit key makes it an honest partner-function for AES. it's outlined within the bureau (National Institute of Standards and Technology) common place 'FIPS 180-4'. bureau additionally offer variety of check vectors to verify correctness of implementation

This Algorithms are initialized in static method called **getInstance()**. After selecting the algorithm it calculate the digest value and return the results in byte array.

BigInteger class is used, which converts the resultant byte array into its sign-magnitude representation. This representation is converted into hex format to get the MessageDigest.



Fig.3 SHA 256 Algorithm flowchart

Example:

In below given we can easily figure out that the input is given and the hash output is being returned accordingly. Even if there is slight change in the string, the hash completely changes.

INPUT DATA	HASH OUTPUT
e_elections using blockchain	31cb936a0720e4c56b168546e6e3f508214dc0ca 5fdb84f8f973875d2278f8c3
e elections using blockchain	741179c4bb7851afa99c99f92bfbc533694e726c7 0929e6f4d9c6865524b5479
E-Elections using blockchain	b2510177a69d40ae0761fd1f342d7ad8f35773ffcd 2e82927d05d86013f26e524

Fig.4 SHA 256 Hash Algorithm working.

V. TOOLS

A. EVM

Ethereum Virtual Machine (EVM) may well be a computation engine that acts as a decentralized laptop that has many practical uses. it's thought-about to be a district of Ethereum that runs execution and sensible contract preparation. The role of the EVM is to deploy some further functionalities to the Blockchain to ensure positive users face restricted issues on the distributed ledger. Every Ethereum node runs on the EVM to stay up agreement across the blockchain. The Ethereum Virtual Machine may well be a robust, sandboxed virtual stack embedded at intervals each full Ethereum node, answerable for penalisation contract bytecode. Contracts typically written in higher level languages, like Solidity, then compiled to EVM bytecode. This means that the machine language is completely isolated from the network, filesystem or any processes of the host laptop. every node among the Ethereum network runs a degree EVM instance that allows them to agree on penalisation identical directions.

B. Ganache

Ganache is employed for fixing a private Ethereum Blockchain for testing your Solidity contracts. It provides a lot of options compared to Remix. you'll study the options once you estimate with Ganache. Before you start mistreating Ganache, you want to initial transfer and install the Blockchain on your native machine. We used Ganache for importation to pretend accounts loaded with ether. It gave us ten fake accounts with a hundred loaded ethers in every account.

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Fig.5 Ganache with account credentials

C. Metamask

Metamask could be a cryptocurrency pocketbook which might

be used on the Chrome, Firefox and Brave browsers. It is also a browser extension. this suggests that it works sort of a bridge between traditional browsers and also the Ethereum blockchain. MetaMask permits users to store and manage account keys, broadcast transactions, send and receive Ethereum-based cryptocurrencies and tokens, and firmly connect with localized applications through a compatible Application.



Fig.6 Metamask wallet

VI. ACCURACY PARAMETER

1- **It is deterministic,** which means that a selected input (or file) will continually deliver identical hash worth (number string). This means that it's straightforward to verify the credibility of a file. If two people severally (and correctly) check the hash worth of a file, they'll continually get identical answer.

2- The odds of "collisions" are low. This means that the chances of two different inputs (files) coincidentally having the exact same hash value are incredibly small—practically non-existent.

3- A hash can be calculated quickly. Generating a hash value is quick and easy (provided you have the right tool). The size of the file in question is also irrelevant—generating a hash value for a large file is as simple as creating one for a small file.

4- Any change to the input will change the output. Even the smallest change to the input file will result in a change to the resulting hash value. This means that it is impossible to alter a file without changing the associated hash value, which makes it very easy to prove (or disprove) the authenticity of a piece of digital evidence.

VII. CHALLENGES

1-Remote authentication. Home networks and infrastructure challenges can be faced by the user.

2-Anonymity. Imperative that the identity of the user and the transactions between the two parties remain anonymous.

3-End to End verifiability. These are voting systems which consists of stringent integrity properties and strong tamper resistance.

4-51% attack. An attack on a blockchain by a group of miners controlling over 50% of a network's mining hash rate, the sum of all computing power dedicated to mining and processing transactions, is called a 51% attack.

VIII. RESULT

If we have voted then directly election result page will come and there we can the live results of the election being held.



Fig.7 Election Result

IX. FUTURE SCOPE

Increase the transparency between the interface and users for better accuracy. Avoid 51 % security attack. Usage of Aadhar card and id proofs for better usage and verification. Adding user verification and candidate verification functionalities.

X. CONCLUSION

With the help of this system and the current voting data that is available, we can conclude that at least 7-9% of the votes will increase throughout the election process. No one will feel left out of voting just because they were not available near the booth or in their respective cities. This technology would provide a 100 % fair elections. This can bring a gradual change in the whole Election history of India and world.

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A SCALABLE MICROSERVICES WEBSITE

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ABSTRACT

Microservices is emerging as a promising architectural style which is driven from traditional Service Oriented Architecture (SOA). This architectural style overcomes the drawbacks of Monolithic Architectural style and makes an application easy to scale, deploy and debug. It helps an application by providing flexibility which can be helpful in any domain such as cloud, IOT, AI,etc. Due to so many functionalities many applications are evolving from monolithic to microservices. In this paper we will discuss a basic approach to build, containerize and deploy these microservices and how different API's can communicate within microservices based application.

Keywords-microservices, service oriented architecture, monolithic, conternarized.

I. INTRODUCTION

In software development various approaches are used to develop Websites among them monolithic and microservices are quite popular. Many companies have been developed using monolithic approach but now many of them are switching to microservices. Microservice is a need for present and future since it overcomes most of the drawbacks of monolithic architecture.

Microservice architecture is now gaining popularity because of its coarsely grained nature. Here, a complex application is broken down into many small less complex services which can be build, test and deploy independently. If any error occurs or an application breaks down then developers can focus on debugging that specific microservice which is causing the issue rather than debugging the whole application.

Microservice applications are built in considering various advantages they possess to a business.

A. Loosely Coupling and easy debugging

One of the most important features of implementing microservices is its coupling nature. Monolithic applications faced drawbacks in scaling, deploying and debugging. Microservices are loosely coupled i.e they are not only built independently but also deployed independently.

So any changes in one service will not affect other services. In monoliths when an error occurs or load on a particular service is more usually the whole site gets crashed and developers need to debug an entire complex application which is tring and time taking but since microservices are not tightly coupled like monoliths, due to their loose coupled nature only the service which is facing issue will go down and it will be very easy for the developers to debug just a small service instead of an entire application.

B. Less Complex

Since the term microservice itself means "micro" i.e small services which means that an application is broken down into small services which then can communicate with each other and will work/run like an entire application. The whole code and dependencies of a microservice is in a separate directory and hence it makes it less complex when we compare to other architectural styles such as monoliths where an entire applications code and dependencies are under same directory. This less complexity feature of microservices helps in easy deploying, building and debugging. One team can be allocated one service and other team another service so the workload of building and testing also becomes easy and less complex since they are allocated small chunks of code s rather than an entire application.

C. Scalable Microservice Deployment

Conternarization is one of the best approaches to scale an application.we can containerized their different microservices in different containers and can deploy it on cloud platforms where various scaling features are available one can also use manually scaling feature while deploying or can opt for auto scaling feature provided by various cloud providers which will automatically scale up or scale down your service based on the requirements and requests a particular service is receiving.

II. LITERATURE SURVEY

Research for the project is done by referring various IEEE papers on this topic which helped in understanding and building microservices based application.

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[1]Towards an Understanding of Microservices- This paper played the most crucial part in understanding what microservices is and what are the various benefits and approaches to implement microservices.

[2]Microservice Architectures for Scalability, Agility and Reliability in E-Commerce-It helped in understanding how we can achieve a scaled and independent application with the help of Microservices architectural approach.how microservices overcomes shortcomings of monolithic architectural style.

[3] Chain-Oriented Load Balancing in Microservice System-

This paper tells that in a microservice system, a request is often processed by a chain composed of multiple different microservices, and these chains often share microservices. Hence, there is competition for resources between the microservices chain

[4]Python microservices development book by Tarek Ziade

This book tells about each and every important step that is required to build, test and deploy microservices. How to use docker and how to deploy on AWS.

[5]Implementing microservices on AWS-This made us understand how services are deployed on AWS and by Using a microservices approach, software is composed of small services that communicate over well-defined APIs that can be deployed independently.

III. PROBLEM STATEMENT

There are various problems that an application faces which requires it to switch to a new and better architectural approach here we will discuss regarding monolithics and microservices:

A. Difficult to Scale

These applications can only be horizontally scaled by having multiple instances of the entire application behind a load balancer. If a specific service within the application requires scaling, there is no simple option. You need to scale the application in its entirety, which is an unnecessary waste of resources. Allows you to scale individual services independently as per your requirements. In the above diagram, if service B needs to be scaled, you can have maybe 10 instances of it while keeping the others as is. This can be changed on the fly, as needed.

B. Long Time to Ship

The entire codebase is deployed rather than just the impacted code. Any change made in any portion/layer of a monolithic application requires building and deploying the entire application. The individual developer is also required to download the entire application code and not just his/her impacted module for fixing and testing. This also impacts continuous deployments.

On the other hand, in microservices architecture, if a change is only needed in one of the hundred microservices, only the changed microservice is built and deployed. There is no need to deploy everything. In fact, a microservice can even be deployed several times during the day, if needed.

C. Complexities faced by Growing Applications

As a monolithic application grows (features, functionality, etc) so does the team, and soon, the application becomes complex and intertwined. As different teams keep modifying the code, it slowly becomes more and more difficult to maintain a modular structure and slowly results in spaghetti code. This not only impacts code quality, but also impacts the organization as a whole.

In a microservices-based application, each team works on separate microservices, which makes it less difficult to make intertwined code.

D. No Clear Ownership

In monolithic applications, teams that look independent are not actually independent. They simultaneously work on the same codebase but are heavily dependent on each other.

In microservices-based applications, the independent teams work on separate microservices. A team will own an entire microservice. There is clear ownership of work with clear control of everything about the service, including development, deployment, and monitoring.

E. Failure Cascade

The failure of one part of a monolithic application can cascade and result in bringing down the entire system, if not properly designed.

In the case of microservices-based architecture, we can make use of a circuit breaker to avoid such failures.

In contrast, a microservices-based application

IV. FLOWCHART AND PROPOSED SYSTEM

The flowchart and proposed system shows 4 microservices which will be implemented in the project



Fig 1: Flowchart

In fig1 this flowcharts shows the request and response flow within the application. Whatever request the user gives from the frontend microservice will be given ahead to the desired microservices and the response from that microservice will be given to the user.

Fig 2 shows that there are 3 more services apart from frontend service and using various API's from the API Gateway various services will communicate with each other and responses will be given to the user.the advantage of microservices can be seen in the proposed system fig 2 where all the microservices have their separate databases.

The microservices implemented in the project are:

- Frontend Microservice
- User Microservice
- Product Microservice
- Order Microservice

These microservices are independently built with various API sets associated with each microservice.



Fig 2: Proposed System

V. RESULT AND DISCUSSION:

After implementing the fig2 system and making all these microservices communicating with each other we can have a whole application build which can communicate through API's.



Fig 3: Use case Diagram

The above fig 3 depicts the use case diagram for the project where various use cases of customer and admin are mentioned such as Log in , Log out,Sign in , add products, view product details etc are mentioned.

The code for various microservices is written in a way that all of them have some specific routes associated with them and these routes are nothing but API's and from frontend service through forms one can handle this request and then the desired microservice will run and will produce the required output/response.

Here each microservices is loosely coupled since these are built and developed on different port addresses and servers and all the requirements and dependencies are installed in different directories for different microservices. And they are containerized and deployed using Docker.

VI. FUTURE SCOPE

Can use newer aws services to make it more reliable and robust.

Newer Services can be added and website can increase the complexity of the webapp.

We will consider different aspects to which our system should justify and fine tune its functionality and work to give the user the best experience.

We can add more microservices and also use different languages to build different services and merge them together, as microservices support applications built from different languages(multi lingual approach).

We can increase our reach and also the team size and wil try for better and newer approaches as in microservices all the code is readable and maintainable.

VII. CONCLUSION

Microservice architectures can be an enabler for scalable, agile and reliable software systems. The Microservices architecture pattern is the better choice for complex, evolving applications. Makes easily maintainable services. It is easier to build, scale and debug this architectural based applications. Now a days the way application usage is increasing rapidly due to digitalization and more users joining the internet all the applications need to switch to microservices for better performance and better business.

VIII. REFERENCE

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IMAGE ENCRYPTION USING CML AND CHAOTIC SYSTEM

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ABSTRACT

The chaos-based picture cryptosystems have been broadly investigated in current years to grant real-time encryption and transmission. In this paper, a novel colored photo encryption algorithm by the use of coupled-map lattices (CML) and a fractional-order chaotic device is proposed to enhance the reliability and strength of the encryption algorithms with a permutation-diffusion structure. To make the encryption technique extra perplexing and complex, a picture division-shuffling system is put forward, where the plain image is first divided into 4 sub-part images, and then the orientation of the pixels in the entire picture is shuffled. To generate primary circumstances and parameters of two chaotic systems, a 280-bit prolonged external secret key is employed.

Keywords-- Image-Encryption, Cryptosystem, Image-Decryption, Coupled Mapped Lattice, Chaotic System, Fractional- Order Chaotic System, Permutation and Diffusion, Secret Key.

I. **INTRODUCTION**

Widespread transmission of digital photos over numerous transmission media challenges to construct credible reliability strategies for the security of restricted and sensitive data to be transmitted. Hence the protection of digital data has emerged as a hot latest topic. Different from textual content encryption, most traditional ciphers such as Data Encryption Standard (DES), International Data Encryption Algorithm (IDEA), Advanced Encryption Standard (AES), RSA (developed via Rivest, Shamir, and Adleman), etc., are no longer appropriate to construct cryptosystems for digital pictures due to inherent characteristics of picture data, e.g. mass information capacity, peak repetition, strong interconnection among adjoining pixels, etc. The implementation of these conventional algorithms for photo encryption generally requires extra computation time and strength and furthermore creates different issues such as in controlling several data formatting.

The goal of permutation is to change a significant picture into a useless, disarranged, and un-systematic picture through disorganizing the orientation of the plain picture pixels, which will improve the computational difficulty of a possible chosen-plaintext attack. In the diffusion process, the worth of the authentic picture pixels is modified sequentially so that a tiny exchange for one pixel can expand out to nearly all pixels in the entire image. The picture encryption techniques utilizing anyone of the permutation-only technique or the diffusion-only technique have few shortcomings in each of protection and pace. So far, the majority of picture encryption algorithms combine disorganizing the orientation of the pixels and changing the grey values of picture pixels to accomplish the required cryptographic properties. The preliminary state for the logistic maps is received by the use of the exterior secret key. Therefore, for the reason of excessive protection, it is very promising to employ CML and fractional-order chaotic structures in colored pictures encryption.

II. PROCEDURE FOR IMAGE ENCRYPTION

The presented chaos-based cryptosystem for colored pictures consists of the following 4 parts:

2.1 The image division-shuffling process

Without loss of generality, we anticipate that the dimension of the colored plain picture I is $M \times N$, where M and N are the breadth and height of the image, respectively. Transforming photo I into its red, blue, and green components, we can achieve 3 colored matrices IR, IG, IB with measurement $M \times N$.

Then mix the red, green, and blue matrices horizontally with the aid of the following formulation (1) and achieve a matrix I1 with M rows and 3N columns:

The image I1 is disintegrated equally into 4 blocks and each block can be labeled in the form of Blk. k, k = 1, 2, 3, 4. The dimension of each block can be given as follows: size (Blk.1) = $M/2 \times 3N/2$, size(Blk.2) = $M/2 \times (3N-3N/2)$, size(Blk.3) = $(M-M/2) \times 3N/2$ and size(Blk.4) = $(M-M/2) \times (3N-3N/2)$. If M is an odd number, append the first row of the end of Blk.2 and delete the first row of Blk.4. The dimensions of blocks Blk.2 and Blk.4 are attained as follows: size(Blk.2) = $(M-M/2) \times (3N-3N/2)$ and size(Blk.4) = $M/2 \times (3N-3N/2)$. And the dimensions of the other two blocks kept unaffected. In the following, we will further jumble the plain picture, which makes the encryption function more perplexed and complicated as it adds one more step to the encryption process.

Similarly, insert each column of Blk.2 in turn into the odd columns of matrix P_2 and insert each column of Blk.3 sequentially into the even columns of matrix P_2 . Finally, insert each row of P_2 in turn into the odd rows of matrix I_2 and insert each row of P_1 sequentially into the even rows of matrix I_2 . Thus a disordered image matrix I_2 with size M×3N is obtained. Implementing the above procedure, we apply the first complexity to our encryption approach, which significantly enhances the resistance against known/chosen-plaintext attacks.



2.2 CML and the fractional-order Chen chaotic system

The cryptosystems based on majorly used one-dimensional discrete chaotic maps face elemental drawbacks such as minor keyspace, slow execution speed, and fragile security functions. To get over these constraints in the presented encryption scheme, a 2D coupled map lattice (CML) and the fractional-order Chen chaotic system are used to originate the key streams.

2.3 Generation of the initial conditions and parameters

In the presented scheme, allow $L = M \times N$ and S = 3 for the CML, i.e., $n = 0, 1, 2, ..., M \times N-1$, k is 1, 2, 3. In view of the primary need of cryptology, the cipher-text ought to have a proximate correlation with the key. There are two methods to accomplish this requirement: one is to combine the key utterly into the undeniable textual content via the encryption process, other is to use an appropriate key technology mechanism. Here we use a 280-bit large external secret key (K).

2.4 Image permutation based on CML

Picture data have robust correlations among adjoining pixels in horizontal, vertical, and also diagonal directions for both usual and computer-illustrated images. In order to weaken the strong relationship among adjacent pixels, a CML is used to scramble the pixel positions of the image I2.

2.5 Image diffusion based on the fractional-order Chen chaotic system

The encryption algorithm presented in this paper is formed on permutation-diffusion architecture. In the diffusion stage, the fractional-order Chen chaotic system is employed to generate the keystream for diffusion, and the pixel values are modified sequentially to confuse the relationship between the cipher-image and the plain image. In some current chaos-based picture ciphers, the keystream used in the diffusion technique is fully

decided through the key. The same keystream is applied to encrypt different plain images if the key remains unchanged. An opponent may derive the keystream by the plain-text attack, i.e., by ciphering some special plain-text sequences and then comparing them with the corresponding cipher-text sequences. In order to make the cryptosystem secure against a differential attack, the modification made to a particular pixel depends not only on the corresponding keystream elements but also on the accumulated effect of all previous pixel values.

2.6 Decryption Process

Because the presented color image encryption algorithm is a symmetric cryptosystem, the decryption procedure is similar to that of the encryption process but just in reversed order.

Step 1: The equations below give the pixel values in the RGB components.

Step 2: Perform the reverse operations to remove the effect of permutation

Step 3: The image division-shuffling process is implemented but in the reversed order to recover the original color image.

Step 4: Since the decryption process requires the same key streams for decrypting the cipher image, the same 280-bit long external secret key K =K1K2K3...K35 should be applied for decryption.

III. PERFORMANCE AND SECURITY ANALYSIS

In this part, the execution of the presented image cryptosystem is analyzed by the use of unique security test measures. These measures are taken as follows: key space analysis, statistical analysis, and key sensitivity analysis.

3.1 Keyspace analysis

The size of the key space is the sum of unique keys that can be utilized in the encryption/decryption process. The key space should be big enough to foil brute-force attacks. From the cryptographic perspective, the size of the key space should not be less than 2^{100} to ensure an apex level of security. Since the secret key of the presented scheme is 280-bit large, the key space is 2^{280} , which is sufficiently long enough to counter a brute-force attack.

3.2 Statistical analysis

Shannon suggested that diffusion and confusion should be employed in a cryptosystem for the purpose of frustrating a powerful statistical analysis. A model cipher should be strong against any analytical attack. In order to exhibit the toughness of the presented picture encryption scheme, we have conducted some statistical trials on the histograms of the ciphered picture and on the relations of adjoining pixels in the ciphered image.

3.3 Key sensitivity analysis

An efficient encryption scheme has also to be sensitive to the secret key, i.e., a very small change in the key will cause a significant change in the output. Suppose that two 280-bit secret keys are chosen randomly as:

K1="2eea2814e6087660406d59f82f740bfd9c2e5e463d96bda-fe482c8054f457bab5cd180" and

K2="2eea2814e6087660406d59f82f740bfd9c2e5e463d96bda-fe482c8054f457bab5cd181".

Obviously, the two keys are different in only one bit.

IV. RESULT



(Input)



(Processing)

×	

(Output)

V. CONCLUSION

In this paper, we have presented a new colored image encryption algorithm totally based on a CML and a fractional-order chaotic system. The proposed cryptosystem is consisting of four encryption algorithms; the presented encryption algorithm has a better accomplishment in terms of security, sensitivity, speed, and toughness. Furthermore, corresponding results also show that the proposed encryption method efficiently overcomes the limitations in the present one-dimensional chaotic image encryption algorithms.

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A NOVEL FACIAL IMAGE RETRIEVAL APPROACH USING MULTI SIMILARITY MEASUREMENTS

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ABSTRACT

Today's world is advanced which comprises of information within the arrange of content, pictures, recordings, and many more. Wide utilization of the Web leads to the development of computerized information. The browsing of the Web also allows clients to look for pertinent pictures or recordings from inaccessible destinations. Image-retrieval is the dynamic investigate regions where clients can get pertinent advanced pictures when they browse through the search engine. Content based image retrieval (CBIR) introduced in 1990s, this is the projecting area in image-processing because of its miscellaneous application in intermultimedia, companies' image-archives. CBIR framework is utilized in numerous applications, for example, Automatic Face Recognition Systems, Biodiversity Information Systems, Crime Prevention, Architectural, and Engineering Design Fingerprint Identification, Cultural Heritage, Digital Libraries, etc.

In the proposed methodology will suggest enhancement in some major area such as time and accuracy over the existing algorithm to retrieve the relevant images from the database.

Keywords: Content based image retrieval (CBIR), Crime Prevention, EAAQ, Face Recognition Systems, imageprocessing, SEPAM.

1. INTRODUCTION

Current CBIR systems generally execute image-retrieval with three fundamental parts specifically, similaritymeasure, semantic-gap-reduction as well as low-level features (Inbaraj, R. and G. Ravi,2019). The Content based image retrieval (CBIR) approach normally rely on feature-extraction as well as similarity measurement techniques. Feature-extraction algorithms are also known to abstract low-level visual information, such as colour ,intensity, shape, texture from the images to create an index feature-vector (Muhammad Kashif, Gulistan Raja, and Furqan Shaukat,2020) and extract high level features, such as cooccurrence matrix gray-level (Meenakshi Garg, and Gaurav Dhiman,2020) , speeded-up-robust-Features (SURF) (Vikas Wasson,2017; Najeeb Ur Rehman Malike et al.,2019) , bag of visual words(BVW) (Arun, K. S., Govindan V. K, and Madhu Kumar S D,2019), scale invariant feature change (Aasia Ali and Sanjay Sharma,2017;Tao He et at.,,2018;Payal Chhabra, Naresh Kumar Garg, and Munish Kumar,2019;) and variations of local-binary pattern (Oana Astrid Vatamanu et al., 2013;Raju et al., 2020). Also, many researchers have presented various algorithms for contentbased image retrieval (CBIR). For enhancing performance of the CBIR, this research methodology uses new methods for the facial image-retrieval system.

2. RELATED WORK

Proposed texture descriptor, and it was the combination of matrix of gray-level cooccurrence as well as local ternary pattern. First local-ternary-pattern of pixels was obtained and then used gray-level cooccurrence matrix in four directions of grey-level, correlations between pixels pairs as features it sets calculated. 2D texture data as well as database of facial-images were consider to test the suggested dictionary, and the results were compared with other descriptions of the feature. (Vahid Naghashi , 2018).

Introduced color retrieval and texture images based on the binary pattern of the local directional region. (Srishti Gupta et al.,2020).

Proposed squared euclidian distance (SED) as well as adaptive-particle-swarm-optimization (APSO) is consider to support to build facial image-retrieval approach. Three steps involve in the program: image-retrieval, feature removal, optimization. Primarily, from the saved images the feature-extraction are completed. Low-level features like texture shape, colour, and high-quality features such as right eye, left eye, face, mouth, nose, where two factors consider in method of removing feature. In the second phase, such elements were narrowed between semantic gap by a well-known process of dynamic particle density. After that, a standard euclidian distance measurement will be used to obtain low-resolution facial images and question. The system with squared euclidian distance (SED) as well as adaptive-particle-swarm-optimization (APSO) as would then developed in active platform of matlab, and then analyzed. (Manikandan Kalimuthu, and Ilango Krishnamurthi,2015). Recommended combination of convolutional neural networks (CNN) along with sparse-representation in CBIR approach, in such deep features were extracted based on convolutional neural network as well as sparse-representation to improve retrieval accurate and even a speed. The result of experiment revealed that the method had reach to the higher speed as well as accurate results compared to state-of-the-art methods. (Amir Sezavar, Hassan Farsi, and Sajad Mohamadzadeh,2019).

The content-based image retrieval (CBIR) dependent on local patterns and supervise ML technique is recommended. The approach used three kinds of databases it means colour, texture, shape to enhance the effective approach of the system. Analysis performance showed that local number portability gave enhanced the average recall than local-binary pattern, as well as local-ternary pattern. To increase accurate outcome as well as system used the local number portability method with ML method, and Analysis performance showed that local-pattern with ML method improved average of accurate outcome from 36.23 - 85.60 percent while the system used Local Number Portability along with cubic SVM on DB1 (Corel1K), and from 82.51 - 99.50 percent while used Local Number Portability including satisfactory KNN on DB2 (Vistex DB), and in the range of 56.63 - 95 precent while used Local Number Portability including group of sub-space discriminant on DB3 (face DB). (Supreethi K.P and Maher Alrahhal ,2020).

3. ISSUES IN EXISTING METHODOLOGY

The existing research methodologies consist of some problems, which are enlisted as follows,

- Facial images are used in several security applications. But facial images have various poses, directions, etc. it is bit difficult for retrieve useful images from database this is the challenging area of research.
- Some methodologies consider the image annotation along with content-based retrieval, which leads to time complexity
- Throughout the image achievement method the facial-images possible to get deuterate by noise. In the facial image obscures noise is present and the useful data or information is available in the image and so it creates the analysis work more crucial.
- In the existing feature descriptor has a weakness in terms of reliability and robustness.
- The existing research methodologies have a problem with accurate retrieval.
- Some of current methodologies use a traditional segmentation algorithm, which has a disadvantage of oversegmentation. This over-segmentation significantly reduces accuracy.

4. OBJECTIVES OF PROPOSED METHODOLOGY

The proposed approach methodology is will be able to successfully retrieve the important facial images from the facial database based on a content-based image retrieval system. The proposed system consists of some objectives, which are described as follows,

- To retrieve useful and relevant images from the facial images dataset.
- To enhance the image contrast as well as at the similar time, remove the noise with the help of a new Enhanced Anisotropic nonlinear diffusion and Adaptive Quadri histogram equalization (EAAQ) algorithm.
- To present the reliable and robust features for accurate facial image retrieval.
- To present the Similarity Estimation based Partition Around Mediods (SEPAM)clustering algorithm for effectively clustering the gender (i.e., male and females).
- To present the Modified-You-Only-Look-Once (MYOLO) segmentation algorithm for segmenting the important parts, like skin, nose, hair, etc. effectively and accurately.
- To reduce and select the important and useful features using the new Entropy-based Red Deer Optimization ERDO optimization algorithm.
- To effectively calculate equality of the query image and the input image with some distance metrics, namely, square Euclidean distance, Minkowski distance, Jaccard distance, Hamming distance, Relative standard distance, and Manhattan distance.
- To show the efficiency of proposed system by comparing the proposed system with the existing methods.

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5. PROPOSED METHODOLOGY

Content based facial image-retrieval approach is challenging issue. To succeed the above-mentioned problem, this paper proposed the novel content based facial image-retrieval system with use of different similarity measurements. In this proposed methodology consists of seven steps, namely, preprocessing, feature extraction, clustering, segmentation, extraction of feature, selection of feature, and similarity measurements.

Firstly, the facial-images taken will take from FG-NET dataset. Then, preprocessing steps will carry out by the use of Enhanced Anisotropic nonlinear diffusion and Adaptive Quadri histogram equalization (EAAQ) algorithm. Here, the noise will reduced first using the Enhanced Anisotropic Nonlinear Diffusion (EAND) algorithm. Anisotropic Nonlinear Diffusion algorithm will be an effective algorithm to decrease noise in flatregions and at similar time, it preserves edges to a higher extend. But the existing AND algorithm degrades the proper structure and reduces the resolution of the image. So, the wavelet transform will applied to fit the resolution for effectively reducing the noise. And, the contrast will enhance by using the Adaptive Quadri Histogram Equalization (AQHE) algorithm. The contrast of the image will enhance to clearly see the features of the object, which will also enhances the retrieval. Here, the AQHE will be consider because the normal histogram equalization has the problem of over enhancement because of the intensity variation of the image. So, to avoid the over-enhancement problem, this research methodology will be uses the AQHE algorithm. After that, some common feature extraction will be done from image such as histogram of oriented-gradients, localbinary pattern, and bag of visual words (Arun, K. S., Govindan V. K, and Madhu Kumar S D,2019) .Next, clustering operation will perform by using Similarity Estimation based Partition Around Mediods (SEPAM) clustering algorithm, which accurately clustered the male and female groups. The goal of the PAM algorithm is to optimize the average inequality of objects to their nearest selected object. But the PAM algorithm takes an initial set of points randomly and it didn't provide accurate results. So the proposed system initially takes the pair of data-points and calculates the similarity between them, so the term is called the SEPAM clustering algorithm.

After that, the segmentation will perform using the Modified-You-Only-Look-Once (MYOLO) algorithm. The normal YOLO algorithm has a problem of less accuracy and it didn't calculate the small objects in facial image effectively. So, the proposed system uses the MYOLO algorithm. After that, the GLCM and from the segmented image some semantic features are extract. After feature extraction, only the important features will choose with the help of Entropy-based Red Deer Optimization (ERDO) algorithm.

Next, thus the pre-processing, feature extraction, clustering, segmentation, extraction of feature, and selection of feature process will carried out for the query image. After that, equality will calculate among the feature which are selected from the query image and the selected feature of input image using some distance metrics, namely, Square Euclidean distance, Minkowski distance, Jacarrd distance, Hamming distance, relative standard deviation, and Manhattan distance. Then all the distances will be summed and the average value will determine. The image which has the less average value will retrieved. The diagram of the proposed approach methodology is shown below:



Figure 1: Flow diagram of proposed methodology

6. CONCLUSION

In this research, a novel approach proposed for content based facial image retrieval using different similarity measurements. In addition, this system will overcome the maximum drawbacks like throughput, accuracy, reliability and over segmentation problem of traditional methods are also suggested. The seven-step process

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namely pre-processing, feature extraction, clustering, segmentation, extraction of feature, selection of feature, and similarity measurements are used to achieve the best performance among the other models.

The performance of the system will enhance various algorithms at different steps of process such as, noise in image reduced using EAAQ, categorisation of gender using SEPAM, whereas MYOLO algorithm use for segmentation of various facial feature like skin, nose, hair, etc., also for selecting these important feature ERDO will used.

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DIET AND EXERCISE RECOMMENDATION SYSTEM USING MACHINE LEARNING

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ABSTRACT

In the recent upcoming society, studies on health care services have been actively conducted to provide improved quality services to medical consumers in wire and wireless environments. However, there are some flaws in the health care services due to the lack of personalized service. These Days more individuals are being diagnosed with diseases that are becoming chronic due to not following the proper diet and exercise routine regularly. For solving these issues, a Diet recommendation service has been proposed and implemented as it mainly focuses on the personal disease information and health information. Our system provides a customized diet and exercise recommendation using machine learning. It comes up with services for preventing and managing chronic disease in health care centres. This system Suggests diet to users by considering the basic information like physical measurements such as height, weight, gender and food preferences. The system also prepares a diet chart for the user according to time of intake such as breakfast, lunch and dinner. This system will help the users who are concerned about the various chronic diseases they are dealing with and want a proper healthy diet recommendation on a daily basis. The system can be useful for individuals as well as doctors as it supports continuous services, customization and helps in adaptation of healthy living habits.

Keywords- Diet recommendation; Machine Learning; Customization; Chronic Diseases; Healthy living.

I. INTRODUCTION

In recent decades ML and AI based technology has increased exponentially, which has given rise to a better recommendation system. There is a very close relationship between a healthy diet and healthy life. We propose a Diet and Exercise Recommendation system for patients. It is basically a system that monitors the daily routine and health check-ups of a user. It can be considered as a tailored approach for recommending suitable food items that are healthy and which also matches the user's preferences and health conditions. This paper suggests methods towards achieving an efficient Diet and Exercise recommendations for patients using machine learning approach. Our system will generate a real time diet chart for the user using dynamic questionnaires and small inputs [1]. The system automatically suggests which food should be given to which patient based on the disease and other features like age, weight, height and time of intake. The system will also recommend exercise to the users according to their health status. A recommendation system for patients is cautiously implemented for the purpose of encouraging the patients to take nutritional supplements; diets and food which are considered better to meet the patient's health needs and dietary preferences [2].

II. LITERATURE REVIEW

In [1] Agapito G., Calabrese B., Guzzi P. H., Cannataro M., Simeoni M., Lamprinoudi T., Fuiano G. and Pujia have proposed a recommender system for adaptive diet monitoring and personalized food suggestion. Their proposed system is able to build a user's health profile, and provides individualized recommendations according to the health profile. The profile is generated dynamically using a real time questionnaire. DIETOS is a web-based recommender system for the adaptive delivery of nutrition contents to improve the quality of life of both healthy people and individuals affected by chronic diet-related diseases, they have used a catalogue of typical Calabrian foods compiled by nutrition specialists for the dataset. Their paper gives detailed and accurate ways for classifying patients depending upon their level/time period of their chronic disease and other physical measurements [1].

In [2] the authors Talked about Development of an efficient recommendation system for patient-dietician based product information, where an artificial intelligence based solution using a medical dataset will automatically detect which food should be given to which patient base on the patient disease and other features like age, gender, weight, body fat content and other nutrients. The recommendation system was implemented using various machine learning and deep learning approaches like LSTM, classification models, RNN techniques. However, the result proves that LSTM technique performs better than other schemes with respect to several accuracy parameters. The LSTM deep learning model gave 97.74% accuracy [2].

In [3] Authors M.P.N.M. Wickramasinghe, D.M. Perera, and K.A.D.C.P. Kahandawaarachchi have proposed "A Dietary Prediction for Patients with Chronic Kidney Disease (CKD) by considering Blood Potassium Level". They used Machine Learning approach. The objective was to predict the most suitable diet plan for patients suffering from CKD using the blood potassium level. Which ultimately slows their progress of CKD.

Their main motivation was to identify a data mining procedure for a more accurate prediction on variations of blood potassium level of both CKD and non-CKD patients [3].

In Paper [4] Maiyaporn Phanich, Phathrajarin Pholkul, and Suphakant Phimoltares in paper "Food Recommendation System Using Clustering Analysis for Diabetic Patients" have tried to find machine learning algorithms that help in suggesting proper diet to diabetic patients. They explained that human body usually needs sugar for energy; however, too much sugar in blood can vitally damage the body, especially diabetes. Hence, diabetes patients should consume proper nutrition and healthy diet which balance sugar to the optimal level and maintain a healthy weight, respectively. For this reason, their approach aims to present the next step in categorization by using the SOM algorithm along with K Mean clustering. In contrast with the existing research, their SOM algorithm will categorize the food, by considering eight significant nutrients as main features that have an effect on diabetic patients [4].

In Paper [5] the authors introduced "A DASH Diet Recommendation System for Hypertensive Patients Using Machine Learning which has an objective to study and predicate Hypertension at early stage and provide a DASH diet for them, depending on health issues that they have currently and the level of alcohol and their smoking habits and then give them proper diet to help them overcome the hypertension have a healthy diet. They recommended dishes to help not only control hypertensive effects but also benefit a normal user to prevent him from getting health complications [5].

In Paper [6] Mr. Vijay Jaiswal suggested "A new approach for recommending healthy diet using predictive data mining algorithm" has an objective to use machine learning algorithms that help in giving proper diabetic patients proper health. The human body usually needs sugar for energy; however, too much sugar in blood can vitally damage the body, especially diabetes. Therefore, diabetes prevention would be the proper nutrition and healthy diet which balance sugar to the optimal level and maintain a healthy weight, respectively. For diabetic patients, nutrition is the major key for controlling diabetes [6].

III. RECOMMENDATION SYSTEM

A. K-means Clustering

K-Means is one of the most well known and commonly used partitioning clustering methods. The k-means clustering algorithm attempts to split up a given anonymous items in a data set into a fixed number (k) of clusters however, the set should not contain any information as to class identity. It takes the input parameter k (number of clusters) and condition for k is that k < n. This algorithm aims to minimize the sum of squared distance between an object to the centroid which is called sum of squared error.

The K-means algorithm proceeds as follows.

- 1. First is to randomly select the k centroids from a dataset.
- 2. The centroid represents the mean value of all the objects in the cluster.
- 3. The next step is to assign the remaining object to the nearest cluster based on the distance between the object and the cluster mean, which is the centroid and then calculates the new mean for each cluster.
- 4. This process iterates until there is no change of the centroid's values. In other words, until the criterion function is convergence [4].

This Results in formation of k number of clusters, each of these clusters have their own centroids.



Fig. 1. K-Means Clustering

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B. Random Forest Algorithm

Random Forest is a machine learning algorithm that belongs to the supervised learning technique. It is used for both Classification and Regression related problems in ML. It is based on the concept of ensemble learning, which is a process of combining multiple classifiers to solve a complex problem and to improve the performance of the working model. Random Forest is a classifier which uses a number of decision trees on various subsets of the dataset. It takes average of decisions of each decision tree to improve the predictive and accuracy of that dataset. In Random Forest algorithm Instead of relying on one decision tree, the random forest takes the prediction from each tree and based on the majority of votes of possible predictions, it will predict the final output. The greater number of trees in the forest the higher is the accuracy and prevents the problem of overfitting [3].



Fig. 2. Random Forest Classifier

IV. IMPLEMENTATION

The first step of implementation is Data Pre-processing. Data pre-processing is a way to convert the noisy and huge data into relevant and clean data, as the data available is Real world data, so it contains inaccurate data, missing values and other noisy data, for removing this inconsistent data from the dataset, the proposed system has to clean the raw data. This is an important part to complete the prediction model. It reduces the dimensionality and helps the machine to achieve better results.

Data cleansing is the process of detecting and correcting inaccurate or outlier records from a dataset and then replacing, modifying, or deleting the wrong data which can affect accuracy of our model. In our case, the data had few unhealthy foods which had a fat percentage more than 40, these data samples were discarded. After that we divide our data into 3 separate dataset that are lunch, Dinner & breakfast. Further, we are using K-means clustering and random forest Classifier to produce the recommendation to the user.

A. Implementation of k means Algorithm

The number of clusters decided for the module is three namely Weight Gain, Weight Loss and Healthy. All the food items at the time of Breakfast, Lunch and Dinner falls into any of these categories. The data is fitted to the model. which makes predictions for the food items. Now we take the data of a specific cluster and divide it into the test and the train dataset which is further used to train the Random Forest Classification model to make recommendations of the food items to the user. The same process is repeated for Weight Loss, Weight Gain and Healthy Categories as per the user requirements. The Algorithm works on the simple principle of mathematics that states the concept of geometry. This centroid is the temporary centroid and is only for the initial stage of classification of the scattered points.

B. Implementation of Random Forest Classification Algorithm

The classification Algorithm that we will be using is Random Forest Algorithm. It is based on Decision Trees. Initially, we pick at random K data points in the dataset. Secondly, building the Decision Tree associated with these K data points is done. Choosing the number N tree of trees that has to be built is to be done. Now for every new data point, each one of the new N trees classify the category to which the data point must be assigned, and assign the new data points to the category that wins the majority vote. The Forest Classifier will classify various food items depending upon the nutrient values into different categories and when the user prompts for a diet, the system would generate food items from different classifiers whichever suits more appropriate depending upon the user profiles.

C. Implementation of Exercise Recommendation Module

- a. Calculation of BMI (Body Mass Index)
- BMI = body weight in kg

Square of body height in m

 $= kg/m^2$

Depending on BMI user can be categorized as one of the following cases:

- *1.* Severely Underweight <16
- 2. Underweight = 16 18.5
- 3. Healthy = 18.5 24.9
- 4. Overweight = 25 29.9
- 5. Obesity or Severely Overweight ≥ 30

b. Calorie Requirement Calculation

For Men : 66.5 + 13.8(W) + 5.0(H) - 6.8(A))

For Women : 65.51 + 9.6(W) + 1.9(H) - 4.7(A)

where,

W = Weight in lbs.

H = Height in inches.

A = Age in years

Depending upon the health category and calorie requirement the system will recommend suitable exercise for the user [7].

DIET RECOMMENDATION SYSTEM		-		×
The F	ood We Choose Make A D	ifference		
Age	21			
Weight	67			
Height	1.7			
1- Breakfast				
2- Lunch				
3-Dinner				
Food Timing	1			
1- Kidney Chronic Disease				
2- Blood Pressure				
3- Diabetic				
4- Arthritis				
Disease	M.			
Weight Loss	Weight Gain	Health	ıy	

Fig. 4. Input GUI



Fig. 5. Output of Diet Recommendation



Fig. 6. Output for Health Status of User

V. CONCLUSION

The work presented in this paper lies in the field of Machine Learning in Health Care sector. We designed a system which can help doctors to recommend diet and exercise to the patients. It precisely deals with health monitoring of chronic disease like Diabetes, Kidney chronic disease, Arthritis and Blood Pressure. This diet Recommendation system is based on Machine learning Recommends diet with the help of Data set. Various machine learning algorithms can combine the user's data to recommend the best diet to the user according to their age, height, weight, disease, intake time etc. Th system will also recommend exercise suggestion to user according to their health status and calorie requirements. The Goal of this system is to provide ease and satisfaction to patients suffering from Chronic diseases which can be cured and controlled by maintaining a perfect balanced diet and exercising regularly.

VI. FUTURE WORK

The future work would consist of a system which can keep a track of diet and exercise and in continuation would provide alternate options with respect to the user's health status. An Artificial Intelligent automated medical diet based cloud system can be implemented to increase longevity. A Reminder module can be added which can create a regular and emergency alert system to remind the user before every follow-up session and in alert user in cases of extreme reports [7].

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IMPROVED ALGORITHM FOR INFORMATIVE CONTENT EXTRACTION THROUGH KEY FRAMES

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ABSTRACT

Video summarization is used in various video processing applications. It is nothing but the abstract, informative, short representation of video content. Minimizing the redundancy is one of the major tasks while creating the summary. In this paper, Key frames are selected based on feature extraction and cumulative frame difference calculation. Colorfulness, brightness, hue value are the considered features for quality score calculation for each frame. Feature helps to cover salient visual part of the video. The videos are taken from openvideo.org and results are compared with previous ones. Redundancy is minimized and only frame with maximum information are selected.

Keywords—Quality score, colorfulness, brightness, hue, cumulative frame difference

I. INTRODUCTION

The evolution in technology has improved the storage and sharing of information in the image and video formats. Lots of data is uploaded on YouTube, Daily motion websites. When we search for any topic on such sites, multiple suggestions are displayed. To browse and go through such vast content is not possible with time and space constraints. To overcome the challenge of retrieving video content efficiently, efforts are being made. Video summary provides the way to achieve the results. It is an efficient approach to give abstract, informative, short summary of large data.

The video summary can be of two types- Key frame representation or video skimming. Skimming covers all the motion part while key frames are static in nature. Again feature extraction, edge detection plays very important role in summarization.

The proposed method used in this paper calculates the quality score using colorfulness, brightness and hue value as a measure. Quality score represents the features of an image. It covers the visual salient region of the video. For each individual frame quality score value is calculated. Cumulative frame difference helps to select frames with maximum content value. The selected frames should represent informative content with less duplication and abstract view.

II. RELATED WORK

Video summarization is a vast area. There are multiple efficient ways by which informative frame are captured and clustered together. The efficient is the one which captures minute details with every drastic change in content and gives minimum number of frames with no or less redundancy.

Dynamic and static maps are separately constructed based on motion intensity, orientation consistency, color and texture contrast. For capturing salient details multiple descriptors are used. And finally time constraint cluster algorithm is used for sequencing frames. [1]

Weighted convex mixture models uses two different descriptors in a single similarity matrix as single descriptor is not sufficient to capture all minute details in video. For each descriptor weight is assigned by weighted clustering algorithm. [2]

The Fidelity measure, the Shot Reconstruction Degree measure and the Compression Ratio measure are used as quality measure. Using cumulative frame difference the frames with more content change are selected. [3] In novel clustering method, pre-sampling (to reduce redundancy), BoW model (for visual content), VRHDPS (clustering) methods are used for summarization. [4]

Context driven approach uses optimization framework for finding static and dynamic changes. Frames with salient changes are grouped using alpha matting to give single frame. [5]

For achieving more semantic context novel technique approach is used with long temporal and duration videos. Frame selector and video descriptor are used for creating semantic attended video summarization network (SASUM). [6]

Quality, user attention, temporal coherence, representativeness and uniformity features are taken into account for feature extraction. Visual content extraction based on cumulative frame difference is calculated for key frame selection. [7]

III. METHODOLOGY

Key frame selection is mainly divided into 4 stages. They are segmentation, quality score calculation and cumulative frame difference measurement and finally elimination of duplicate frames. The quality scores for each frame is computed in the combined form of brightness, colorfulness, hue value. Then cumulative frame difference is calculated. In the last stage duplicate frames are eliminated through edge detection.

1) Video Segmentation:

Video segmentation plays important role in various applications of video processing. Segmenting is nothing but portioning of the content. A complete video is partitioned into no of scenes, shots etc. It is the representation of continuous frames in divided form of scenes and shots. The major goal of segmentation is simplifying the presentation of video which will lead to easy and efficient analysis and processing of video content.

2) Quality Score:

Individual frames are the basic building blocks of video. Each frame contributes to the content through the properties it has like color, brightness, its features etc. These features play important role in extracting visual content. The quality of frames is affected by many factors.

Quality Components:

1. Brightness-

Brightness is an attribute of visual perception in which a source appears to be radiating or reflecting light. In other words, brightness represents the luminescence of a visual target.

2. Colorfulness-

Colorfulness is the "attribute of a visual perception according to which the perceived color of an area appears to be more or less chromatic".

3. Hue-

Hue is one of the main properties of a color, defined as "the degree to which a stimulus can be described as similar to or different from stimuli that are described as red, green, blue, and yellow. Hue can typically be represented quantitatively by a single number.

3) Cumulative Frame Difference-

Each frame is represented using a single numeric value calculated from matrix representation of an image for

its pixel values. The difference between the adjacent frames is nothing but cumulative frame difference.

4) Edge Detection-

In a good quality frames, the object of interest will be well defined and hence high frequency edges will be found only at one place and not cluttered.

For eliminating the blur images edge detection is efficient. For creation of visual attention model it plays important role. Form attention curve we can select frames at the tip points to cover vast change in the content.

IV PROPOSED ALGORITHM



Step 1: convert video into the frames. Step 2: Primary Key-frame extraction
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- 1. For each frame i compute quality score q. where i=1 No of frames
- q = mean (color fullness, brightness, hue)
- 2. By considering group of 50 frames range like 1- 50,51-100,101-150.....N no of frames compute the mean of group of quality score.
- 3. The weight is assign to these score is directly proportional to the mean of each group which is considered as a threshold.
- 4. Key frame has selected if and only if its quality score is greater than the threshold.

Step 3: Cumulative key frame difference

- 1. Compute histogram of each frame
- 2. Compute histogram difference between each pair of frames

Difference=sum ((h2-h1)^2);

- 3. Calculate mean of histogram difference and assign some weight to this mean which is considered as a threshold for cumulative frame difference.
- 4. If the distance is less than the threshold t then the frames are considered as similar and it will be eliminated from frames.

Step 4: edge detection

- 1. For each frame which is selected from step 3, apply edge detection using 'sobel'.
- 2. Then compute the mean and assign some weight on it as threshold.

3. Then final Key-frames are selected if its value is greater than threshold. Primary key frames extraction

Colorfulness, brightness and color space values are nothing but the visual features of an image represented by a value.

An average of these values for each extracted frame is considered as a quality score for an image.

By considering group of 50 frames range like 1-50,51- 100,101-150.....N no of frames compute the mean of group of quality score.

As proposed in Algorithm the score are computed for each frame using different color spaces like hue, lab, ycbcr, gray image as well as brightness and colorfulness of an image. Each score represents different feature of an image.

Elimination of duplicate key frames

Eliminating the redundancy is one of the major tasks while creating the summary. The scenes might be having different motions depending upon that varying length in a video is possible. Though the key frames are selected uniformly using quality score, they might be redundant frames if the scene was long. So histogram difference is used to delete redundant frames. So the extracted summary will be abstract and without duplication of content and thereby minimizing the space and time constraint.

Edge detection

Edge detection is identifying the points in an image where there is much discontinuity. It plays important role in feature extraction. For eliminating blur or darken frames it's useful. Also it is helpful for removing motion in video.

IV. EXPERIMENTS AND RESULTS

Experiments are performed on various video data sets to prove the validity of proposed algorithm. Final outputs for 4 videos from openvideo.org are compared with the existing outputs of open video.

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STEP 1: Primary Key-frame extraction



STEP 2: After deleting duplicate frames

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NO	Video Details	Category	Duration	Total Frame
V1.	Ideal Doll Commercial #3	Ephimeral	01:00 min	1795
V2.	Exotic Terrane, Segment 11 of 12	Documentary	02:00 min	3605
V3.	Exotic Terrane, segment 01 of 12	Documentary	01:38 min	2939
V4.	Introduction to HCIL 2000 reports	Educational	01:21 min	2438
V5.	Mountain Skywater, segment 01 of 12	Documentary	01:56 min	3503
V6.	Clerks typing bags, U.S.P.O.(1903)	Historical	00:55 min	1651

Table 1. Open-Video Project details

NO	Total Frames	Key-Frames
V1.	1765	9
V2.	3605	10
V3.	2939	11
V4.	2438	18
V5.	3503	15
V6.	1651	8

Table 2. Selected Key frames

V. CONCLUSION

In this paper, proposed method is extracting representative frames based on feature extraction and cumulative frame difference calculation. Features are extracted in terms of quality score of frame. Quality score calculates hue, colorfulness, brightness. Cumulative frame difference is applied to minimize the redundancy. Experimental results are compared with output of videos on openvideo.org and they give better results in terms of content extracted.

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AQUAPONICS - AN ALTERNATIVE TO AGRICULTURE

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ABSTRACT

Food security and sustainability is a major concern for India due to its rapid urbanization, land scarcity, and low local food productions of fish and leafy vegetables. This proposal attempts to design and develop a smart aquaponics system that can synergize fish farming and plant growing. Aquaponics is a technique of incorporating both aquaculture and hydroponics. 'Aqua', meaning water and comes from aquaculture, which is the farming of fishes and 'Ponics' comes from hydroponics, which is the farming of plants, in water, using chemicals as nutrients. In this system, water from the aquarium is fed to the plants where the by-products are broken down by nitrification bacteria into nitrates and nitrites and used up as nutrients. The water is then filtered and circulated back to the fish aquarium. Due to ever increasing population, increment in urbanization, climatic changes and increased use of chemical fertilizers have resulted in land scarcity and soil degradation. With some light, temperature, and humidity manipulation of the plant, cultivation of the crops will be well suited to be applied to indoor systems.

I. INTRODUCTION

Agricultural technology design with aquaponics using the concept of Internet of Things can be very helpful because the information from the sensor and control actuators can be accessed through applications installed on the smartphone from anywhere with the Internet connection. This will result in improvement in the graph of food cultivation and help in sustainable development. The proposed smart and sustainable small scale aquaponics system consists of various sensors, actuators, and a microcontroller with internet connectivity to continuously monitor, control, and record fish tank environments. The system will also check the ambient air quality. Healthy growth of fish and plants could be ensured by sending an alert message to the user incase of any abnormal system condition encountered by the system. This will ensure that the yield of cultivation is maximized, and preventative actions can be taken for unpredictable hazards. Use of IoT in Aquaponics based agriculture design will help in automation and minimization of human errors. With IoT, the system can be easily monitored and controlled from any remote location. The sensors placed in the Aquaponics system will continuously monitor the system and the data could be stored on Google Spreadsheets where it can be used for further analysis.

II. OBJECTIVES

- To improve the graph of crop cultivation.
- To develop a sustainable way of crop cultivation.

• The low energy design of aquaponics will help in saving energy and resources such as electricity, water and money.

- To improve the Revenue
- Both crop cultivation & fish farming can be done.
- Real-time information can be taken
- It can be controlled using a mobile application.

Through creating an aquaponics system, our group hopes to create a system that will accommodate the needs of sustainable agriculture by combining aspects of a hydroponics system, as well as a fish farm.

By the end of the project, we hope to have created a system in which we will be able to grow plants and raise fish in an efficient and environmentally friendly manner.

III. RESEARCH METHODOLOGY

This model contains methodology to create a unique or smart aquaponics system that is suitable for every atmosphere as well as the economic strata of the country. This project is principally implemented on agriculture and production using traditionally technical ideas. It's an innovative technique that is brought into the scenario by a combination of hydroponics and aquaculture. With the help of electronic media, it will increase productivity and also the quality is maintained. it'll also create interest for Next Generation Youngsters within

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the field of Agriculture. As traditional techniques of agriculture were very tedious and time taking process so Aquaponics farming may be a solution with the incubation of IoT and Mobile Application. Where the data sensed will be shown on the mobile application however in rural areas same data can be received through a text message. Fish consumes food and excretes waste in the form of ammonia. This ammonia is broken down into nitrite and then nitrate by different naturally occurring bacteria in the aquaponics ecosystem. The water is purified by plants absorbing the nitrate and eventually recirculated back to the fish tank. Aquaponics utilizes 90% less water than conventional farming. Moreover, it employs soil-less media for growing plants, which yields crops that are free of soil prone diseases. Crops are also organic and chemical-free because they are fertilized by fish waste. While large scale aquaponics has shown efficient production of edible fish and plants in recent years, this proposed system suggests the design and development of an aquaponics system for home environment, with the notion that if every household within a country can produce its own fish and plants, the overall food demand of the country will be reduced. A. Assembling an Aquaponic System The fish tank and grow bed is used. There are 2 pipes used in this system.1st pipe is attached from the fish tank to the grow bed and 2nd pipe is attached from grow bed to fish tank this 2nd pipe will be connected to the filter system. Grow bed consists of some soil as well as the pebbles with plants in it.

IV. DESIGN

IoT & Mobile Computing, With the help of the different sensors and internet and WIFI connectivity all the values are sensed from the sensor. The LoRa technology will be used to capture data on Cloud hosted platform. The senses are sent to the farmer who doesn't have internet connectivity to their mobile. An Aqua-Agro-Tech mobile application is developed through which the farmer can see the value of the sensed sensor and the same can be controlled through the mobile application itself. I The Proposed system will consist of a fish tank, a cubic grow bed filled with gravel, a fountain pump, and a filter box. The system will be powered using external inputs: electricity for the pump. A LED light panel which will mimic the sun and provide optimum light for the growth of plants and for the process of photosynthesis. The second or middle layer is of the plant bed. Here, the plants are grown in a rock filled bed with water beneath. The third or last layer is the fish filled water tank. The

fish tank is like the heart of the framework, giving both water and manure to the plants. The fish faces provide nitrate for the plants while the plants filter and give clean water back to the fish tank. This depicts a symbiotic relationship between the plants and the fishes. There are numerous sensors and actuator devices which are connected to the system. The aquarium contains a pH sensor, a temperature sensor, a water heater, an oxygen supplier, a water pump and a fish feeder. The plant bed, on the other hand, contains a humidity and temperature sensor. The light bed panel, along with the actuator devices like water heater, water pump, oxygen supplier is connected to a relay, from where they can be switched on or off.



Fig 1. Schematic diagram of an aquaponic system

Preliminary Work Aquaponic farms have been gaining popularity in recent years. There has been a rapid increase in backyard aquaponic farming and small scale aquaponic farms. However, all these systems are manual and need constant monitoring and supervision to get the desired results. Due to this reason, there are difficulties in adopting this way of farming for commercial purposes and on a large scale. The proposed system not only targets urban farming, but also the end user requirements, ensuring a user-friendly system interaction. A basic aquaponic system usually consists of a rock bed where plants are grown, a fish tank and a water pump. Manual assistance is required to pump up the water to the plant bed whenever necessary. Using IoT in aquaponic systems helps in automation and avoids any human intervention. The sensors placed in both the water tank and plant bed will detect the change in moisture content, humidity and automatically feed the fishes, pump up the water and also maintain appropriate environmental conditions such as temperature and humidity. Expected Outcomes A smart and sustainable home aquaponics system with feature-rich IoT mobile application was successfully designed and developed. This can be attributable to the seamless integration of multiple sensors for continuously monitoring fish tank water and ambient air quality; actuators for automatically controlling water temperature, dissolved oxygen in water, and plant grow lights; microcontroller with internet connectivity; as well as real-time interaction between the user and home aquaponics system.

A proper well planned design of a hydroponic system reduces the risk of water and nutrients. An aquaponic farm also uses 90 less water than a conventional farm. India has a huge market for veggies, aquaponics in a closed environment produces organic veggies and fruits which attract better prices.

V. FUTURE SCOPE

While the proposed home aquaponics system can potentially address the food security issue, there is still room for improvement. Firstly, a sump tank with freshwater can be implemented as a replacement water reservoir where freshwater can be automatically pumped into the fish tank when the water level is low. Secondly, a solar panel system coupled with an automatic solar tracker could be employed to deliver power to the system. Lastly, computer vision and artificial intelligence could be adopted to determine the healthiness of fish from its movement in the fish tank and healthiness of plants from its appearance and coloring. Hydroponics is currently ahead of its time in India. The cost of produce coming out of a hydroponic unit currently is much higher than the cost of one coming out of traditional units. As such the market for hydroponic produce is limited to largely Metro's and a few tier 1 cities for now. However, with constant innovation and adoption of newer techniques of growing, the cost differential is reducing. So, we will see progressive farmers adopting the technologies faster in coming years. But still the large part of farming in India will remain traditional due to cost considerations and also technology limitations. Consider this, most (almost 100%) of time when people talk about hydroponic farming, they relate it to or plan of growing microgreens. The currently prevalent grow units cannot grow staples like rice, wheat etc. Think about it, just how many lettuce sandwiches you can have? And even if you can have many, you will still need that bread for the sandwich which the hydroponic growers won't grow due to higher cost. So, in future, adoption will increase near big cities, but a large part of agriculture will continue to be traditional.

VI. LIMITATIONS

Some people think that aquaponics is all about the fish but when you can get three or four crop rotations in the time it takes to raise your fish, I would say that's where the limitations lie. One of the limiting factors of plant growth is the temperature at the roots. Ideally this temperature will be above 60 degrees Fahrenheit and growth is increased when the temperature is raised. Unfortunately, there are only certain types of fish that lend themselves to that environment. The majority of commercially viable fish require cooler water than your plant roots would find comfortable. The fish that are suitable-like tilapia-are severely overproduced and don't bring much profit. That means you have to work a lot harder to distinguish your product from your competitors.

High Ammonia levels are toxic to fish. If your system is new or not fully cycled, or the fish are overfed, sudden spikes in the Ammonia levels, especially when temperature conditions are warmer than normal, can kill fish very quickly. Also, the variety of crops which can be grown via aquaponics is limited.

VII. CONCLUSION

A smart and sustainable home aquaponics system with feature-rich IoT mobile application was successfully designed and implemented. This system can be attributable to the seamless integration of multiple types of sensors for close and continuously monitoring of fishes in the fish tank and ambient water quality; actuators for automatically controlling water temperature, dissolved oxygen in water, and plant grow lights;

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USE CASE AND MISUSE CASE

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ABSTRACT

In Software security testing is an important technique for discovering software vulnerabilities that violate security requirements [1]. Gathering security-related requirements and designing dependable software is difficult [2]. Over the last decade, use cases have grown in popularity to become a major technique in early stage of software requirements analysis [3]. In the early phases of requirements engineering use cases are used to test a system, but use cases offer less assurance for security requirements. However, misuse cases can specify behaviour not wanted in the system [4]. This paper presents previous work on use case and misuse cases and explains how we identify architectural components and their connections and analyze whether software architecture can address security concerns or not. The paper explains how greatly use cases and misuse cases improves the traceability of security concerns, which allows a system developer to know what requirement an architectural component of a software requirements [4].

Keywords: Software Testing; Security; Use case; Misuse case.

I. INTRODUCTION

Software vulnerability is a major cause of the widespread cyber security problems. Vulnerabilities get into software because of various reasons such as lack of security requirements specification, flawed software design, insecure programming, and inadequate quality assurance. Software Security Testing should be carried out carefully throughout the software development process [1]. Use cases have proven helpful for the elicitation of, communication about and documentation of requirements. However, there are some problems with use case based testing approaches in requirements engineering. Important requirements may be missed because of oversimplified and predefined assumptions and steps about the problem domain of a particular software, and the test cases for use case are predefined and are especially concerning the user interface. Partly, this may be reason due to there are problems with the testing process. It follows a monotonous pattern and overlooks new vulnerabilities [6]. Misuse Cases can be used in such cases as they overcome this problem and provides a wider and variant test cases for software testing. Section 2 of this paper explains about Use case. Whereas section 3 shows how misuse case and mitigation use cases helps in enhancement of security testing using test cases.

II. LITERATURE SURVEY

Samer Khamaiseh and Dianxiang Xu, have presented an approach for building security test models from the artifacts of use case modeling for software requirements analysis, i.e., use cases, misuse cases, and mitigation use cases. They concluded that security test models can be used to generate security tests automatically for exercising the software under test. Their case studies have shown that the security tests resulted from their approach are effective in discovering potential vulnerabilities that violate security requirements [1]. Lasse Harjumaa and Ilkka Tervonen, have proposed a new approach for modeling possible mitigation activities related to the misuse cases. They have suggested using extension points in UML diagrams for connecting mitigations to the actual use cases and defining recover, or prevent relationship between misuse cases and mitigation use cases for guiding the test case creation. They concluded that when the modelling is done carefully, test cases for the security related functionalities could be identified quite easily. They suggest defining and documenting mitigation use case models alongside misuse cases in the requirements specification phase of a system [2]. Joshua J. Pauli and Dianxiang Xu, presented an approach for analysis of secure software architecture according to the requirements in the form of use/misuse cases. They stated that Architectural design is often a heuristic process even though the requirements specification is available. The analysis in their current approach is done in an informal way [4].

III. USE CASE AND MISUSE CASE

Use cases are used in the first steps of the functional requirement analysis, it show the functionality of the software and depicts the scenarios which users are allowed to do with the software. A use case typically describes the interaction between user and system to complete a specific task or activity. Use case maps were introduced to make a linkage between proposed system's behaviour and its architectural structure, in a visual way. In most cases, there is a gap between basic requirements for the system and detail design. Use case maps are the best choice to fill this gap in requirement engineering and system design. Basic user activities are extracted from use cases which are then delegated to different architecture components. These delegations are

modelled by a set of notations that can be classified in three main notation categories. Use case maps notations consist of scenario paths, architecture components and responsibilities [3].

Use cases are good for working with so-called functional requirements, but not necessarily with extra-functional ones, such as security requirements. These security concerns are rarely stated by the stakeholders, as they are the one who have concerns about what should not happen in the system. Use cases, by their nature, concentrate on what the system should do, and have less to offer when it comes to describing the opposite. But system behaviour that should be avoided is also important, which could potentially be investigated through misuse case [6].

Misuse case map is a diagrammatical representation that supports the depiction of system architecture, together with security vulnerabilities and their mitigations. It also enables the representation of intrusion scenarios through exploit paths [3]. Misuse (or abuse) cases as a form of use cases, which help document negative scenarios Some misuse cases occur in highly specific situations, whereas others continually threaten systems. A complete abuse case defines an interaction between an actor and the system that results in harm to a resource associated with one of the actors, one of the stakeholders, or the system itself [2]. Use case has actors/users of any particular software, while a misuse case has misactor or an attacker who is an actor that initiates misuse cases. This may be done either intentionally or inadvertently.

Figure 1 Depicts an ecommerce website use case and misuse case, The lefthand side shows the use case and user activites/functionalities of e-commerce platform it involves activities such as placing order, user registration etc. The righthand side in black shows the misuse case, negative activities such as stealing card details, flooding the system etc. The components and notations of both use case and misuse case diagrams are the same.



Figure 1

These diagrams can become quickly complex with the arising details of the system activities and the intrusion activities, thus tool support is a big step forward for spreading the use of these notations [3].

IV. MITIGATION USE CASE

The security related functionality or enhancements of a software system could be tested by creating tests based on the mitigation use cases. Mitigation use case is generally used to trace activities that can be helpful in preventing mishaps [2].Mitigation cases basically describes the prevention techniques that can be used avoid mishaps states in misuse cases. Figure 2 illustrates modeling use cases, misuse cases and mitigation use cases in UML notation. The left-hand side of the figure shows a normal use case named StoreData and the right-hand side a misuse case that threatens the system, named InsertErroneuousData. Thus, the figure depicts a situation where a hostile user tries to corrupt data in a system. BackupTheData is a mitigation use case for alleviating the consequences of that threatens the system, named InsertErroneuousData. Thus, the figure depicts a situation where a hostile user tries to corrupt data in a system. BackupTheData is a mitigation use case for alleviating the consequences of possible misuse [4].



Figure 2

CONCLUSION

Security aspect cannot just be clued into the underlying development process. The whole software quality assurance process needs to be adjusted in order to efficiently address security issues. Presented approach to the analysis of secure software architecture according to the requirements in the form of use case, misuse cases and Mitigation Case are useful and have shown positive results in concluding system security requirements.

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MOVIE RECOMMENDATION SYSTEM BASED ON CONTENT-BASED APPROACH

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ABSTRACT

Movies are one of the sources of entertainment, but the problem lies in finding the content you want in the evergrowing millions of content every year. However, recommendation programs are very helpful in these situations. The purpose of this paper is to improve the accuracy and effectiveness of the standard filtering strategy. The recommendation system incorporates two main methods that help to provide sound recommendations namely, a shared filtering algorithm and content-based filtering. In this paper, we have used a mixed-method that uses the Content and Sharing filter algorithm. The algorithm discussed in this article is different from previous work in this field as it combines a novel approach to finding similar content between two objects. The paper includes an analysis that proves this new approach and how it can provide practical recommendations. The above method is tested on existing user and material data and produces improved results compared to the other two preferred methods, Integrated Clean Filtering, and Single Value Deterioration.

Keywords— Recommender Systems, Sparsity, cosine similarity, Collaborative Filtering, Content-Based Filtering, Singular Value Decomposition, Hybrid Approach

I. INTRODUCTION

A recommendation system or recommendation engine is a model used for information filtering where it tries to predict the preferences of a user and provide suggestions based on these preferences. These systems have become increasingly popular nowadays and are widely used today in areas such as movies, music, books, videos, clothing, restaurants, food, places, and other utilities. These systems collect information about a user's preferences and behavior and then use this information to improve their suggestions in the future.

Although there are a lot of algorithms, collaborative filtering is the most popular one used by companies as it involves user interactions more. Collaborative filtering can predict better than content-based filtering because it analyses the user's browsing history and compares with other users and then suggests results. Whereas, content-based filtering takes the user's information as an input to find similar movies and recommends them in descending order (using cosine similarity). Our goal in this project was to keep our system very accurate compared to other recommendation techniques while making it as simple as possible.

One goal of this paper is to design a movie recommendation system that considers the past movie ratings given by various users to provide suggestions to the user. We implemented this system using collaborative filtering algorithms and Apache Mahout framework The second goal is to compare the performance and efficiency of user-based recommender systems and item-based recommender systems.

II. RELATED WORK

There are many ways of recommending movies using Content-based, Collaborative (User-item, User-user), context-based, hybrid methods, and nowadays deep learning is also used to solve this problem.

In [1] C. S. M. Wu, D. Garg, proposed a recommendation system using collaborative filtering where rating and user's history is used to suggest the list. The authors have used the Apache Mahout framework and essentially compared the performances and efficiency of user-based & item-based recommendations.

In [2] R. E. Nakhli, H. Moradi, and M. A. Sadeghi proposed the percentage view approach for recommending movies to the users, it finds relevant movies for the customer and then compares the performance with a random movie recommendation system for showing the accuracy of the project.

In [3] a content-based recommendation system is proposed by H. W. Chen, Y. L. Wu, M. K. Hor, and C. Y. Tang using neural networks. In recent years, these are top topics for researchers to work on when they want to build a movie recommendation system. Different terminology used in the implementation of the movie recommender system is discussed below.

A. Content-based Filtering

This recommendation system requires some data or information on what the user might like or what his previous watched history is. It is based on previous action or explicit feedback. Most of the systems in the

industry don't use this approach as they require data or they are not reliable enough. For example, if a person watches the education documentary genre more multiple times than the action genre, the person is more likely to see the most-watched genre in descending order. Figure 1 below explains the process.



Figure 1: Content-based filtering

As in [4] R. Van Meteren and M. Van Someren created a recommendation system by comparing the profile of the user with the content of each document in the sets of the collection. These sets of terms can be represented as the content of the document. The content-based system uses data of users and interests and browsing history to determine the results. As this requires a lot of domain knowledge, thus becomes a drawback compared to collaborative filtering

B. Maintaining the Integrity of the Specifications

Filters out the content according to users' similar interests with other users, it recommends the items to users that have a similar taste [5]. It is also a popular and famous algorithm in the industry. In the memory-based techniques, there are two popular filtering algorithms [6]. There is another technique known as model-based which is not as reliable as compared to memory-based techniques [7]. Figure 2 and figure 3 discussed itembased and user-based collaborative filtering.



Figure 2: Demonstration of User-Based CF



Figure 3: Demonstration of Item Based CF

In the item-based like in [8], it is assumed that the user will like those items that are similar to the other items like before. The hybrid approach-This approach provides very accurate results using both collaborative and content-based filtering while removing the drawbacks of the algorithms at the same time. This integrated system is getting more attention nowadays as it is better than both algorithms [7].

III. PRO PO SED RECO MMENDATIO N ENGINE

The proposed recommendation system used the collaborative filtering technique (item-based approach) which is far more accurate and more efficient to use, as the item-based method can be done offline and because of its non-dynamic nature whereas the user-based changes. The proposed approach uses the KNN algorithm to find the distance between the target movies with every other movie in the dataset and then it ranks the top k nearest similar movies using cosine angle similarity. Different techniques used in this proposed algorithm are discussed below:

• KNN algorithm- is famous in a recommendation system for its faster predictive nature and low calculation time. KNN classifies any unlabeled class to their respective classes by prediction on a similarity measure as shown in figure 4.

• Cosine similarity is to calculate the distance between the target movie. The movies in the dataset is classified by cosine similarity. It measures the similarity between two documents irrespective of how different they are in size, and calculates the cosine angle between two vectors in multi-dimensional space[6],

$$\theta = \frac{\vec{a}.\vec{b}}{||\vec{a}||.||\vec{b}||} \qquad Eq.(1)$$

Eq. (1) is used to define the cosine similarity of the proposed model.



Figure 4: Demonstration of the K-NN algorithm (value of k=3).

• **Item-based collaborative filtering**- assumes users will like items that are similar to the items that are liked before by the user.

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Figure 5 shows the proposed collaborative filtering method.

First, the extraction of the dataset to gather information about the target movie and the user's rating.

Second, the collaborative filtering begins with the formatting of the rating dataset so that it can be consumed by the KNN model, to remove the huge dataset handling problems. The dataset is reduced according to the popularity removing the noisy error pattern to get the sparse matrix.

Now cosine similarity is used to find the distance between the target movie and other movies, which gives us the top k nearest neighbor. And finally displaying the required recommended list of movies with descending order of distance. In the KNN algorithm, if the value of K=1, then the case is assigned to its nearest neighbor of that class.

IV. IMPLEMENTATION

A. Dataset

The Movie Recommendation Database is known as the "TMDB 500 Dataset" collected in Kaggle. The database contains many features including Actor, Director, Staff, Budget, Ratings, etc. Data was incorrect so it was removed from the data processing step. Since the algorithm requires numbers, we cannot work with alphabets from data. Therefore, we need to clean up the data before applying it to our model. This data is not suitable for our model so we have converted it to such values that can be used in our model and its modification does not affect the output.

B. Data Cleaning

Movies Dessriptive ontentent Information file is compiled with approximately 40 columns. Most of these columns were not required for our tests and as a result, have been removed. The data set also included the many empty values and the recurring values that need to be resolved. Additionally, there have been some movie submissions on Movies user ratings files that did not respond to any movie in the Movies Desktop otnent Information file. This entry has been removed for convenience.

V. CONCLUSION

In this paper, to avoid the use of content-based filtering, the Item-based CF filtering approach is used for obtaining better results. KNN collaborative recommendation system is proposed using cosine similarity by using TMDB 5000 dataset. The existing system are compared and found that the proposed system is

more reliable and accurate. It is also found that when the proposed methodology is applied to different larger datasets, both accuracy, and efficiency increase which proves that our system is both accurate and as well as efficient. This item-based filtering is more convenient than user-based. The main aim was to improve the regular recommendation algorithm and to provide better results. The research work was successful as it has been able to fulfill our aim of the project. In the future, more features can be included to datasets (year of release, actor, genre, casting details etc) to make recommendations more reliable and innovative. The content-based filtering and collaborative filtering can be combined to minimize the errors and improve the performance as a hybrid approach.

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POLITICAL EVALUATION USING SENTIMENT ANALYSIS

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ABSTRACT

Sometimes the news we see and hear is not completely true. And as we all know social media is the ocean of data. Considering the fact that people spend hours on social media, we can use it to analyze the social behavior of a person. This project is on big data and machine learning. We analyze the Social Impact of the candidate in an election or the action taken by them over the people which can be positive or negative using the social media platforms like Facebook, Twitter, Reddit, LinkedIn, and so on. We will analyze the social sentiment in percentage. Using a few algorithms like Naive Bayes algorithm, Random Forest and VADER all together a very accurate result is given as output. It is widely applied to data in the form of words and sentences extracted from the response of common people regarding people from political backgrounds to get favourable outcomes.

Keywords-Election prediction, Sentimental Analysis, Machine Learning, Big Data

I. INTRODUCTION

The Indian general elections are held once every 5 years to elect the Member of Parliament from 541 constituencies all over the Nation. These elected MPs elect the Prime Minister who rules the country for the upcoming 5 years. For confirming the term, the PM who took oath should have a majority in Lok Sabha. In this motion, the Prime Minister must have the support of at least 272 MPs including the vote of the elected speaker. This process has been happening since 1952 when the country was declared a republic. The country had elections in 1952, 1957, 1962, 1967, 1971, 1977, 1980, 1984, 1989, 1991, 1996, 1998, 1999, 2004, 2009, 2014 and 2019 respectively. Until the 2009 elections, the election campaigning was party and ideology-centric. Since 2014 the trend has shifted towards the Prime Minister candidate. There have been many processes carried out by various independent agencies to predict the outcome of polls in the past. Pre-poll analysis was conducted weeks or months before the election and an Exit poll was conducted on the day of the election with the voters returning from the voting booth as sample space. This is done on all 7 phases of the election conducted in various parts of the country with different timetables. These kinds of poll predictions were banned by the Election Commission of India under the model code of conduct for the elections to happen without bias in the largest democracy in the world. Internet users in India have increased exponentially over the past decade and it is expected to continue the trend in the future. Though the process of election prediction is banned due to the model of conduct, this even applies for twitter based prediction. So this process is carried out during the election time and results are published after the election, because the model code of conduct is lifted by the Election Commission of India, which is now legal. This paper discusses the election prediction from Twitter in the past and proposes new methods good enough for the upcoming long electoral process done in the Republic of India. For a country with nearly 1.4 billion populations, it is not practical possible to conduct pre-poll and exit poll surveys in all 543 constituencies in a neutral and transparent manner. So the agencies managing the political campaign and the media house need to gain knowledge through freely available raw data from which the exact outcome is understood.

II. OBJECTIVE

Our main objective is to provide better predictions of the election which are going to happen in the future. Also, our system will provide the user with an almost accurate output of how many votes the candidate will get. i.e. in percentage and graph.

We will provide recommendations to users based on the messages, tweets, news, and articles published before elections.

III. SCOPE

Our prediction system makes use of information retrieval, machine learning, and data mining to provide a better user experience.

This recommendation system will provide the latest and best result of prediction taking the latest data available before that moment.

It will make predictions on the basis of the messages, tweets ,news and articles published before elections. The main intention behind the development of the prediction system model is to help users get best results without making any extra efforts online.

Our system will be completely unbiased. i.e. it will not predict in favour of any one it will just give results based on the input data.

IV. LITERATURE SURVEY

This paper addresses a methodology to predict the outcome of the 2019 Indian general elections using the sentiment analysis of twitter data. Decision tree classifier is used to train and test data and the predicted outcome. This methodology is efficient enough to map the mood of people over a timely basis across various phases of polls.[1]

This paper describes a Naive Bayesian predictive model for the 2016 U.S. Presidential Election based on Twitter data. The predicted sentiments are used to forecast the U.S. Republican and Democratic parties' candidacies.[2]

This paper aims to perform sentiment analysis of real-time 2019 election twitter data using the feature selection model word2vec and the machine learning algorithm random forest for sentiment classification.[3]

In this paper analysis on the data collected using HTML and python and was analysed using SPSS and EXCEL SHEETS were used. VADER(Valence Aware Dictionary for Sentiment Reasoning) and Statistics is used to evaluate data.[4]

In this study, a sentiment analysis application for twitter analysis was conducted on 2019 Republic of Indonesia presidential candidates, using the python programming language. In this paper comparison was carried out using naïve bayes, svm and K-Nearest Neighbor (K-NN) methods.[5]

In this paper, Election forecasting based on the poll model and Apriori Algorithm is proposed. The model predicts election results of the Hong Kong Legislative Council in 2016.[6]

V. METHODOLOGY

Our Proposed system has different phases :

A.The first phase is the data collection phase in which the data is collected from different platforms, like twitter in our case for training the algorithms.

B. The Second phase is Data-preprocessing phase: here, from the collected data we extract the useful data and discard the useless data, processes used in this phase are :

a. POS Tagging(parts-of-speech Tagging)

- It is the process of marking up words in a text with respect to a particular part of speech, based on both its definition and its context.

b. Regex for filtering data or data cleaning

- because the data we are using is social media posts which will contain all kinds of unwanted characters for example., Hashtags etc.

C.Next are the sentiment classification algorithms. This is the most important phase of our system .

D.Algorithms We studied were:

a. Naive Bayes

b. Random Forest

- c. decision tree
- d. Vader

E. After understanding the working of these algorithms we considered using **Naive Bayes** and **Random Forest**.

F. In the Final phase of our project we compare the output given by both the algorithms individually and Evaluate the Result.

G. The Evaluated Result is represented by use of graphs and pie charts.

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Fig. 2 : System Flow of proposed system

VI. RESULT & ANALYSIS

A. Experimental Results

Below given is the result of analysis on small testing data. This data was separated from training data for testing purposes.

Based on the words used in the tweets, sentences are further categorised for one candidate. For e.g. if Narendra Modi is one of the candidates for election of prime minister then bjp, narendra modi, namo etc. all these words are considered for him only. And is taken into consideration in popularity count. In this way the output we get will be very close to the outcome of the election.

On performing the statistical analysis, we get the following graph Fig. 3, Fig. 4 and Fig. 5.



Fig. 3 : Pie Chart of outcome.







Fig. 5 : Divided bar plot

B. Dataset

The dataset has a Train set of 25000 tweets and the test set has 3000 tweets. In the training data, the data has been classified using sentiment analysis into negative and positive then they were assigned 0 and 1 respectively. It has been seen that there are \sim 1240 positive tweets and \sim 1760 are negative tweets. The tweets used for training have been gathered through twitter using different hashtags related to election and stored using Python web scraper. The testing data is the random and unclassified set of collected tweets used to check whether it fits into the Machine Learning Model.

C. Evaluation Metrics

F1 score is mostly being used as the evaluation metric. It is the

weighted average of Precision and Recall. It is more suitable for uneven class distribution problems. Therefore, this F1 score formula takes both false positives and false negatives into consideration.

The important elements of F1 score are:

• True Positives (TP) - These are the correctly predicted positive values. Here, actual and predicted values are yes.

- True Negatives (TN) These are the negative values which are predicted correctly.
- False Positives (FP) When actual class is no but, the predicted class is yes.
- False Negatives (FN) When an actual class is yes but, the predicted class is no.

Precision = TP/TP+FP

Recall = TP/TP+FN

F1 Score = 2(Recall Precision) / (Recall + Precision)

Mod/Para	Accuracy	Precision	Recall	F1 Score
Naive B.	0.86	0.75	0.80	0.77
Random F.	0.87	0.71	0.87	0.78
Both Combined	0.89	0.77	0.90	0.83

Comparing Parameters Of Different Models

VII. CONCLUSION

In this project, we analyze the public sentiment towards the political candidate of choice. For this, we first preprocess the data to obtain the data in the ideal form for analyzing it. Then we apply various algorithms to get their individual results and then display the majority of results as the final output. We follow this method to get the most unbiased results with the highest accuracy.

VIII. FUTURE SCOPE

This system can be updated by adding any better classification model that we find.

With proper planning and execution this also can be used in Cloud Project using Cloud Computing.

For which we are planning to use BDaaS for the computing part.

And Google's BigTable can be used for storing Big Data on the Cloud.

IX. CHALLENGES

Challenges that can be faced are :

- Sometimes due to people targeting one candidate, the system proposed can give biased decisions.
- Also, due to implementation of multiple classifiers it can take a time more than one algorithm system.
- Sentences of the sarcasm category may not be categorized as needed.

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SECURITY ISSUES IN CLOUD COMPUTING

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ABSTRACT

Cloud computing provides consumers and enterprises with a variety of services; data storage is one of them. However, it has been recognized that data theft via the internet is a major issue. There's also the issue of data leakage and attacks on cloud storage. The goal of this work is to achieve cloud storage data security and to provide an analogous cloud storage security approach. These techniques are integrated with the results of current data, considering security concerns and user data on cloud storage, and moving toward the right security strategy based on cloud storage system attributes. This paper will delve into security issues and challenges by reducing risks and dangers. Access to information on the cloud is beneficial for some applications but also poses risks by sending data to applications that may already have security restrictions. In Cloud Computing the use of virtualization and guest OS for distributed computing may jeopardize information.

Keywords — Cloud Computing, issues and solutions, IaaS, PaaS, Data Storage, Challenges, and Issues, Data Security, CIA, Cloud Services, Cloud Models.

I. INTRODUCTION

Over the years, there has been rapid growth in Technology, Cloud computing has made cloud features and applications to wider audiences. It has eased the traditional ways of sharing data, development and has led to growth in the connected development of new technologies. Cloud Computing is widely accepted by many organizations and enterprises to reduce the maintenance and deployment costs of the servers. Among the many advantages offered by Cloud computing, the major upper hand lies in the Service models which can be represented as an X-as-a-Service (XaaS) where X stands for services like platform, software, infrastructure. Cloud Computing has several features such as virtualization, resource sharing, utility computing, and cloud storage.

Despite the high level of convenience and flexibility that cloud computing brings, the implementation of cloudbased solutions still faces limitations due to security concerns. Due to the network environment, cloud computing implementations face all the weaknesses of the network. In the meantime, cloud applications need to address network vulnerabilities as well as potential threats from people involved in the cloud, such as unknown third-party vendors and unexpected data users. This means that most cloud applications are under threat from both inside and outside. Cloud computing has several risks that include data abuse, malicious insiders, insecure interfaces and APIs, data loss, account theft or service hijacking, and many internal and external factors. A proper and accurate understanding of cloud security is a fundamental requirement for a successful cloud deployment.

II. LITERATURE REVIEW

There are numerous vulnerabilities and threats possible to the system from the perspective of security in cloud computing. We studied various research papers based on the security point of view in cloud computing and solutions on it.

The paper [1] has a detailed study of cloud computing, its characteristics, its architecture, services provided by the cloud such as SaaS, PaaS, IaaS. It explains various cloud models, cloud storage, and challenges that can be faced during deployment in the IT Sectors.

The referred paper [2] is a survey to review all crucial security aspects of cloud computing. It mentions that Cloud Security includes various factors that can be classified as Device Security, Network Security, and Data Security. It points to the major threats and vulnerabilities of cloud computing and the relative defense methods or potential solutions.

The [3] paper summarizes the cloud computing technology, the current and the upcoming future trends. It discusses which services are provided by cloud computing, what security issues and challenges can be faced, which attacks can occur on Cloud Computing. It mentions various security concerns on Common Attack Vectors, Data availability to User, Legal Issues Related to Data Control, DoS attacks, Man in the Middle attack, Malware Injection Attack, etc. to cloud.

[4] This paper studies various security issues in SaaS, PaaS, IaaS and applies methods to countermeasure advanced security as well as define stringent security policies of DevSecOps processes, Automated application

deployment, and management tools, Unified security with centralized management across all services and providers. It describes various security attacks such as Session Hijacking, Net Sniffers, SQL Injection attacks, etc.

The paper [5] summarizes the cloud model and its service, the need for cloud security, and the advantages of cloud computing. It mentions hindrances and obstacles faced during the data security and protection issues in the quick development of cloud computing.

The research paper [6] is all about the security requirements for Cloud-based C4I Security Architecture. The C4I system is the abbreviation for 'Computers' to 'Command, Control, Communication, and Intelligence'. As various countries are pushing the efficiency of defense and public sector, national innovation, and implementation of the infrastructure for cloud computing utilization environment caused by cloud-applied policies. However, the existing security requirements of information systems have difficulties solving the security vulnerabilities caused by the incorporation of cloud computing. Thus, it becomes important to append new security requirements related to cloud computing systems to existing command and control information systems.

III. DATA SECURITY ISSUES OR CHALLENGES

Cloud service providing companies store the data of their user in their servers and users don't have full control of their data. The data is stored inside the cloud service provider's server, and they have physical access to the data servers and data farms. These servers are vulnerable to various threats and as they are available all over the internet and not just local. Thus, additional security checks are needed to be implemented by the users and enterprises using the cloud services to ensure confidentiality of their data and to prevent any security vulnerabilities in the cloud that may lead to data breaches in the cloud.

A. Data Security and Storage

Data storage is an important aspect of cloud computing as it plays a major role in security and accessing data properly. In cloud computing data is handled in various stages like data creation, data storage, data access, and data deletion.

The main issue arriving in data deletion is the fundamental way the data is deleted in any system. The pointer pointing to the data address is freed and not the data itself. So, the data is still located in the drive, just the location or pointer loses its address. But this creates a problem that there may exist some characteristics of the data that can be used to reconstruct it. Thus, files can be retrieved and restored even after deleting them from the system and hardware and can be potentially risky to the data privacy. This poses the problem of data confidentiality and integrity of the system, leading to poor data confidentiality problems in the cloud.

B. Confidentiality, Integrity, and Availability (CIA)

Confidentiality, Integrity, and Availability are some of the most important properties of data security in cloud computing and cloud storage. These are the three pillars of data security.

Confidentiality is important to safeguard the sensitive data of any users or organizations in cloud computing by protecting the data from unauthorized access. Confidentiality is important to secure sensitive data in the cloud by managing roles and access rights to users properly.

Integrity means protecting information from unauthorized alteration. These measures ensure completeness of the data and only authorized system users can alter information. Integrity needs to monitor data transmission as well as data retrieval properly to the users.

Availability means providing information and data to authentic users and preventing unauthorized users from viewing and altering any data from the cloud provider. Some issues related to availability are:

- Hardware Failures
- Unscheduled software downtime
- Network bandwidth issues

IV. CLOUD COMPUTING SERVICES

A. Service Models:

The cloud deployment model specifies the sort of cloud environment possession, scalability, and access, as well as the structure and purpose of the cloud. The Cloud Deployment model defines the location of where servers should be stored and who uses it. It defines how your cloud architecture will appear, what you may alter, and

whether you will be provided with services or must design everything yourself. Cloud deployment types impact the relationship between the Xaas infrastructure and users.

1) Software-as-a-Service (SaaS):

In this paradigm, customers have the liberty to avail application services by the cloud providers. Consumers can use thin clients (such as web browsers) or APIs to access the service. The program, as well as the underlying operating system and infrastructure, are completely uncontrollable by users. The consumer's sole option for control is to change the user configuration settings. Among a few examples of Software as a Service some are Netflix, Amazon, YouTube, Salesforce, and other companies.

2) PaaS (Platform-as-a-Service):

In this model, customers can create and deploy their apps using the cloud provider's platform (languages, libraries, and tools). The core operating system and infrastructure (servers, storage, network, and so on) are completely beyond the control of consumers. Consumers will have limited ability to alter platform (environment) settings. Microsoft Azure, Amazon Web Services, Google Cloud Platform, IBM Bluemix, Amazon SimpleDB/S3, and other providers are examples of PaaS.

3) IaaS (Infrastructure-as-a-Service):

In this model, the client can provision processing, storage, network, and other resources for developing or deploying an application. The operating system, firewall, storage, and deployed apps are all under the consumer's control, but not the underlying cloud infrastructure. Digital Ocean, GoGrid, Flexiscale, Google computing engine, and other providers are examples of IaaS [4].



Fig: Diagram of SaaS, Paas & IaaS

V. CLOUD COMPUTING VULNERABILITIES

A. Cloud Vulnerabilities

A threat can lead to an occurrence that might cause harm to a system or an organization. A vulnerability is a weakness in a person, place, or thing that a threat can exploit. Threat agents exploit vulnerabilities to carry out threats. Various dangers and vulnerabilities for cloud computing are found after an extensive literature review. They are covered in further depth below:

1) Data Breaches:

A data breach is an incident that can reveal sensitive information to unauthorized persons. Data breaches can take place for many reasons of which majorly occurs for theft. In this new era of Cloud computing, security against data breaches has become one of the major concerns. Many incidents of this type have occurred in the history of computing, and more recently in the history of cloud computing. Cloud computing is a technology that provides on-demand services in terms of infrastructure, software, and platforms, making it prone to various

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types of data breaches. In the absence of security mechanisms, data owners have raised concerns about the security of transferring data to the public cloud. While cloud service providers make every effort to ensure the privacy of their customers' data, most reputable companies have had enough data breach-related incidents to cause problems.

The fine-grained control over server infrastructure that organizations have been accustomed to with on-premises data centers has been shifted to the public cloud vendor. Additionally, in recent years, news headlines filled with massive data leaks or breaches add to the cloud security concerns that many organizations may have about the public cloud.

- Encrypting in flight and at rest data
- Implementing an API based cloud access security brokers
- Monitoring, auditing, and proactively alerting
- Micro-segmentation access and network resources for users
- Backing up public cloud resources

2) Data Loss:

Corruption of data or its unavailability caused by natural disasters such as floods can be termed as Data Loss. Earthquake: simple human error, e.g., hard drive error, power failure, malware infection, etc. if a cloud administrator accidentally deletes a file. The most efficient strategy to avoid data loss is to back up your data in multiple locations and replace it with a copy available in another location if it gets corrupted or lost in one location. Is to do so.

The prevention of data loss is to protect sensitive data at rest, in transit, and on endpoints for reducing the chances of data theft or unauthorized access. Data Loss Prevention solutions aim to preserve sensitive information and confidential data from being stored, used, or transferred insecurely.

- Use good quality encryption, both on stored data and connections.
- Awareness about phishing.
- Two-Factor Authentication.
- Have a decent password policy.
- Set correct user permissions.
- Keep backups.
- Use the right cloud provider.

3) Malicious Insider:

Also known as Turn cloak, the Malicious Insider program maliciously and willfully misuses legitimate credentials, usually as a financial or personal incentive to steal information. For example, an office employee can do this kind of activity out of grudges against the organization. Turn Clocks are superior to other attackers because they are familiar with your organization's security policies and procedures, as well as their vulnerabilities.

Malicious insiders are a serious threat to an organization since they are harder to detect and prevent. Certain steps that can be taken to the enterprise policies are:

- Log Events
- Management of User Identity
- Monitoring Components
- User Access Controls

4) **Denial of Service & DDOS:**

DDoS attacks can occur from within the organization or externally and can throw into disarray all layers of the cloud system (IaaS, PaaS, and SaaS). An external cloud-based DDoS assault targets cloud-based services and originates from outside the cloud environment. This type of attack can cause issues to the customers for serviceability. The SaaS and PaaS levels in the cloud system are the most vulnerable to external DDoS attacks. Internal cloud-based DDoS attacks can take numerous forms and happen in the cloud system, in particular in the

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layers of the PaaS and IaaS. Some companies offer trial periods for their cloud services. This could be an opportunity for attackers to take advantage of the trial period. Within the cloud, an authorized user can launch a Denial of Service against the workstation. Sharing infected virtual machine images, on the other hand, might allow an attacker to take control of and use the infected virtual machines to launch an internal DDoS attack.

DDoS can be prevented with certain steps taken by organizations to reduce the risk and damage to the enterprise and users:

- Creating a proper plan for DDoS attacks.
- Secure Network Technology
- Create a CDN Network
- Monitor Network Traffic

5) Account Hijacking:

In the cloud, account hijacking is the method by which an attacker can steal or hijack a person's or organization's cloud account by stealing their account credentials through phishing and fraud techniques to engage in malicious or unauthorized behavior. If a cloud account is hijacked, then an attacker impersonates the account holder by using hacked account credentials. While cloud computing delivers benefits to enterprises, such as lower capital costs and on-demand services, it also provides cybercriminals with an environment ideal for assault since massive volumes of data are held in one location. Because data is stored and accessed on devices and resources that are frequently shared by several users, the threats posed by cloud account hijacking are numerous. Hackers might steal your information by using your personal information to gain access to cloud services. The account credentials can be stolen by techniques such as phishing and fraud. Enterprises should limit the exchange of account credentials between users and cloud services, and employ multi-factor authentication whenever possible.

Account hijacking is a major concern with the organization to protect users' privacy and keep their accounts safe. It can cause serious damage to the organization and its users. Thus, this problem needs to be prevented by:

- Multi-Factor Authentication (MFA)
- User and Access Management System
- Proper role and permission management
- Event Logs

VI. FUTURE SCOPE AND CONCLUSION

Security and privacy are major factors in cloud computing and cloud storage technology. The cloud features such as resource sharing techniques, virtualizations, and guest OS make cloud security more vulnerable and can potentially cause data loss or theft. Cloud vulnerabilities and data security issues and challenges that lie behind cloud computing and its potential solutions are addressed in this paper. All these innovations and features in cloud computing pose new issues, which must be dealt with. Technology changes at a rapid pace, thus always examining security policies and procedures and updating them is needed to protect the data and privacy of the users.

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PREDICTIVE ANALYSIS OF MOVIES ON OTT PLATFORMS USING MACHINE LEARNING APPROACH

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ABSTRACT

Movies are considered to be an important art forms, a worldwide source of entertainment, and a powerful medium for educating or indoctrinating citizens. As far as the current pandemic situation is concerned, OTT platforms act as one of the most entertaining factors and a significant stress reliever for people around the globe. This project aims to explore all the movies in popular OTT platforms, in order to gain interesting insights. This is carried out with the aid of a Kaggle dataset, collected from Netflix, Prime Video, Hulu and Disney+ API. Dataset contains the complete information of all the movies, their ratings and the corresponding OTT platforms in which they are available. It provides detailed information such as Year of release, Genre, IMDb rating, Director and the Language of each movie. Here in this project, we are using Multiple linear regression and Random Forest to analyze our data and to get meaning full insights from the data collected from different OTT platforms collected from Netflix, Prime Video, Hulu and Disney+. Furthermore, the result obtained from each of these algorithms are compared to understand their respective suitability under varied conditions.

Keywords: R, dplyr, ggplot, Netflix, Amazon Prime, Hulu, Disney+

1. INTRODUCTION

Traditionally TV has been the source of entertainment along with recording it within CDs, after the boom of technology and internet there have been many OTT (Over the Top) apps available in the market which has now a days almost replaced the traditional ways of consuming content, OTT apps like Netflix, Prime Video, Disney Plus, Hulu have emerged and are preferred more due to their ease and self-paced content consumption. Here the data is analyzed and some visualization and manipulation are carried to get a more precise and a graphical picture of the entire dataset and this will help to shed views of a particular product or topic. If people find topics relevant or interesting, then they would desire to share their opinion about the topic. The topic could be a product or any other object. Understanding this can help us decide and OTT platforms the type of movies that are popular among the people rather it be depending on reviews, rating or age group. In this project we are also using algorithms like Multiple linear regression and Random Forest to analyze our data and to get meaning full insights from the data collected from different OTT platforms collected from Netflix, Prime Video, Hulu and Disney+. Furthermore, the result obtained from each of these algorithms are compared to understand their respective suitability under varied conditions.[3]

2. RELATED WORK

- [1] In this paper Movies Reviews Sentiment Analysis and Classification, the authors main focus is how sentimental is performed here goal of this work is to address SA by constructing an approach that can classify movie reviews and then compare the results in an inclusive study of eight well-known classifiers. To evaluate the proposed model, IMDB reviews real dataset was utilized. Tokenization was applied on the dataset to transfer strings into word vector, then stemming was used to extract the root of the words, afterwards gain ratio was applied on the dataset as an attribute selection algorithm. Then, the data was split into training and testing datasets using the percentages 66%, 34% respectively. In order to compare the eight different classifiers, five different evaluation metrics are utilized. The results show that Random Forest outperforms the other classifiers. Furthermore, Ripper Rule Learning performed the worst on the dataset according to the results attained from the evaluation metrics.
- [2] Here we followed paper based on The Performance Comparison of Multiple Linear Regression, Random Forest the paper gave us an detailed classification about the processes . For comparison of there are several data mining techniques, the power production data from a Photovoltaic Module was used in the research. In this study, the model was constituted from seven variables. The highest correlation coefficient was obtained in Artificial Neural Network architecture (R = 0.997). The study by author also showed the importance of data mining method. If this study had been evaluated by MLR then the findings of the study would have been obtained biased and non-robust. So, a study must be evaluated by robust statistical methods in order to estimate a model in a high accuracy rate. This study showed that the MLP-ANN architecture has the best performance when compared with MLR and RF.

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3. PROPOSED SYSTEM

A. Data Pre-processing

Data pre-processing is a data mining technique which is used to transform the raw data in a useful and efficient format.

Steps Involved in Data Pre-processing:

1. Data Cleaning:

The data can have many irrelevant and missing parts. To handle this part, data cleaning is done. It involves handling of missing data, noisy data etc.

2. Missing Data:

This situation arises when some data is missing in the data. It can be handled in various ways.

Some of them are:

Removing NA value: This approach is suitable only when the dataset we have is quite

large and multiple values are missing within a table.

3. Filling or Skipping missing values:

There are various ways to do this task. You can choose to fill the missing values manually, by attribute mean or the most probable value. Or we can skip such values

Helps us to perform data cleaning operations on the data

dp111 = complete.cases(dp11)

dp11_11= dp11[dp111,]

dp1=dp11_11[!duplicated(dp11_11),]

code example

B. Data Visualization and manipulation of data:

Our dataset is quite large so let's visualize through graph

• Visualizing Number of Titles by each country

This graph shows number of titles of each country within different OTT platform. As we can see major titles is of USA, India and United Kingdom.



Fig. 1. Number of titles of each country

• IMDB Rating trends by year

As we see the profit yearly so plot the graph as per year of titles. Below is graph of different titles trending yearly. In these modern times as, the internet is growing so is the availability of various movies and series. With the increasing time the watching among people is also increasing



Fig. 2 Trends of each year

• Number of titles based on themes / Genre of Titles

Next graph is trend by genres of movies across different OTT platform. Majority of people like drama and comedy because they made them fresh. So, we can see the highest trend is among drama, comedy and thriller.



Fig. 3 Trends by genres

• Age Distribution of Movies

Age is the major factor of what movies or shows to watch below is the graph of age distribution. From the graph we can see majority of adult people is watching movies and shows.



• Runtime Analysis of platforms

The runtime analysis of the platforms gives us a brief idea about hours of content present across different ott platforms. Below we can see the runtime of Disney, Amazon Prime, Netflix and Hulu.



C. The Training and Testing Phase:

• Data preprocessing before training

As there are various OTT platform, we have taken a large amount of dataset so for getting a higher accuracy we need to cleanse data. So, in preprocessing step we are cleaning the data by first removing all the N.A values in the respective column age, year and IMDB. After we are selecting particular column for our processing.

dp3_ml = dp1 %>% select (Runtime ,Genres , Year,IMDb,Age) %>%

mutate(Age_i = parse_number(Age))%>% drop_na()

 $\label{eq:g_ml_spin} $$ dp3_ml \ \%>\% $ filter(is.na(Runtime)==T & is.na(Age_i)== T & Age_i!= 'all' & is.na(Year)==T & is.na(IMDb)==T) \ \%>\% $ select(Runtime,Genres,Year,IMDb,Age_i) $$ description of the select of the select$

code example

• Splitting data for training and testing training and testing set

The next step would be dividing the data into training and testing set. We divided dataset into 70% for training set and 30% for testing set

set.seed(88)

split <- sample.split(dp2_ml\$IMDb, SplitRatio = 0.70)</pre>

code example

• Multiple linear regression:

Here we are using multiple linear regression which often known as multiple

regression, is a statistical technique that predicts the result of a response

variable by combining numerous explanatory variables. MLR aims to

represent the linear relationship between the explanatory (independent)

variables and the response (dependent) variable.

model <- lm(IMDb ~., data=train)

predicted_value <- predict(model, newdata = test)</pre>

multi_linear = as.data.frame(cbind(Actual = test\$IMDb, Predicted = predicted_value))

code example



Fig 6 Multiple Linear Regression

Random Forest:

Random forest is a learning algorithm that is supervised. It creates a "forest" out of an ensemble of decision trees, which are commonly trained using the "bagging" method. The bagging method is based on the premise that combining different learning models improves the final output. Random forest has the advantage of being able to be utilize for both classification and regression issues, which make up the majority of existing systems.

model <- randomForest(IMDb ~., data=train)</pre>

predicted_value <- predict(model, newdata = test)</pre>

random_forest = as.data.frame(cbind(Actual = test\$IMDb , Predicted predicted_value))

code example

	model <- randomForest(IMDb ~., data=train)
	predicted value <- predict(model, newdata = test)
	random_forest = as.data.frame(cbind(Actual = test\$IMDb , Predicted = predicted_value))
	error = (random_forest\$Actual - random_forest\$Predicted)
	random_forest = as.data.frame(cbind(random_forest,error))
	rmse = sqrt(mean((error)^2))
	head(random_forest)
	Actual Predicted error
1	8.7 6.329825 2.370175
2	8.7 6.302840 2.397160
	8.3 6.267569 2.032431
4	8.3 6.491673 1.806327
5	8.3 6.281408 2.018592
6	8.4 6.681656 1.718344
	print(rmse)
[1	1] 1.186786

Fig 7 Random Forest

4. COMPARATIVE STUDY

The comparison of both algorithm through results can give us a better understanding about their accuracy and usefulness within the project. The Fig 6 which is for Multiple Linear regression gives us the actual value along with predicted and error value. The root mean square error is 1.203138 here. In Fig 7 which is for Random Forest, it gives us the actual value along with predicted and error value. The root mean square error we can judge that the Random Forest algorithm is much more accurate and efficient as compared to the Multiple linear regression.

5. CONCLUSION

Herein, after cleaning and removing duplicate values from data analyzed the data with respect to its IMDb ratings which as predicted using many other independent parameters. The aim of this experiment was movies on OTT analysis wherein we predict the IMDb ratings based on various other parameters using Multiple Linear Regression Algorithm and Random Forest Algorithm. For the data we used Kaggle which provided us with the data the data was around 16,744 which was later processed and manipulated to get meaning full insights. From results It is clear that the accuracy of Random Forest Algorithm with root mean square error = 1.186786 is a bit higher as compared to Multiple Linear Regression Algorithm with root mean square error = 1.203138 but as the data will increase the accuracy of the algorithms will also change. Hence the addition of more data will help us in better prediction for actual values.

6. FUTURE SCOPE

The Existing Database is of around 16k data which is not sufficient to get meaningful insights from the data that accurately. Also, this type of database is limited for processing of structured data and has a limitation when dealing with a large amount of data. So, the use of Big Data technologies like Hadoop can be used to achieve better results. We could further improve our analysis by using various different algorithms and see which gives us better accuracy.

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SOLAR POWER GRASS CUTTER

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ABSTRACT

These days we are facing the problems like pollutions, power cut problem etc. To overcome these problems, we have thought about the device, which can be performing its functions without causing any of these problems. So, we have thought of doing the project on cutting grass, this uses the renewable source of energy for its operation like solar energy. This project aims at developing a portable solar operated grass cutting device, as there is power shortage. So, we have decided to make a solar energy operated device. Solar panel is connected to the battery. Then by connecting inverter to battery DC current is converted to AC current. This will run the AC motor. This motor is connected to blade shaft by the help of belt drive. This will rotate the blade in high speed, cut the grass. This device will help in building of eco-friendly system. Current technology commonly used for cutting the grass is by the manually handled device. In this paper used novel technology. So, in this paper we are trying to make a daily purpose robot which can cut the grasses in Lawn. The system will have some automation work for guidance and other obstacle detection and the power source that is battery, and a solar panel will be attached on the top of the robot because of this reduces the power problem

Keywords— Solar Energy, Solar, Arduino, Solar Cutter.

INTRODUCTION

The first lawn mower was invented by Edwin Budding in 1830 in Thrupp, just outside Stroud, in Gloucestershire, England. Budding's mower was designed primarily to cut the grass on sports grounds and extensive gardens, as a superior alterative to the scythe, and was granted a British patent on August 3 I, 1830. [1] in 1995, the first fully solar powered robotic mower became available.

What is Solar Energy?

Solar cell can be used to generate electricity from sunlight. It is a device. that converts light energy into electrical energy. Sometimes the term solar cell is reversed for devices intended specifically, to capture energy from sunlight, while the term photovoltaic cell is used when the light source is unspecified.

Grass cutter machines have become very popular today. Most common machines are used for soft grass furnishing. In a time where technology is merging with environmental awareness. Pollution is man-made and can be seen in our own daily lives, more specifically in our own homes. Here in, we propose a model of the solar grass cutting machine powered through solar energy. Automatic grass cutting machine is a machine which is going to perform the grass cutting operation on its own. This model reduces both environment and noise pollution. The main parts of the Grass cutting machines are DC motor, relay switch for controlling motor, Battery for charging it through solar panel. It is placed in a suitable machine structure. The motors having 12000rpm and 200rpm are connected to the electric supply using a roll of wire. The linear blades are attached in this machine. Working principle of the grass cutter is providing a high-speed rotation to the blade, which helps to cut the grass. The blade will get kinetic energy while increasing the rpm. The cutting edges are very smooth and accurate. Also, electric grass cutting machines are much easier to be used in garden, lawn, and grass fields. To enhance the beauty of home-lawns and gardens, Grass cutting machines are the best available option in the industry. With the help of a lawn mower which is a machine with revolving blades to help us cutting lawns at even length, people can easily maintain and beautify their lawns and gardens without any hassle. The system uses an Arduino Mega microcontroller, Battery, DC motors, Ultrasonic sensor, and Solar panel. The main source of power is the solar panel which is used to charge the lithium-ion battery. The battery provides the power supply to the Arduino. The DC motors and the sensors are interfaced with the Arduino. The Ultrasonic sensor is an obstacle detection sensor. It detects any obstacle present in that range. The Accelerometer sensor is a lifting detection sensor. It stops the working if the vehicle is above the ground. The DC motors are used to move the grass cutter and rotate the cutting blade. Depending upon the input to the sensor the Arduino controls the grass cutter. This project of solar powered automatic grass cutter will relieve the consumer from mowing their own lawns and will reduces both environmental and noise pollution. Ultimately, the consumer will be doing more for the environment while doing less work in their daily lives.

In the conventional grass cutter, we add so many things new. There is not any fuel consumption and maintenance part. The grass cutter is totally operated on so lar energy, so that the pollution and usage of fuel

controlled. The grass cutter becomes automated because of the controlling mechanism i.e., Arduino. And the obstacles are also detected by the ultrasonic sensor. The speed of vehicle is controlled. The so lar grass cutter is used in various applications such as various types of ground. This project reduces the human effort, as well as environmental and no is pollution.

Objective

Solar grass cutter is a fully automated grass cutting robotic vehicle powered by solar energy that also avoids obstacles and is capable of grass cutting without the need of any human interaction. The system uses batteries to power the vehicle movement motors as well as the grass cutter motor. We also use a solar panel to charge the battery so t there is no need of charging it externally. The grass cutter and vehicle motors are interfaced to Arduino family Arduino that controls the working of all the motors. It is also interfaced to an ultrasonic sensor for object detection. The Arduino moves the vehicle motors in forward direction in case no obstacle is detected. On obstacle detection, ultrasonic sensor monitors it, and the Arduino thus stops the grass cutter motor to avoid any damage to the object/human/animal. Arduino then turns the robotic vehicle off until it gets clear of the object and then moves the grass cutter in forward direction again.

Block Diagram and Its Description



Fig. 1 Block-Diagram

Solar cell can be used to generate electricity from sunlight. It is a device that converts light energy into electrical energy. Sometimes the term solar cell is reversed for devices intended specifically to capture energy from sunlight, while the term photovoltaic cell is used when the light source is unspecified. The design of solar powered agricultural equipment will include direct current (DC) motor, a rechargeable battery, solar panel, a stainless-steel blade, and control switch. The automatic grass cutting machine is going to perform the grass cutting operation by its own which means no manpower is mandatory. The purpose of the project here is to design and build a remote-controlled grass cutter. In our project we used Arduino Uno, HC-SR05 Ultrasonic sensor, HC-05 Bluetooth module, motor driver module, solar panel, charging controller, battery, motors. Arduino Uno is the interface with Bluetooth module, motors, ultrasonic sensor, and battery. Bluetooth module is connected to Arduino for transmission and reception of the signals. Bluetooth modules send the signal and then our two motors start there working. One motor is used for the grass cutting. And other for vehicle movement, and we used motor driver for cont. and give the power supply to the motors. We used Ultrasonic sensor to obstacle detection. The Arduino moves the vehicle in the forward direction in case no detected obstacle. If in case any obstacle is detected by the sensor then the Arduino stops the vehicle motor and avoid any damage to object/ Human/animal/ coming. We use Bluetooth Arduino Controller application for the sending command to the Bluetooth module. Then Bluetooth module forward the command to the Arduino board. Then according to the instruction Arduino board will move the motor. Motor driver are used to amplify the current and it is connected to the Arduino board. They instruction forwarded by the Arduino to the motors via motor driver for the driving purpose. Arduino board is also interfaced with ultrasonic sensor, ultrasonic sensor transmits the sound waves and that sound waves gets hit by the obstacle wherever it is present. Then the signal reflects to the sensor after it gets hit by the obstacles such signal is known as echo signal. According to time. required by the signal to get reflected to the sensor and the speed of signal we calculate the distance between sensor and the obstacle. Arduino is also interfaced with buzzer. When the grass cutter is in the range between 10m to 5m the buzzer enables, and it starts giving indications. When the grass cutter comes in the range of 5m the movement of grass cutter, operation of motor and buzzer gets stop. One more motor is used interfaced with the blades for the grass cutting purpose. The solar panel is used to charge the battery and battery is used i to provide power supply to the components. As it is solar based grass cutter it does not required gas or petroleum. So that it is not hazardous to the environment.

Circuit Diagram and Its Description



Fig. 2 Circuit-Diagram

In our project we used Arduino Uno, HC-SR05 Ultrasonic sensor, HC-05 Bluetooth module, motor driver module, solar panel, charging controller, battery, motors buzzer, linear blades We uses Bluetooth Arduino Controller application for the sending command to the Bluetooth module. Then Bluetooth module forward the command through the transmission pin (TXD) to the Arduino board and the signals from Bluetooth module is received at receiving pin (RXO) of Arduino board. Now the receiving pin of Bluetooth module i.e. (RXD) is connected to the transmitting pin (TXI) of Arduino board. Then these signals are forwarded to the motor of both sides. The Vcc pin of Bluetooth module is connected to the 5v power supply, and the ground pin is connected to the ground. In our project we have used three motors out of which two of them are of (200rpm) used to drive the vehicle. These two motors are connected to the motor driver via pin A1 and pin A2 for right hand side motor and pin B1 pin B2 for left hand side motor. Another motor is interfaced with the blade is of (12000rpm) to cut the grasses. This motor gets power supply directly from the battery. Now the motor driver is connected to the Arduino board of pin 11 and pin 12 for right hand side motor and pin 8 and pin 9 for left hand side motor. The ultrasonic sensor transmit signal through the trigger pin which is connected to the pin 3 of Arduino board and the reflected signal arrived that echo pin of sensor which is connected to the pin 4 of Arduino board. Vcc pin of sensor is connected to the power supply and ground pin is grounded. Whenever an obstacle presents between the path of vehicle the signals from the sensor gets reflected to it and according to the time and speed required by the signals to travel the distance between obstacle and vehicle are calculated. When the range of obstacle is between 10cm to 5cm buzzer gets unable and start giving indications. When the range of obstacle is below or equal to 5cm the vehicle stops moving as well as the operation of buzzer and Arduino gets stop. The buzzer is connected through the Arduino board to pin no.

Hardware and Software

Sr.No	Requirement
1	Arduino Uno Board
2	Ultrasonic Sensor (HC-SR05)
3	Bluetooth Module (HC-05)
4	Motor Driver (L293D)
5	DC Motors [1200 rpm, 200 rpm (2 pcs)]
6	Buzzer
7	Solar Panel (6×10 cells)
8	Battery
9	Arduino IDE

Table 1 Equipment Required

Arduino Uno



Fig. 3 Arduino Uno Board

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller, simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to - serial converter.

Ultrasonic Sensor



Fig. 4 Ultrasonic Sensor

Ultrasonic sensors overcome many of the weaknesses of IR sensors they provide distance measurement regardless of color and lighting of obstacles They also provide lower minimum distances and wider angles of detection to guarantee that obstacles are not missed by a narrow sensor beam. This model is an upgrade from the lower precision HC SRO4. This has 5 pins and can be used in 1-pin trigger/echo or 2-pin.

Bluetooth Module



Fig. 5 Bluetooth Module

The HC-05 is a very cool module which can add two-way (full-duplex) wireless functionality to your projects. Bluetooth Communication is a 2.4GHz frequency-based RF Communication with a range of approximately 10 meters. It is one of the most popular and most frequently used low range communication for data transfer, audio

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systems, handsfree, computer peripherals etc. You can use this module to communicate between two microcontrollers like Arduino or communicate with any device with Bluetooth functionality like a Phone or Laptop. There are many android applications that are already available which makes this process a lot easier, the HC-05 can be set as Master as well which enables making a communication between two separate Arduino Boards. There are several different versions of this this module, but I recommend the one that comes on a breakout board because in that way it's much easier to be connected. The HC-05 module is a Bluetooth SPP (Serial Port Protocol) module, which means it communicates with the Arduino via the Serial Communication. The module communicates with the help of USART at 9600 baud rates hence it is easy to interface with any microcontroller that supports USART. We can also configure the default values of the module by using the command mode. So, if you are looking for a Wireless module that could transfer data from your computer or mobile phone to microcontroller or vice versa then this module might be the right choice for you. However, do not expect this module to transfer multimedia like photos are songs, you might have to investigate the CSR8645 module for that. The aim of this circuit is to connect the Bluetooth Module with Arduino, Pair the Bluetooth Module with an Android Phone, send data from Android Phone to the Bluetooth Module using a simple App, read the data from Bluetooth Module through Arduino and finally, display the data and control a device based on the data.

Motor Driver



Fig. 6 Motor Driver

This module is a medium power motor driver perfect for driving DC Motors and Stepper Motors. It uses the popular L293D motor driver IC. It can drive 4 DC motors in one direction or drive 2 DC motors in both the directions. L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction. It means that you can control two DC motor with a single L293D IC. Dual H-bridge Motor Driver integrated circuit (10). The 1293d can drive small and quiet big motors as well, check the Voltage Specification at the end of this page for more info. It works on the concept of H-bridge. H-bridge is a circuit which allows the voltage to be flown in either direction. As you know voltage need to change its direction for being able to rotate the motor in clockwise or anticlockwise direction, Hence H-bridge IC are ideal for driving a DC motor. In a single L.293D chip there are two h-Bridge circuit inside the IC which can rotate two de motor independently. Due its size it is very much used in robotic application for controlling DC motors.

DC Motor



Fig. 7 DC Motor

A direct current or DC motor converts electrical energy into mechanical energy. It is one of two basic types of motors: the other type is the alternating current or AC motor. Among DC motors, there are shunt-wound, series-wound, compound-wound, and permanent magnet motors. DC motor is an electric motor that runs on direct current power. Practical DC Motor consists of field windings to provide the magnetic flux and armature which
acts as the conductor. Brushless DC Motors Work. The input of a brushless DC motor is current/voltage, and its output is torque. A DC motor is an electric motor that runs on direct current power. In any electric motor, operation is dependent upon simple electromagnetism. A current carrying conductor generates a magnetic field, when this is then placed in an external magnetic field, it will encounter a force proportional to the current in the conductor and to the strength of the external magnetic field. It works on the fact that a current carrying conductor placed in a magnetic field experiences a force which causes it to rotate with respect to its original position.

Buzzer



Fig. 8 Buzzer

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke. A buzzer or beeper is a signaling device, usually electronic, typically used in automobiles, household appliances such as a microwave oven, or game shows. It most commonly consists of several switches or sensors connected to a control unit that determines if and which button was pushed or a present time has lapsed, and usually illuminates a light on the appropriate button or control panel and sounds a warning in the form of a continuous or intermittent buzzing or beeping sound. Initially this device was based on an electromechanical system which was identical to an electric bell without the metal gong (which makes the ringing noise). Often these units were anchored to a wall or ceiling and used the ceiling or wall as a sounding board. Another implementation with some AC connected devices was to implement a circuit to make the AC current into a noise loud enough to drive a loudspeaker and hook this circuit up to a cheap 8-ohm speaker. Nowadays, is more popular to use a ceramic-based piezoelectric sounder like a sun alert which makes a high-pitched tone. Usually these were hooked up to "driver circuits which varied the pitch of the sound or pulsed the sound on and off. In game shows it is also known as a "lockout system, because when one person signals (buzzes in"), all others are locked out from signaling. Several game shows have large buzzer buttons which are identified as "plungers. The word "buzzer comes from the raping noise that buzzers made when they were electromechanical devices, operated from stepped down AC line voltage at 50 or 60 cycles. Other sounds commonly used to indicate that a button has been pressed are a ring or a beep. Some systems, such as the one used on Jeopardy, make no noise at all, instead using light

Solar Panel



Fig. 9 Solar Panel

Solar panels are devices that convert light into electricity. They are called "solar panels because most of the time, the most powerful source of light available is the Sun, called Sol by astronomers. Some scientists call them photovoltaics which means, basically, "light electricity. A solar panel is a collection of solar cells. Lots of small solar cells spread over a large area can work together to provide enough power to be useful the lighter data hits a cell, the more electricity it produces, so spacecraft are usually designed with solar panels that can always be pointed at the Sun even as the rest of the body of the spacecraft moves around, much as a tank turret can be aimed independently of where the tank is going.

Battery



Fig. 10 Battery

A battery consists of some number of voltaic cells Each cell consists of two half-cells connected in scries by a conductive electrolyte containing metal cations. A battery generally consists of an anode, a cathode, and an electrolyte. Common types of commercial batteries and some of their characteristics and advantages are summarized in the following table Battery types not shown include the Zinc-Air, Flooded Lead Acid, and Alkaline batteries. The terminal voltage of a cell that is neither charging nor discharging is called the open circuit voltage and equals the cmf of the cell. The 5V to 9V voltage generated by a battery depends on the chemistry of the electrochemical cell and how many cells are stacked in series The 2A current produced by the battery depends on the number of charges freed during the electrochemical reaction. For instance, in an alkaline battery, the anode is typically made of zinc, and manganese dioxide acts as the cathode. And the electrolyte between and inside those electrodes contains ion. The anode is known as the reducing agent because it loses electrons.

RESULT AND CONCLUSION

This project is more suitable for a common man as it is having much more advantages i.e., no fuel cost, no pollution and no fuel residue, less wear and tear because of a smaller number of moving components and this can be operated by using solar energy. The people and can be easily handled. This solar powered grass cutter mower will meet the challenge of environmental production and low cost of operation since there is no cost for fueling. A solar powered lawn mower has been lawn where tractor driven mowers could not be used. The machine capacity is adequate for its purpose. The machine has proved to be a possible replacement for the gasoline powered lawn mowers. This grass cutter occupies less space and light in weight and as it uses nonconventional source of energy hence running cost is zero. It has facility of charging battery while grass cutter is in the working condition. This system is having facility of charging the batteries while the solar powered grass cutter is in motion. So, it is much more suitable for grass cutting also. The same thing can be operated in nighttime also, as there is a facility to charge these batteries in day light. The cost of solar based grass cutter is less than the market grass cutter Grass cutter is used to keep the lawn clean and uniform in schools, gardens, and playgrounds.

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DESIGN & PERFORMANCE ANALYSIS OF MICROSTRIP ANTENNA ARRAYS FOR RF POWER HARVESTING FOR WIRELESS SENSOR NETWORKS

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Abstract— Present day technologies are emerging with considerable improvements in Wireless Networks (WN). These WNs mainly rely on Energy harvesting i.e. Radio Frequency Power Harvesting. The fundamental of RF Energy Harvesting is to collect ambient RF power, process over it and provide gathered voltage to low power consuming devices in Wireless Sensor Networks (WSNs). Different microstrip array antennas structures are simulated and the optimum antenna feeding system is decided based on the different antenna parameters in this paper. The designed antennas provide return losses (S11) in the range of -10.2dB to -20.17dB at frequencies around 2.45GHz by using FR-4 dielectric substrate with permittivity, ε_r = 4.4 and height, h =1.588 mm. The gain of antennas after simulation is found about 15dB and an effort to maintain side lobe level lower than main lobe is achieved successfully. To collect ambient RF signals, an antenna or an array of antennas are used which resonate at 2.4 GHz. In this work, we have compared different antenna arrays that give comparable results to harvest RF energy.

Keywords- MIMO, Array

I. INTRODUCTION

Wireless Power Transmission (WTP) and Electromagnetic Energy Harvesting (EEH) are current technologies that are gaining importance as the Internet of Things (IoT) era is exponentially growing. This is so because of the passive devices like sensors used in IoT, which consume low power and are generally considered as passive devices. EEH is the better solution where an antenna and rectifier circuitry is used to make the IoT devices battery-less. A circuitry with an antenna and a rectifier is known as Rectenna. Most of the Rectennas are designed at ISM and GSM band frequencies. In the era of information and communication technology, the most important backbone of the system is to be provided by the IoT. A self-sustaining network of objects is much needed to ensure functioning of the communication network. These objects will play the role of sharing information and sensing the information of the surrounding environment once they are powered. Thus, it makes imperative to have a power source to keep the network functioning and eco-friendly as well. Among the non-conventional sources, EEH is the most affordable and eco-friendly solution.

During the past decades, wireless systems have grown vastly and have presented engineers with newer demands and challenges. The trend of integrating the entire system on a single chip or board has garnered exuberance. This has forced the engineers to design miniature, power efficient and conformable antennas. Moreover, multiband system of antennas have been receiving considerable attention. This current requirement has initiated researchers to become active in field of filters, multiband antennas, etc.

In addition, mobile and wireless communication has developed rapidly due to which spectrum resources become more and more tenser in the recent years. In order to meet the growing demand of the users achieving multiband frequency work in the communication system, therefore, the studies of multiband antenna becomes a prime importance.

Different microstrip antenna array configurations give high gain, improved bandwidth and efficiency intrinsically. The voltage distribution among the weather of an array depends on feeding network design. All the induced voltages are often fed into single point if suitable feeding network is employed [3]. Higher efficiency for the microstrip antenna are often achieved with proper impedance matching and tuning when using corporate or series feed array configuration [4]. Beam steering with the assistance of phase transition are often done by using corporate feeding, also, power distribution among the weather are often modified [5]. The selection of design parameters like dielectric substrate material, height of substrate and operating frequency, etc. is very important as antenna performance depends on such parameters. Performance of radiation are often improved by proper usage of varied structures of design [6]. the dimensions of a microstrip antenna are often reduced by using high permittivity substrates [7]. Using thick substrates can surely offer wide bandwidth and better efficiency, but it'll cause larger footprint of the antenna [8]. An uniaxial substrate can produce high gain and radiation efficiency in mm wavelength if micro strip antenna is employed alongside superconducting patch [9]. The resonating micro strip antenna length and radiation efficiency fades if there's discontinuities during a micro strip patch [10].

II. MICROSTRIP PATCH ANTENNA, ARRAY AND FEED DESIGN

. The mathematical equation equations for designing of patch antenna are as follows [11, 12 and 13].

$$W = \frac{c}{2f_0\sqrt{\frac{(\ell_F+1)}{2}}}\tag{1}$$

$$\varepsilon_{eff} = \frac{\varepsilon_r + 1}{2} + \frac{\varepsilon_r - 1}{2} \left[1 + 12 \frac{h}{w} \right]^{-\frac{1}{2}}$$
(2)

$$L_{eff} = \frac{c}{2f_0 \sqrt{\varepsilon_{eff}}} \tag{3}$$

$$\Delta L = 0.412h \frac{(\varepsilon_{eff} + 0.3)(\frac{W}{h} + 0.264)}{(\varepsilon_{eff} - 0.258)(\frac{W}{h} + 0.8)}$$
(4)

$$L = L_{eff} - 2\Delta L \tag{5}$$

Equations 6 to 8 are been used to calculate the radius of the circular patch [10]

$$a = F\{1 + \frac{2h}{\pi F \varepsilon_r} \left[\ln\left(\frac{\pi F}{2h}\right) + 1.7726 \right] \}^{-1/2}$$

Where,

$$F = \frac{8.791 \times 10^9}{f_r \sqrt{\varepsilon_r}} \tag{6}$$

$$a_e = a\{1 + \frac{2h}{\pi a \varepsilon_r} \left[\ln\left(\frac{\pi a}{2h}\right) + 1.7726 \right] \}^{1/2}$$
(7)

$$R_j = \frac{8.33 \times 10^{-5} nT}{I_b + I_s} \tag{8}$$

Microstrip patch antennas also are utilized in arrays like those in single element designs. Radiation over narrow band of frequencies and low power operating levels unlike those of waveguide, coaxial or maybe stripline are a number of the restrictions that a microstrip antenna faces [2]. These limitations are often common in array configurations, feeding techniques and dielectric material selection.. A microstrip array are often fed using single or multiple feed lines during a corporate feed network arrangement [12, 13]. Supported their feeding methods, they will be classified as

- Series feeding network
- Corporate feeding network
- Corporate-series feeding network

III. RECTENNA DESIGN

Rectenna is a structure in which is a rectifier connected along the antenna output. The RF energy received from antenna is converted into DC voltage by the rectifier which can be used to power the RFID tag or sensor. The Rectenna design has four subsystems: (1) Receiving antenna structure, (2) the matching stub sections, (3) the rectification circuit , and (4) the post-rectification filter.

Generally, Schottky diodes, are preferred as they have a low forward conduction voltage.

Different Types of Voltage Multipliers are as follows:

- 1) Cockcroft-Walton Voltage Multiplier
- 2) Dickson Voltage Multipliers
- 3) Mandal-Sarpeshkar Voltage Multiplier
- 4) Voltage Multiplier with Vt-Cancellation
- 5) Bergeret Voltage Multiplier

Different Types of charge pump topologies are currently available like Dickson method and Cockcroft-Walton Voltage Multiplier. These all methods have their own benefits and trade-offs, and also include several stages of shunt capacitors connected with series diodes. Each stage features a capacitor that holds charge.

IV. ANTENNA DESIGN CONFIGURATIONS & SIMULATIONS

A. Single Patch Antenna

The illustrative rectangular and circular antenna element structures are shown in the figure below:



Figure 1: Antenna Element Structure



Fig 2: Single Patch Antenna



Fig 3: Single Patch Antenna VSWR

B. 4x1 Circular Patch Antenna Array



Fig 4: 4x1 Circular Antenna Array



Fig 5: 4x1 Circular Antenna Array VSWR

C. 2x2 Circular Patch Antenna Array



Fig 6: 2x2 Circular Antenna Array



Fig 7: 2x2 Circular Antenna Array VSWR

D. 2x4 Circular Patch Antenna Array



Fig 8: 2x4 Circular Antenna Array



Fig 9: 2x4 Circular Antenna Array VSWR

V. RECTENNA DESIGN USING SCHOTTKY DIODE

The Spice parameter characteristics of Schottky Diode HSMS-2850 has following ,value of R_j which can be calculated

$$R_j = \frac{8.33 \times 10^{-5} nT}{I_b + I_s}$$

Schottky Diode design simulated in ADS software is as shown in figure below:



Fig 10: Schottky Diode Equivalent Design

Dickson's model using Schottky Diode:

VI. RESULTS

The performance of the designed antenna array is analyzed in ANSYS HFSS software. As per analysis, various antenna parameters have been studied like mutual coupling, impedance matching, radiation pattern, directivity, return loss, VSWR and gain.

Sr. No	Antenna Type	Gain	
1	Single Rectangular Patch	-10.3dB	
2	4x1 Circular Patch Array	-10.05dB -17dB	
3	2x2 Circular Patch Array		
4	2x4 Circular Patch Array	-20.0748dB	

Comparing the results of all the simulated antennas, it is observed that the gain of antenna increases as we increase antenna array elements. Such an antenna array can be efficiently used for energy harvesting applications.

VII. CONCLUSION

The antennas designed are simple, cost effective with improved gain. The optimization of different parameters are executed to achieve smaller dimensions and high radiating efficiency which will enhance the performance of RF Power harvesting. The future scope includes interfacing of designed antenna array with rectifier circuit and calculate RF energy Voltage and efficiency.

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Fig 12: Return Loss of Antenna Element

At operating frequency 2.4 GHz, for rectangular patch VSWR is observed as 1.08 and for circular patch VSWR is observed as 1.16. Observed a gain of 10.3dB for rectangular patch and 20.0748dB for the circular patch antennas at the operating frequency of 2.4 GHz. From the results it can be observed that the shape of the radiating elements is not having any effect on the gain of the antenna.

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GESTURE CONTROLLED SMART AUTOMATION

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ABSTRACT

A Smart Home System gives access to the controllable household appliances and may help render the electricity supply in a household, controlling use and along these lines lessening utilization. It has also proven to be an incredible advantage for the elderly and disabled. A form of home automation systems called assistive domotics provides an extensive feature range that can help the ones with particular accessibility concerns in their homes. These technology systems and assisting equipment have emerged as a viable option for the needy, who would rather stay in their homes than move to assisted living facilities. Home Automation system provide user to select the appliance to be controlled through a display which shows the list of appliances in a drag-able fashion. The user can swipe through the devices by moving a hand in left or right direction and switch the appliance ON or OFF by moving a hand in an upward or downward direction. Hence, the system provides comfort to the specially-abled and simultaneously, it also keeps the caretakers.

Keywords-Automation, Home Appliances, Gesture-based Automation, Security

INTRODUCTION

HOME Automation is the automation is also called domotics. Home automation is a technique of remotely controlling the different appliances present in the house such as lights, appliances, cooling systems which are connected to each other via an internal network. Today, by having a home automation control system on a smartphone device can let us know the status of a particular appliance or system, i.e. ON/OFF over a long distance. Home automation is a new trend in a consumer market [1]. There are many home automation systems with different features and facilities. All the home automation systems are used to control home appliances through a remote control. The remote control can be a stationed unit or a wireless remote. The remote used for controlling appliances usually have keys or touch-based sensors. In this project, a home automation system is designed which can be controlled by gestures. In a smart home environment, ideally a home owner should be able to exercise her control of home appliances in a convenient and natural way [3]. Among various control methods, hand gesture is the most convenient and natural way for the control of smart home. Among various ways of detecting hand gestures, the wearable device provides an effective way for getting a user's hand gesture with the advantages of low cost and transparency. There are two ways to detect hand gesture using wearable devices user dependent model and user independent model [4].

Each module has its own advantage and disadvantage. In this research, we propose a new hybrid combining the advantages of user dependent user independent modules. Our research investigates which model among three is the best approach for recognizing hand gestures [2].

OBJECTIVE

. The objective of the home automation system is to create a system that can control home appliances using any one of the two assigned methods: - 1. Gesture-based 2. Web based. Disabled or old aged people who can't walk require an effortless way of accessing things around them which must be served systematically and efficiently. This idea integrates automation with technology [5]. Traditional home automation systems are not suitable for aging populations or disable persons. It's for those who cannot perform basic activities efficiently. Home automation systems are used to control home appliances through remote control (smartphone). Web-based automation and gesture-based automation provides an advantage to those people who are physically unable for efficiently performing the day-today activities. Many gesture tracking technologies which predominantly include attached hand gloves to sensors or special feature gloves - To overcome situations where normal cabling is difficult or financially impractical. • It can be used in home applications system where short-distance communication is required. • Suitable for physically impaired people to operate the devices within the home. • To provide comfort and convenience for common users as well, especially in the home system [1].

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Block Diagram



Fig. 1 Block Diagram of Gesture Based Home Automation System

PROPOSED METHODOLOGY

Once the circuit is powered, the Arduino board loads the required libraries. The user needs to press the switch to initialize the automation system. Initially, the appliances are switched OFF by passing a LOW logic at the Arduino pins connecting the relays. Some initial messages are passed to the LCD module and the module starts displaying the horizontal list of appliances. The user can swipe through the appliances by hovering finger left or right over the gesture module. On hovering the finger upwards, the selected appliance is switched OFF by sending LOW logic at the respective Arduino pin connecting the relay that controls the respective appliance. On hovering the finger downwards, the selected appliance is switched ON by sending HIGH logic at the respective Arduino pin connecting the respective appliance [4].

The gestures of moving finger upward, downward, left, right, far and near are detected by using the Sparkfun library's readGesture() method and accordingly, the value of certain variables is changed in the code. The status of these variables is traced to determine the selected appliance and changing the ON/OFF status of the current appliance on the list. The proximity detection feature of the module is used to control all the appliances together. If the finger is brought near the sensor module, all the appliances are switched ON and if the finger is taken away from the sensor module, all the appliances are switched OFF [2]

HARDWARE COMPONENT Arduino UNO



Fig. 2 Arduino UNO

The **Arduino Uno** is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion board (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts. It is similar to the Arduino Nano and Leonardo [3].

APDS-9960 gesture sensor



Fig. 3 APDS-9960 gesture sensor

The Broadcom APDS-9960 is a digital RGB, ambient light, proximity and gesture sensor device in a single 8pin package. The device has an I²C compatible interface providing red, green, blue, clear (RGBC), proximity and gesture sensing with IR LED. The RGB and ambient light sensing feature detects light intensity under various lighting conditions and through various attentuation materials including darkened glass [1]. Gesture detection utilizes four directional photodiodes, integrated with visible blocking filter, to accurately sense simple UP-DOWN-RIGHT-LEFT gestures or more complex gestures. The addition of micro-optics lenses within the module provides high efficient transmission and reception of infrared energy. An internal state machine allows the device to be put into a low power state between RGBC, proximity and gesture measurements providing very low power consumption [4].

Transistor (BC547)



Fig. 4 Transistor (BC547)

BC547 transistor pinout or pin diagram has three pins, starting from left: collector, emitter, and base respectively. BC547 has three pins called the emitter, collector, and base respectively. BC547 transistor acts as a switch between the collector and emitter. If the base of the transistor is given enough current, this switch closes and the current flows from the collector to the emitter. So a small current to the base pin of the transistor switches the large current between the collector and the emitter. BC547 is also used for the amplification of the input signals. A small amount of current at the base is used to control a large amount of current between the collector and emitter. So basic applications of BC547 are switching and amplification [5]

12V Relay



Fig. 5 12V Relay

A **relay** is an electrically operated switch. It consists of a set of input terminals for a single or multiple control signals, and a set of operating contact terminals. The switch may have any number of contacts in multiple contact forms, such as make contacts, break contacts, or combinations thereof.

Relays are used where it is necessary to control a circuit by an independent low-power signal, or where several circuits must be controlled by one signal. Relays were first used in long-distance telegraph circuits as signal repeaters: they refresh the signal coming in from one circuit by transmitting it on another circuit. Relays were used extensively in telephone exchanges and early computers to perform logical operations [2].

The traditional form of a relay uses an electromagnet to close or open the contacts, but other operating principles have been invented, such as in solid-state relays which use semiconductor properties for control without relying on moving parts. Relays with calibrated operating characteristics and sometimes multiple operating coils are used to protect electrical circuits from overload or faults; in modern electric power systems these functions are performed by digital instruments still called protective relays [1].

Latching relays require only a single pulse of control power to operate the switch persistently. Another pulse applied to a second set of control terminals, or a pulse with opposite polarity, resets the switch, while repeated pulses of the same kind have no effects. Magnetic latching relays are useful in applications when interrupted power should not affect the circuits that the relay is controlling [2].

CONCLUSION

The objective of this seminar is to develop such a system which will help the physically impaired to control home appliances by hand gestures using an accelerometer. This provides comfort and convenience for common users as well, especially in home systems. Wireless technology is used for home automation for physically impaired. In this system physical impaired people use the home appliances very easily or they are comfortable with using the devices [4]. This system is simple for operating the devices, this will be replaced by the remote-control instead of pushing the button there for this system will be very suitable for operating the home appliances [3].

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MACHINE LEARNING MODEL FOR PERSONALIZEDMOVIE RECOMMENDATION

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ABSTRACT

Recommender systems are one of the most successful and widespread application of machine learning technologies in business. This is information filtering approach that is used to predict the preference of that user.

Recommender System is a tool helping users find content and overcome information overload. It predicts interests of users and makes recommendation according to the interest model of users. It also help users to find the movies of their choices based on themovie experience of other users in efficient and effective manner without wasting much time in useless browsing.

Keywords—Recommendation systems, collaborative filtering, dataset, machine learning, user based recommendations

I. INTRODUCTION

A recommendation system is a type of information filtering system which attempts to predict the preferences of a user, and make suggests based on these preferences.

In the browser, if we search movie name it will give similar movies related to that input movie. This is done by three recommendation engine such as popular based recommendation engine, content-based recommendation engine. The popular based recommendation engine is nothing but trending list on YouTube, Netflix, etc. They will keep on tracking the video views and update the on-trending list.

Recommendation systems have become well known nowadays, be it in the field of entertainment, education, etc. Earlier, the users needed to settle on choices on what books to purchase, what music to tune in to, what motion pictures to watch and so on. Commercial movie libraries effectively exceed 15 million films, which boundlessly exceeds the visual ability of any single individual. With a large number of motion pictures to browse, individuals now and then get overpowered.

1.1 Collaborative Filtering

Collaborative filtering is a technique for predicting unknown preferences of people by using already known preferences from manyusers An example of collaborative filtering based on a ratings system One approach to the design of recommender systems that has wide use is collaborative filtering. Collaborative filtering is based on the assumption that people who agreed in the past will agree in the future, and that they will like similar kinds of items as they liked in the past. The system generates recommendations using only information about rating profiles for different users or items. By locating peer users/items with a rating history similar to the current useror item, they generate recommendations using this neighbourhood. Collaborative filtering methods are classified as memory-based and model-based. A well- known example of memory-based approaches is the user- based algorithm, while that of model-based approaches is the Kernel-Mapping Recommender. A key advantage of the collaborative filtering approach is that it does not rely on machine analysable content and therefore it is capable for accurately recommending complex items such as movies without requiring an "understanding" of the itemitself

For an instance, assume two users named James and Creed, who have very comparable tastes. If the ratings, which both have stated, are very similar, then their resemblance can be determined by the fundamental algorithm. In such cases, there is a high probability that the ratings where in just one of them has definite value, are also likely to be similar. This similarity can be used to make interpretations about partly stated values.

1.2 Content Based Filtering

A Content-Based movie recommendation system uses the data provided by users such as ratings, feedback, and reviews. A user profile is generated using this data which is then used to make recommendation to the user. The engine becomes more accurate and robust, as the user takes more actions or provides more inputs on the recommendation system. Also, Term Frequency (TF) and Inverse Document Frequency (IDF) are used to retrieve the information and for content-based engine.

Here, the system uses your features and likes in order to recommend you with things that you might like. It uses the information provided by you over the internet and the ones they are able to gather and then they curate recommendations according to that ,The goal behind content-based filtering is to classify products with specific

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keywords, learn what the customer likes, look up those terms in the database, and then recommend similar things. This type of recommender system is hugely dependent on the inputs provided by users, some common examples included Google, Wikipedia, etc. For example, when a user searches for a group of keywords, then Google displays all the items consisting of those keywords. The below video explains how a content-based recommender works.

2. TECHNIQUES USED IN METHODOLOGY

The proposed solution is for improving the scalability and quality of the movie recommendation system. For computing similarity between the different movies in the given dataset efficiently and in least time and to reduce computation time of the movie recommender engine we used cosine similarity measure. To check if a review to the same is positive or not we have used sentimental analysis method Naive Bayesclassifier.



Fig -1: Architecture of the Movie RecommendationSystem

A Content-Based movie recommendation system uses the data provided by users such as ratings, feedback, and reviews. A user profile is generated using this data which is then used to make recommendation to the user.

The engine becomes more accurate and robust, as the user takes more actions or provides more inputs on the recommendation system. Also, Term Frequency (TF) and Inverse Document Frequency (IDF) are used to retrieve the information and for content-based engine.

similarity(A,B) =
$$\frac{A \cdot B}{\|A\| \times \|B\|} = \frac{\sum_{i=1}^{n} A_i \times B_i}{\sqrt{\sum_{i=1}^{n} A_i^2} \times \sqrt{\sum_{i=1}^{n} B_i^2}}$$

They are used to determine relative information such as

Movie, article, etc. Content-Based Filtering For theimplementation of a content-based filtering system following steps to be done:

- Terms Allocation
- Terms Representation
- Learning Algorithm Selection
- Provide Recommendations

B.Term Frequency (TF) and Inverse DocumentFrequency (IDF)

TF refers to the frequency of a particular word in the document. IDF is the inverse of the document frequency in whole body of documents.TF-IDF is a statistical measure which determines how relevant a word is to a document in an accumulation of documents. It is importantly used in automated text analysis and also in scoring words in machine learning algorithms for NLP.

In other words, the weight of a word in a document cannot be evaluated as a simple raw count and hence the equation below:

Equation:



C.Cosine Similarity

Similarity Score is a numeric value which ranges between Zeros to one. Which is used to determine the similarity of two items to each other on a scale of zeroto one. This score is obtained by measuring the similarity between texts of both the documents. Therefore, similarity score can be defined as the measure of similaritybetween given texts details of twogiven items. This can be done by- Cosine similarity. Cosine similarity is a measure used to determine how similar the textsaredespite of their size. Tocalculatethe cosine of angle between two vectors projected in a multi-dimensional space cosine similarity is used.

3. Sentimental analysis

Sentiment analysis is one of the Natural Language Processing fields, committed to the assessment of subjective opinions, views or feelings collected from a variety of sources about a specific subject. In more precise business terms, it can be summarized as "Sentiment Analysisis a set oftools to identify and extract opinions and use them for the benefit of the business operation ". Such algorithms push deep into the text and find the substance that points out the attitude towards the result in conventional or its specific element.

Another example is multinomial naive Bayes, here the features are presumed to be produced from a simple multinomial distribution. The multinomial distribution defines the possibility of observing counts between a number of categories, and thus multinomial naive Bayes is most suitable for features that represent counts or count rates. The idea is exactly the same as before, apart from that instead of modeling the data distribution with the best-fit Gaussian, we model the data distribution with a best-fit multinomial distribution.

P (**positive** | **overall liked the movie**) = P (overall liked the movie | positive) * P (positive) / P (overall liked the movie)



Fig -2: Flowchart of the Movie recommendationsystem

2. PROPOSED SYSTEM

A. Dataset

We have used three different data sets available in Movie Lens, which is generated by the group lens research team for the research work in the field of recommender system, to help developers to evaluate their recommendation systems. These are:

- 1. IMDB 5000 Movie Dataset
- 2. The Movies Dataset
- 3. List of movies in 2018
- 4. List of movies in 2019
- 5. List of movies in 2020

The Movies Dataset consists of metadata for all 45,000 movies listed in the Full Movie Lens Dataset. This dataset contains movies released on or before July2017. Data consist of cast, crew, plot keywords, budget, revenue, posters, release dates, languages, production companies, countries, TMDB vote counts and vote averages. This dataset also has files containing 26 million ratings from 270,000 users for 45,000 movies. Ratings are in the range of 1-5 and have been obtained from the official Group Lens website. The dataset of movies from 2018 – 2020 are acquired by web scraping their respective Wikipedia pages.



B. Recommendation system quality measures

We have used the TMDB Ratings to come up with our Top Movies Chart. And also IMDB's weighted rating formula to construct the chart.

Mathematically, it is represented as follows:

Weighted Rating(WR) =
$$\left(\frac{v}{v+m}.R\right) + \left(\frac{m}{v+m}.C\right)$$

Where,

v represents the number of votes for the movie m represents the minimum votes required to be listed in thechart

B.RESULT ANALYSIS

1. Accuracy of Sentimental Analysis Model

The multinomial Naive Bayes classifier is fitting for classification with distinct features (e.g., word counts for text classification). The multinomial distribution usually needs integer feature counts. Nonetheless, in practice, fractional counts such as could also work.

Accuracy of 98.77% is observed for the dataset provided

In [20]:	<pre>clf = naive_bayes.MultinomialNB() clf.fit(X,y)</pre>			
Out[20]:	MultinomialNB()			
In [21]:	accuracy_score(y_test,clf.predict(X_test))*100			
Out[21]:	98.77167630057804			
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2. Working

The movie recommendation system basically works by providing suggestions to the users by using the two renowned algorithms explained above. This movie recommendation system recommends movies to a user or client by evaluating IMDB rating

R represents the average rating of the movie

C represents the mean vote across the whole repot

We will take the top 25 movies based on similarity scores and calculate the vote of the **60th percentile** movie. Then, using thisasthevalue, we will calculate the weighted rating of each movie using IMDB's formula.

At home page user can sign up as new user or sign in with their unique user ID and password (**Fig -1: User Sign Up**) andget recommendations of themovies which are based on the results of content based filtering and collaborative based filtering algorithms.



Fig -2: Rating Page

Out

After finding out the similar users from the dataset using collaborative filtering and content based filtering, recommendations are generated for a particular user 'XYZ' (Fig – 3:Collaborative filtering Recommendations).

rating no	
	title
4.750000 16	Empire Strikes Back, The (1980)
4.750000 12	Schindler's List (1993)
4.666667 12	Usual Suspects, The (1995)
4.666667 12	Close Shave, A (1995)
4.642857 14	Aliens (1986)
4.611111 18	Boot, Das (1981)
4.600000 20	Raiders of the Lost Ark (1981)
4.588235 51	Star Wars (1977)
4.545455 11	Alien (1979)
4.538462 13	Secrets & Lies (1996)

Fig -3: Collaborative filteringRecommendations

ACKNOWLEDGMENT

Watching movies is one of the popular entertainments in the modern society, and these days, people can watch movies anytime and everywhere—at work, at home, or intheir cars. However, following the normal supply and demand curve, in the calendar year of 2019, there were 7,547 most popular

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RFID BASED NO-LINE CART

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ABSTRACT—

A supermarket or a Hypermarket is a place where wide variety of product items are available. These products can be food, beverages, or any household products. Shopping at these places have become easier and lifesaver for people, if considering time as one of the important factors. Currently, every person in the mall purchases majority of the product placed in the trolley. With that, the person also has to stand in a queue for scanning and billing process at the counter, where in the billing process, an employee scans each and every product's barcode and bills it to final payment. This can be a lengthy process and even worse on holidays, special offers or on weekends. Out of all these things, people also get confused at the counter while comparing the total price of all the products with the budget in the pocket before billing. To overcome all these problems, a smart way to shop in malls has been developed using Arduino Uno Board. With this system each product will be having RFID tags instead of barcodes. The Smart Trolleys will feature a RFID Reader, LCD Screen and Keypad. When a person places any products inside the trolley, the RFID Reader will scan the tags on the products, and the details of the products i.e., product's name, price and expiration date, displayed on the LCD Screen. The total cost will be added to the final checkout bill. The bill is stored in Micro-controller's (Arduino Board's) memory. Whenever there is multiple quantity of the same product i.e., 4 packets of a biscuit or 2 packets of dry-fruits, the Keypad mounted with this system will help to Insert and edit the number of quantities of the particular product item. With this system there is no need for customers to wait in the queue for the scanning of the product items. It will work as on a normal trolley. The objective of the proposed system is to provide a technology oriented, low cost, easily handled and efficient system for assisting shopping in person. Arduino IDE Software is used for programming the Arduino Uno Board and Proteus Software is used to check the simulation results before the hardware implementation.

Keywords — Arduino Uno, RFID Tags, RFID Reader, LCD display, Keypad, Smart Trolley.

INTRODUCTION

SHOPPING is easy, but waiting at the bill counter can be very boring & laborious. Rush plus cashiers who prepare a bill with a barcode scanner take longer & have longer-lasting results. Recent advancements in technology and communication have caused revolution in all fields. In this new era, we need to implement smart technology by bringing about automation in system. Challenge is not to develop such system instead to handle the problems aroused due to automation like energy consumption, cost, efficiency etc.

This innovative project includes an automated billing system that can be placed in a shopping trolley. This automated billing and payment system includes an RFID reader controlled by Arduino instead of the traditional barcode readers.

RFID tags are simply called as advanced barcode. It is nothing but small transponder which transmits an identifier or serial number to a reader. RFID is the special type wireless card which has inbuilt embedded chip along with loop antenna. The inbuilt embedded chip represents the 12-digit card number. RFID reader is the circuit which generates 125KHZ magnetic signal. This magnetic signal is transmitted by the loop antenna connected along with this circuit which is used to read the RFID card number. In this project RFID card is used as security access card. So, each product has the individual RFID card which represents the product name. RFID reader is interfaced with microcontroller. Here the microcontroller is the flash type reprogrammable microcontroller in which we have already programmed card number. The microcontroller is interfaced with keypad.

Any product, he/she has to scan it against the RFID reader & then has to get it into the cart. All the product details are displayed on the LCD along with the price of the product. As the shopper goes on adding products, every product is detected by the module & therefore the price will increase accordingly.

In case if clients want to eliminate the product from the cart that they have taken, they can do it by the use of a key. Once purchasing is over, the total amount will be displayed in the LCD and billing can be accomplished by using QR code. At the exit point checking of consignment and packing of merchandise can be done. In order to

make shopping less difficult for shoppers in malls/shops, there have been a number of strategies planned for clever purchasing trolleys. By eliminating waiting in lengthy billing lines, it saves customer time. This clever trolley also lowers the strength of the man. This machine is efficient and easy to use.

MOTIVATION AND OBJECTIVE

Benefit to the customers:

This system provides on spot scanning of the product and shows its price details on LCD. This allows customers to compare the total price with the budget in the pocket before billing. Whenever a customer is done with his/her shopping and near to the billing counter, the data from the LCD is going to transfer to the billing counter computer through serial number of the device. By this way, it will save the time of the customers as well.

Benefit to the store:

This system works for the customers which will be having these devices the mall. This is implemented by using RFID Tag and RFID Reader. Customers need to place the product required close to the RFID Reader. Once RFID Reader detects the presence of RFID Tag only then it will allow the shopping trolley or basket to become smart. Otherwise, it will act as a simple trolley.

Reason behind using Arduino:

We designed the system using the Arduino Development Board. It provides complete access to functions of microcontroller or microprocessor like to program the controller, to use the input/output pins, to communicate. The system using Arduino is less bulky and it can easily transfer from one place to another. It requires less power supply and we can easily improve the system, if required, because of its easy programming.

Cost efficient and user friendly:

Since we designed this system using Arduino and user Smart Mobile Phone act as Barcode Scanner, this system requires less cost to design. This system requires less power supply and it displays the total amount to the user so this system is user-friendly.

PROJECT OUTLINE

The main aim of the project is to satisfy the customer and to reduce the time spent on the billing process which is to complete the billing process in the trolley rather than waiting in a queue even for one or two products. The customers must add the products after a short scan in trolley and when the shopping is done the finalized amount will be displayed in the trolley. Customer can pay their bill to our device by card swipe or QR code payment options and also, they can pay their bill at the billing counter. Finally, the whole process of the shopping experience will be without long queues and less time consuming.

HARDWARE AND SOFTWARE REQUIREMENT

Arduino Uno



PIN DESCRIPTION OF ARDUINO UNO:

The Uno is a microcontroller board based on the ATmega328P. It has 14 digitals input/output pins (of which 6 can be used as PWM outputs), 6 Analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. Each of the 14 digital pins can be used as an input or output, using pin Mode (), digital Write (), and digital Read () functions. They operate at 5 volts. Each pin can provide or receive 20 mA as recommended operating condition and has an internal pull-up resistor (disconnected by default) of 20-50k ohm.

A maximum of 40mA is the value that must not be exceeded on any I/O pin to avoid permanent damage to the microcontroller.

In addition, some pins have specialized functions:

- Serial: 0(RX) and 1(TX). Used to receive (RX) and Transmit (TX) TTL serial data.
- External Interrupts: 2 and 3. These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value.
- PWM: 3, 5, 6, 9, 10, and 11. Provide 8-bit PWM output with the analog Write () function.
- SPI: 10(SS), 11(MOSI), 12(MISO), 13(SCK). These pins support SPI communication using the SPI library.
- LED: 13. There is a built-in LED driven by digital pin 13.
- TWI: A4 or SDA pin and A5 or SCL pin. Support TWI communication using the wire library.

The Uno has 6 analog inputs, labelled A0 through A5, each of which provide10 bits of resolution. By default, they measure from ground to 5 volts, through is it possible to change the upper end of their range using the AREF pin and the analog Reference () function.

There are a couple of other pins on the board:

• AREF Reference voltage for the analog inputs. Used with analog Reference.

Reset. Bring this line LOW to reset the microcontroller. Typically used to add a reset button to shields which block the one on the board.

RFID tags/cards



RFID tags are a type of tracking system that uses smart barcodes in order to identify items. RFID is short for "radio frequency identification," and as such, RFID tags utilize radio frequency technology. These radio waves transmit data from the tag to a reader, which then transmits the information to an RFID computer program. RFID tags are frequently used for merchandise, but they can also be used to track vehicles, pets, and even patients with Alzheimer's disease. An RFID tag may also be called an RFID.

TYPES OF RFID TAGS:

Passive Tags - It is the cheaper version using no battery. The Tag uses radio energy transmitting from the reader. So, the Reader must be close to the tag to transfer energy to power the Tag. Since the tags have unique serial number, the reader can recognize them individually.

Active Tags – These have an on-board battery and periodically transmits ID signals to the reader.

Battery Assisted Passive or BAP – These Tags have small battery on board and will be activated in the presence of signals from the reader.

Read only Tags – These have a unique factory assigned serial number used as the key for the data base.

Read/ Write Tags - These can write object specific data give by the system user.

Field programmable Tags – These can write once but read many times. Black tags can be written with an electronic product code by the user.

RFID MODULE/READER





Operating Frequencies

Different types of RFID systems operate at different radio frequency. Each radio frequency has its own read distance, power requirements and performance. The choice of frequency depends on the application. Mostly four types of frequencies are used in RFID technology:

- A. Low frequency (120-140KHz) Low frequency RFID tags operate in low frequency range. Low frequency tags are used for depositing and withdraw and controlling following with the assets.
- B. High frequency (13.56 MHz) High frequency RFID tags operate in high frequency range. HF tags are useful for asset-tracking applications, contactless credit cards and ID badges.
- C. The ultra-high frequency (869 MHz-928 MHz)-UHF RFID tag operate in 869 MHz 928MHz. UHF tags are used in supply chain management applications. tags offer the longer reading range and are cheaper to manufacture in bulk.
- D. Microwave (2.4 GHz-2.5 GHz) Microwave system offers higher read rate. Microwave tags are expensive than UHF tags. Microwave tags are used in electronic toll applications.

16x2 LCD Display

Pin No.	Pin Name	Description
1	R1	Taken Out From 1 st ROW
2	R2	Taken Out From 2 nd ROW
3	R3	Taken Out From 3 rd ROW
4	R4	Taken Out From 4 th ROW
5	C1	Taken Out From 1 st COLUMN
6	C2	Taken Out From 2 nd COLUMN
7	C3	Taken Out From 3 rd COLUMN
8	C4	Taken Out From 4 th COLUMN
Pin No.	Pin Name	Description
Pin No. 1	Pin Name R1	Description Taken Out From 1 st ROW
Pin No. 1 2	Pin Name R1 R2	DescriptionTaken Out From 1st ROWTaken Out From 2nd ROW
Pin No. 1 2 3	Pin Name R1 R2 R3	DescriptionTaken Out From 1st ROWTaken Out From 2nd ROWTaken Out From 3rd ROW
Pin No. 1 2 3 4	Pin Name R1 R2 R3 R4	DescriptionTaken Out From 1st ROWTaken Out From 2nd ROWTaken Out From 3rd ROWTaken Out From 4th ROW
Pin No. 1 2 3 4 5	Pin Name R1 R2 R3 R4 C1	DescriptionTaken Out From 1st ROWTaken Out From 2nd ROWTaken Out From 3rd ROWTaken Out From 4th ROWTaken Out From 1st COLUMN
Pin No. 1 2 3 4 5 6	Pin Name R1 R2 R3 R4 C1 C2	DescriptionTaken Out From 1st ROWTaken Out From 2nd ROWTaken Out From 3rd ROWTaken Out From 4th ROWTaken Out From 1st COLUMNTaken Out From 2nd COLUMN
Pin No. 1 2 3 4 5 6 7	Pin Name R1 R2 R3 R4 C1 C2 C3	DescriptionTaken Out From 1st ROWTaken Out From 2nd ROWTaken Out From 3rd ROWTaken Out From 4th ROWTaken Out From 1st COLUMNTaken Out From 2nd COLUMNTaken Out From 3rd COLUMN

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Pin No:	Name	Function
1	V55	This pin must be connected to the ground
2	VCC	Positive supply voltage pin (SV DC)
3	VEE	Contrast adjustment
4	85	Register selection
5	R/W	Read or write
6	1	Enable
7	D00	Data
£	DB1	Data
÷	082	Data
10	063	Data
51	D84	Data
12	DBS	Data
13	086	Dida
14	D87	Data
15	LED+	Back light LED+
16	LED-	Back light LED-
6	000000	
	lin	A LCD Display

A liquid-crystal display (LCD) is a flat-panel display or other electronic visual display that uses the lightmodulating properties of liquid crystals. Liquid crystals do not emit light directly.

This is a basic 16 character by 2-line display.16×2 LCD module is a very common type of LCD module that is used in 8051 based embedded projects. It consists of 16 rows and 2 columns of 5×7 or 5×8 LCD dot matrices. The module we are talking about here is type number JHD162A which is a very popular one. It is available in a 16-pin package with back light, contrast adjustment function and each dot matrix have 5×8 dot resolution. The pin numbers, their name and corresponding functions are shown in the table below.

4x4 KEYPAD



These Keypad modules are made of thin, flexible membrane material. The 4 x4 keypad module consists of 16 keys, these Keys are organized in a matrix of rows and columns. All these switches are connected to each other with a conductive trace. Normally there is no connection between rows and columns. When we will press a key, then a row and a column make contact.



To detecting a pressed key, the microcontroller grounds all rows by providing 0 to the output pins, and then it reads the columns. If the data read from columns is = 1111, it means no key has been pressed.



When no key has been pressed

When we will Pressing a button shorts one of the row lines to one of the column lines, allowing current to flow between them. For example, when key 'Button 1' is pressed, column 1 and row 1 are shorted.



When Button1 key is pressed

R1 R2 R3 R4 = 0000

C1 C2 C3 C4 = 0 1 1 1

If the first column bit value is a zero, this means that the "Button1" key was pressed. For example, if C1 C2 C3 C4 = 0111, this means that a key in the C1 column has been pressed.



Column C1 and Row R1 gets notified about the key is pressed

This process is continuing for all row & columns

BUZZER



A buzzer or beeper is an audio signaling device, which is piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

ARDUINO IDE SOFTWARE

ARDUINO The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in C++ and based on Processing and other opensource software.



CIRCUIT DIAGRAM AND DESCRIPTION



WORKING

A power supply of 5V is given to the RFID Reader Module, LCD and Arduino Uno Board. An RFID tag (of frequency 125khz) is attached to every product in the mall and the reader (EM-18) is attached to the trolley. At the time of selection/purchase, customer can scan the tag attached to the product and the reader will acknowledge the product by making sound from the buzzer attached to it. Each tag has a unique Electronic Product Code EPC. Based on the EPC received by the Arduino, the information of the product is displayed on the LCD along with the updated cost.

If the customer wants to remove the added product, He/she can use the keypad to add or subtract the product, same can be done to change the quantity of a particular product as per need. Then the cost of the corresponding product will be deducted from the bill, which will be shown on the LCD. Once the shopping is complete, pressing the specific keypad button will give the final bill amount will be displayed on the LCD.

The customer can then approach towards the billing counter with the trolley and make payment for its bill.

ALGORITHM

Step 1: Initially the cart is reset.

Step 2: Then the RFID TAG is read by the reader. It will read the EPC from the RFID Tags and display the product Name, Price and Quantity on LCD display.

Step 3: If the Customer wants to change the quantity i.e., Add or Subtract from the cart then by pressing the Keypad buttons they can change it.

Step 4: Once the Shopping is complete the customer can press the button to display the final billing amount and
canapproachthebillingcounter.Step 5: The customer can make the payment for bill at count.

ACKNOWLEDGMENT

Special thanks to our Guide Prof. Samita Bhandari for assisting us to partially complete our project on "No-Line Cart".

Her expertise and talent in circuit designing and troubleshooting and logical regression helped us effectively to partially complete this project.

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FOOTSTEPS POWER GENERATION WITH RFID BASED CHARGING

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ABSTRACT

Here we tend to propose an footstep power generator system that uses piezo sensors to get power from human footsteps. As we all know the energy canot be created nor destroy however we will rework energy from one type to a different. As thousands of step per day is taken by every body. power is generated by the footstep taken by the peoples as a results of walking. It's a reality that great deal of energy is lost by everybody throughout routine walk that is the main supply for this technique. The system permits for a platform for putting footsteps. The piezo sensors are mounted below the platform to get voltage from footsteps. The sensors are placed in such an arrangement so as to generate most output voltage. The current is distributed using RFID cards so solely an authorized person will use the generator for charging. Likewise, it's anything but a USB cellular phone charging point where a client or consumer would possibly associate links to charge the cellular phone from the battery charge. The current is sent utilizing (radio repeat ID) RFID cards thus simply an approved individual will utilize the generator for charging. On these lines we've a tendency to charge electrical device utilizing power from strides, show it on digital display utilizing an arduino circuit and take into consideration mobile charging through the arrangement. Our task model expense is powerful and simple to carry out and furthermore it's helpful for climate.

Keywords-Voltage, Piezoelectric-sensor, Footstep, RFID, Arduino, Relay, LCD

INTRODUCTION

ENERGY is just the capability to require care of job. Force has remodeled into facilitate for the human folks recently. Its solicitation is growing quickly. In everyday, life advancement wants a huge proportion of electrical force for its varied exercises. Force age is that the single biggest wellspring of tainting on the earth. thanks to that varied energy assets are delivered and wasted. Power is for the foremost half created from assets like water, wind, coal, and then forth for manufacturing the power from these assets improvement of giant plants that are needed having high support and vital expense. In like approach, it's the target of this advancement to grant the strategy for electrical force age from that habitually extending human those that does not unfavourably influence the conventional assets. This advancement depends upon a customary known as the electricity impact sway, within which bound materials will foster an electrical charge from having weight, the strain applied to them. The piezoelectric impact is that the impact of specific materials to supply the electrical charge thanks to applied mechanical weight on that. it's the impact whereby mechanical vibrations, pressing issue or strain applied to the electricity material square measure modified over into electrical structure. electricity suggests the limit of a few of materials to deliver an electrical potential considering associated weight. The embedded electricity material will offer the charm of the ever-changing overweight applied by moving place into the electrical flow, that is put away in a very battery and more circulated utilizing RFID cards.



HARDWARE AND SOFTWARE REQUIREMENTS

Arduino uno: The fundamental part of the proposed framework is arduino uno. It need a 5v force supply which can be work by various part like advance change, rectifier, channel and controller. Arduino controls the significant three segments of our proposed framework. There is RFID data perusing, arduino turn on the hand-off switch and show a message on LCD no time like the present opening.

Led : The 16x2 LCD is utilized to show different status of the framework. At the point when framework turns on, regulator unit is show. first message on the LCD "Register Mode" in the wake of enlisting it shows message to client label your RFID TAG subsequent to labeling it show time allotment for this schedule opening length our application comes to use in the wake of finishing time allotment. It shows message again label your RFID TAG.

Piezoelectric sensor: Piezo sensor may be a contraption that utilizes the piezoelectric impact to quantify amendment in speed increase, pressure, strain, temperature or power by dynamic over this energy into an electrical charge. A transducer can be anything that convert one type of energy to another. The piezoelectric material is one sort of transducers. At the point when we crush this piezoelectric material or apply any power or pressing factor, the transducer convert this energy into voltage. This voltage is a component of the power or pressing factor applied to it.Piezoelectric sensor is a gadget that utilizes the piezoelectric impact to quantify change in speed increase, pressure, strain, temperature or power by changing over this energy into an electrical charge. A transducer can be anything that convert one type of energy to another. The piezoelectric material is one sort of transducers. At the point when we crush this piezoelectric material or apply any power or pressing factor, the transducer can be anything that convert one type of energy to another. The piezoelectric material is one sort of transducers. At the point when we crush this piezoelectric material or apply any power or pressing factor, the transducer convert this energy into voltage. This voltage is a component of the power or pressing factor, the transducer convert this energy into voltage. This voltage is a component of the power or pressing factor, the transducer convert this energy into voltage. This voltage is a component of the power or pressing factor applied to it.



Block diagram

Relay Switch: So transfer is switch which controls circuits electro precisely, the principle activity of this gadget is to represent the deciding moment contact with the assistance of a sign with no human association to turn it on or off. It is basically used to control a powerful circuit utilizing a low force. It permit a between capacity battery to our application.

RFID Reader and RFID Tag: RFID has a place with a gathering of innovations alluded to as Automatic Identification and Data Capture (AIDC). AIDC techniques consequently acknowledge objects, gather info concerning them, and enter those info squarely into computer frameworks with next to zero human intercession. RFID methods use radio waves to attain this. At a simple level, RFID frameworks comprise of 3 parts: a RFID tag or keen mark, a RFID peruser, and a recieving wire. RFID labels contain a coordinated circuit and a recieving wire, which are utilized to communicate information to the RFID peruser (additionally called an investigative specialist). The peruser then believers the radio waves to a more usable type of information. Data gathered from the labels is then moved through a correspondences interface to a host PC framework, where the information can be put away in a data set and broke down sometime in the future. A RFID label comprises of a coordinated circuit and a radio wire. The tag is likewise made out of a defensive material that holds the pieces together and safeguards them from different natural conditions. The defensive material relies upon the application. Programming Tool: The product stage utilized for arduino will be arduino IDE.



CIRCUIT DIAGRAM

Connections : As we see in a circuit diagram the fundamental part of our framework is Arduino uno. LCD has 16 pin first goes to ground second used to 5 volt third for contrast which is connected to 1k ohm and then connect to GND. RW (Read/write) pin is connected to GND as we want to write not read. The RS (register select), enable pin and Pins D4 to D7 are connected to digital pin of arduino. RFID means radio frequency identification which uses electromagnetic field to transfer data over short distance the first pin is Vcc which is connected to 3.3v of arduino. Pin no.2 is RST reset pin, Pin no.3 is GND while MISO, MOSI, SCK, NSS pin are SPI (Serial Peripheral Interface) which is connected to SPI pin of arduino. Relay have three pin +ve , -ve and signal pin which get signal from Arduino by RFID. Piezo sensor is connected to amplifier so we can get more gain in voltage which then connected to USB port circuit which make relay a switch. When RFID tag or card is swipe on RFID sensor it will give signals to relay to switch with the help of arduino, then mobile can charge which will be display on and LCD with the help of arduino.



III. WORKING

Piezoelectric Effect is the capacity of specific materials for creating electric charges in light of applied mechanical weight on the piezoelectric plate. Accordingly, press certain precious stones and you can make power move through them. In many precious stones, the unit cell is even in piezoelectric gems. Regularly, the piezoelectric precious stones are electrically independent and particles within the electricity plate might not be equally organized, but their electrical charges are impeccably adjusted, the electric charge in one spot offsets a negative charge close by them. Notwithstanding, if you crush or stretch the piezoelectric precious stone, you distort the design, negative, and making net electrical charges show up. This impact helps through a whole style therefore net positive and negative charges show up on the inverse, external countenances of the gem. Typically, the charges in the piezoelectric gem are by and large adjusted, regardless of whether they are not evenly orchestrated. On the off likelihood that you just crush the gem, you power the charges out of equilibrium. Presently the impacts of the charges are not, at this point disposed of each other out and net positive and negative charges show up on inverse precious stone appearances. By pressing a gem, you have created the voltage across its contrary countenances and that is piezoelectricity. In this venture, we've to utilised an identical marvel of delivering piezoelectric effect from the piezoelectric gem as a coin form circle.

IV. APPLICATIONS

- Can be comprehensively used as the piece of schools, Schools, public vehicle spots and colleges.
- This can be realized in air terminals, transport stations, railroad stations.
- Street lights can be completed using this methodology rather than sunlight based in the blustery season.
- This system can be completed in amassed places like retail plazas, pathways, etc.

V. ADVANTAGES

- It is a renewable source of energy.
- It saves agricultural land.
- It is not harmful to atmosphere.
- No smoke or ash or any toxic chemical is produced.
- Utilized human waste walking energy in to electrical energy.
- Economic
- Easy maintenance
- Reduce Environment pollution.
- Utilized renewable source of energy.
- Easy to install and Low Cost.

VI. FUTURE SCOPE

The utilization of wasted energy is greatly relevant and necessary for extremely inhabited countries in the world in the future.

I. Flooring Tiles- Japan has already started experimenting with the utilization of the piezo effect impact on generating energy. They implement a electricity on the bus stairs. So each time passenger steps on the tile s they trigger the tiny vibration that may be hold on as energy within the battery. The flooring tiles are designed by the rubber which might absorb the vibration . This vibration generates when folks are running or walking on it. Underneath these tiles , the electricity material is placed . They can generate electricity once the movement is felt by the fabric. at the same time this generated energy is s to red into the battery. The generated electricity may be used for the lighting of a lamp or street light. Energy is generated by the step of 1 individual is just too less however if the amount of steps increases ultimately energy production conjointly will increase at the same time .

2. Dance floors- Europe is one in every of the countries that enforced and commenced experimenting with the use of a crystal for energy generation in night clubs. the ground is then compressed by the dancer's feet and electricity materials but contact and generate electricity which might be used as the generator within the club. The generated electricity is nothing but 220 watts. It depends on the impact of the dancer's feet. If constant compression of the crystal causes a large quantity of energy.

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VII. CONCLUSION

The objectives of this seminar is to create a system that helps to conserve energy thereby reducing the strain on mother earth. this can be because device is pollution-free; it's clean. Uses of power turns to be necessary for every work in today's world. To comfort our daily routines the devices can be employed in massive numbers. The advantages of energy harvesting systems are probably glorious. To generate the power through footsteps as a supply of renewable energy that we are able to get while walking on a definite arrangement like stepping foot on work in tiles. Day by day, the population of the country is increasing and also the demand of the power is additionally increasing. At an equivalent time the wastage of energy is additionally increasing in several kind and one among them is due to the human locomotion. So, reforming this energy back to usable kind is that the major resolution.

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WIRELESS BASED HOME AUTOMATION SYSTEM

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ABSTRACT

Internet of Things (IoT) conceptualizes the idea of remotely connecting and monitoring real world objects (things) through the Internet. When it comes to our house, this concept can be aptly incorporated to make it smarter, safer and automated. This IoT project focuses on building a smart wireless home security system which sends alerts to the owner by using Internet in case of any trespass and raises an alarm optionally. Besides, the same can also be utilized for home automation by making use of the same set of sensors. The leverage obtained by preferring this system over the similar kinds of existing systems is that the alerts and the status sent by the Wi-Fi connected microcontroller managed system can be received by the user on his phone from any distance irrespective of whether his mobile phone is connected to the internet. The microcontroller used in the current prototype is the TI-CC3200 Launchpad board which comes with an embedded micro-controller and an onboard Wi-Fi shield making use of which all the electrical appliances inside the home. Keywords—Home automation, Wireless LAN, Wi-Fi, Microcontrollers

INTRODUCTION

Wireless Home security and Home automation are the dual aspects of this project. The currently built prototype of the system sends alerts to the owner over voice calls using the Internet if any sort of human movement is sensed near the entrance of his house and raises an alarm optionally upon the user's discretion. The provision for sending alert messages to concerned security personnel in case of critical situation is also built into the system. On the other hand if the owner identifies that the person entering his house is not an intruder but an unexpected guest of his then instead of triggering the security alarm, the user/owner can make arrangements such as opening the door, switching on various appliances inside the house, which are also connected and controlled by the micro-controller in the system to welcome his guest. The same can be done when the user himself enters the room and by virtue of the system he can make arrangements from his doorstep such that as soon as he enters his house he can make himself at full comfort without manually having to switch on the electrical appliances or his favourite T.V. channel for an example. Thus using the same set of sensors the dual problems of home security and home automation can be solved on a complementary basis[1].

SYSTEM ANALYSIS

Problem definition

Today people are looking at ways and means to better their life-style using the latest technologies that area available. Any new facility or hope appliance that promises to enhance their life-style is grabbed by the consumers. The more such facilities and appliances are added, it becomes inevitable to have easy and convenient methods and means to control and operate these appliances. Conventional wall switches are located in different parts of a house and thus necessitates manual operations like to switch on or off these switches to control various appliances. It gets virtually impossible to keep track of appliances that are running and also to monitor their performances.

System requirements

The following list gives an overview of the most important requirements of the proposed system

1) User friendly interface: User can easily manage system locally or remotely home automation system, through their mobile.

2) Security and authentication: Only authorized user can login to the system (locally, or remotely) in order to control. If system detects any thing wrong it should immediately alert the system owner and lock login capability for a while.

3) Low cost per node / High node count: Thinking of building automation, hundreds of nodes may be needed to provide automation. However, the market requires competitive performance (compared to wired networks) to be delivered at this low system cost. Additionally, also protocols need to scale to high node count e.g., ensuring message delivery

4) Large area coverage: Another challenge lies in the fact that devices of a building automation system are dispersed over large areas. Since transceivers must not consume so much power, they cannot be built with a

transmission range sufficient for sensors to reach associated controllers or actuators directly. Also, they may rely on an infrastructure of access points and a wired backbone network (or particularly sensitive receivers).

5) System Scalability: Scalability is the ability of a system, network, or process, to handle growing amount of work in a capable manner or its ability to be enlarged to accommodate that growth. For example, system upgrade/downgrade by adding/removing hardware interface module should be easy and systematic task.



System design and implementation System Layout



Functions and working

Make the connection for Home Automation project as given in the circuit diagram. First of all, we connect the bulb with AC powered sources and with relays as given in the circuit diagram. Then the relays are given DC power from the Arduino Uno board. Data pins of the relays are connected at pins 8, 9, 10 and 11 to the Arduino which are the output pins of Arduino. Then connect the HC-05 module with the Arduino Board as shown in the

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diagram and power the Adruino Board. Upload the code given at the end of the project using Arduino IDE. Turn on the Bluetooth in your smartphone and connect the HC-05 module by entering the password. By default, the password is "0000" or "1234". After successfully connecting your smartphone with the HC-05, Open "**Bluetooth terminal HC-05 app in your smartphone**" and it will show your device connected to HC-05. Now send the data "Bulb1 turn on" or "Bulb2 to turn off" to turn on or off any bulb. This is how you can control the lights in your home remotely.

Advantages

- Appliance Safety and Lighting.
- Security
- Saves Time
- Convenience and Cost Efficiency
- Allows you to adjust temperature

Disadvantages

- Greater acceptance
- devices, security will become a greater issue

Future Work

Home of the future is a space for the digital natives. With the invention of lots of automation technologies featuring IOT and AI, home automation has become a reality. One can implement several of their tasks with just a single command of verbal instructions. These technologies can used to build fully functional home automation system and control smart home devices including smart lights, connected thermostats, and appliances.

CONCLUSION

The system as the name indicates, 'Home automation' makes the system more flexible and provides attractive user interface compared to other home automation systems. In this system we integrate mobile devices into home automation systems. A novel architecture for a home automation system is proposed using the relatively new communication technologies. The system consists of mainly three components is a BLUETOOTH module, Arduino microcontroller and relay circuits. WIFI is used as the communication channel between android phone and the Arduino microcontroller. We hide the complexity of the notions involved in the home automation system by including them into a simple, but comprehensive set of related concepts. This simplification is needed to fit as much of the functionality on the limited space offered by a mobile device's display. This paper proposes a low cost, secure, ubiquitously accessible, auto-configurable, remotely controlled solution. The approach discussed in the paper is novel and has achieved the target to control home appliances remotely using the Wi-Fi technology to connect system parts, satisfying user needs and requirements. Wi-Fi technology capable solution has proved to be controlled remotely, provide home security and is cost effective as compared to the previously existing systems. Hence we can conclude that the required goals and objectives of home automation system have been achieved. The system design and architecture were discussed, and prototype presents the basic level of home appliance control and remote monitoring has been implemented. Finally, the proposed system is better from the scalability and flexibility point of view than the commercially available home automation systems

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SHOPPING WEBSITE USING FULL STACK

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ABSTRACT

We all can see how fast the Technology is increasing. One of its types is e- commerce. E-commerce is a process in which customers can see/search a wide range of products, specifications, features, classification, price, information provided by the seller through the internet instead of going physical to the shop.

E-commerce also changed the geographical barriers over the decade and got a huge amount of success in the world. Online shopping also saves a lot of time, so everyone prefers this simple way of shopping.

Here the main problem is that the guarantee of getting the same product you ordered is not sure. As we have examples in which customers didn't receive their ordered product.

Keywords: - Encryption, Preference, perception, spammers

1. INTRODUCTION

Online shopping is a form of electronic commerce which allows consumers to directly buy goods or services from a seller over the Internet using a web browser or a mobile app. Consumers find a product of interest by visiting the website of the retailer directly or by searching among alternative vendors using a shopping search engine, which displays the same product's availability and pricing at different e-retailers.

Online stores enable the customer to browse the firm's range of products and services, view photos or images of the products, along with information about the product specifications, features and prices. Online stores enable shoppers to use "search" features to find models, brands or items. Online customers must have access to the Internet and a valid method of payment in order to complete a transaction, such as a credit card, an Interacenabled debit card, or a service such as PayPal. For physical products (e.g., paperback books or clothes), the etailer ships the products to the customer; for digital products, such as digital audio files of songs or software, the e-tailer usually sends the file to the customer over the Internet.

We have also used the same technology in this project of online shopping but the method is different. Our website will provide a platform in which any shopkeeper of any physical store can open it's online shop. It is a platform in which users can select online and they can also do it physically if they want.

2. LITERATURE SURVEY

Shilpa Arora and Suman Preet Kaur (2015), A Comparative Study of leading E-commerce Websites in India. The number of internet users around the world has been gradually growing and this growth has provided the opportunities for global and regional e-commerce. This number is expected to touch 39.0 million users by 2015 as internet penetration increases and e-commerce becomes more secure. The effects of E-commerce are already seen in all areas. This paper analyzes the two emerging giants of E-commerce Flipkart and Snapdeal. Their current scenario in the market and challenges to them are discussed. We also present the future of these two web portals in the Indian market. It has been concluded from the secondary data collected from various websites, newspapers that Flipkart has a better command on the current e-market and Snapdeal is growing its business at a faster rate to compete with Flipkart. Based on various parameters these two web portals are analyzed in this paper.

Sheeba Praveen and Prof.(Dr.) Devendra Agarwal andSumaiya faizyab (2015), Comparative study of Flipkart.com, Snapdeal, Ebay: India's Leading E-business Portals. E-commerce portals are now trending in India. It is growing in every place and customers are showing interest in using these portals effectively. There are so many portals which are unique in their features and the design of websites. After analyzing the whole model of E-commerce I found basically three business Models have evolved over a period of time in this space and each has its own Pros & cons. Rest all business models are a mix and match of any of the following 3 models.

K FRANCIS SUDHAKAR and HABEEB SYED

(2015), A comparative study between FLIPKART and AMAZON India, Internet became a more powerful and basic tool for every person's need and the way people work. By integrating various online information management tools using the Internet, various innovative companies have set up systems for taking customer

orders, facilitating making of payments, customer service, collection of marketing data, and online feedback respectively. These activities have collectively known as e-commerce or Internet commerce. Online shopping made it so easy for everyone with their product variations and simple way to buy things. An attempt has been made to critically examine various corporate and business level strategies of two big e-tailers and those are Flipkart and Amazon. Comparisons have been done considering e- commerce challenges, their business model, funding, revenue generation, growth, survival strategies, Shoppers' online shopping experience, value added differentiation, and product offerings. Both these big players made their own mark in India, but who is going to be the ultimate winner or be the top one is going to be. A comparative study of Flipkart.com with one of the close competitors Amazon.com delivers the information about the different strategies to succeed in the e-commerce market and different opportunities available in India.

Swapnil V. Mishra and Dr. Shamkant N. Kotkar (2015), A Study on Current Status of E-Commerce in India: A Comparative Analysis of Flipkart and Amazon, E-commerce has reached to the doorstep of a common individual in India it can be seen as a future of commerce. E-commerce has broken the technological and geographical barriers over the years and has got a huge amount of success which many economic analysts and experts never predicted and still it has to go a long way ahead in India. A comparative study of Flipkart.com with one of the close competitors Amazon.com delivers the information about the success of Flipkart.com in the present Indian market scenario.

Dr. Komal Chopra and PrernaBhan (2016), Study of E

- Com Retail Models in India, The E-Com business sector is prospering and balanced for a solid development in

Asia. There are players who made a decent start. Their prosperity relies upon their comprehension of the E-Com sector and offerings. This paper gives an outline without bounds of E-Com in India and talks about the future development verticals in India's E- Com. It likewise discovers different elements that would be fundamental for future development of Indian E-Com. A primary survey of consumer purchase behaviour has also been done. The results reveal that convenience and discount offers play a very important role in the buying decision of the consumer. The study concludes that inventory based model, marketplace model and hybrid model are the three prominent models that help a retailer sustain in the market.

3. METHODOLOGY

A lot of confusion we have faced here. By discussing with our teachers, experts we concluded that discussion and taking ideas from previous research helps a lot.

So why be late? We instantly have formed two teams: one team collects data from discussion, survey and one team collects data from previous research.

At least once a week we gather and discuss what we have done till now and what we will do in the future. We also focus on technology which is trending presently.

4. OUTPUT

In Online shopping buyers order products and receive them from online stores. Everyone wants this way of shopping as it saves a lot of time.

The only way one can get good success is through input

+ processing = output.

The higher the input and processing is the higher will be the output.

We have to do the same input means we have to make a good website, server + if the process of shopping will be good then we will get a very good output.

We will add a location facility so that customers can see shops near to them.
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Fig. (b)Website

BLOCK DIAGRAM 5.



Fig. Block Diagram

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Lets see how the e-commerce process works. Some companies create their own store and when a buyer orders some products through their app or website they deliver it to the buyer address.

Lets see how we have used the idea of online shopping and how it will be different from other online shopping processes.

We will add Physical store present at any location so that it will cover all the locations which are near to the user/customer. For shopping everyone has to login first through their phone number so that the seller can send the bill of the product ordered through sms.



Fig. Flow Chart

6. CONCLUSION

At present e-commerce has been at its peak in every part of the world and in the near future at what speed it is going to increase no one can predict that. The main problem is that e-commerce shifts the mindset of people from going & shopping from physical stores to online stores. The growth in the internet user will also base aid to the further growth of e -commerce .

As "Technology is a boon to us" why not

To overcome such problems, shopkeepers have to make their own online shop. Our project will have the same idea. If you want online shopping you can choose this and if you want physical shopping you can.

This will be a good idea for both shopkeepers and customers, as the number of physical stores is more than the online store. From a customer point of view this type of online seller will not cause any type of fraud to them.

7. FURTHER SCOPE

When the website will come on search engines no one will know what this will do or remember the name of this website, neither the shopkeepers nor the customers. Here we have two category: -

- 1) what we will do, For shopkeepers we will do marketing for at least 1 year. For customers, we have to advertise at important places such as railway stations, bus stations and even at more places so that everyone can have the idea of this website so that they can use it. We will try to add all the shops which are there in the country so that customers can get a wide range of products available for them.
- 2) what feedback we will get through customers and shopkeepers. Most importantly we have to provide the knowledge of e-commerce to shopkeepers which are not Literate .Because in countries like India the number of literate shopkeepers are very less.

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IOT BASED ELECTRIC VEHICLE CHARGING STATION

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ABSTRACT

The Earlier the population of electric vehicles are low, Now the electric vehicles are going to be the future transport but the main disadvantage of the electric vehicles are lack of charging stations and the long charging time. In order to increase the efficiency of the charging station and to reduce the charging time we made the charging station by utilizing the renewable and nonrenewable energy to increase it's efficiency and with fast charging technology through wired or wireless modes to reduce the charging time. When a electric vehicles battery is charged using AC Supply by using AC to DC Converter there are many losses due to conversion and in form of heat and it reduces the charging station efficiency and increases the charging time. To overcome this problems, The charging station should have a separate battery pack from which the electric vehicles are to be charged by using DC to DC rapid charging technology, Thus the efficiency of the charging station is increased with reduced charging time. Every electric vehicles power consumption details and the cost for charging of each vehicle gets updates to the charging stations website periodically. The efficiency of the charging station and charging speed can be increased by installing charging ports or wireless charging pads in the parking of hotel, parks, theatre, malls and in traffic signals.

Keywords -- Electric vehicle, storage, IOT, charging station.

I. INTRODUCTION.

Nowadays Electric Vehicle (EV) technology has grabbed great passion from the people. EVs, as a backup to the conventional combustion engine vehicles, are widely recognized as a quick fix solution to enhance energy efficiency and cut down carbon emissions. EVs commonly have a great energy demand with a high charging rate, hence their accelerated growth under the approach of a smarter grid can place a considerable amount of stress on the existing power grid without effective scheduling mechanisms. In [1] inexhaustible energy generation appliances were supplied in the energy station. In [2] & [9], there are chain of charging stations supplied with an energy storage appliance and propose a system that allots power to them from the grid, as well as routes customers. In [3], the work empower the vehicle to compute a routing policy that reduces their expected time of journey. [4] describes the fee scheduling problem in EVs at the micro-grid scale. In [5] To reduce the computational demand during long control horizon, a nested optimization method is used to breakdown the joint OPF and EV charging problems. In [6] the paper explains the problem of charging a set of electric vehicles from photovoltaic power and rectified by "Maximum Variable Resource Allocation Problem" (MVRAP). In [7] & [8] an energy management algorithm that organize the optimal charging and discharging times of an electric vehicle battery has been introduced. In [10], they introduced charging rate compression (CRC) algorithm which decreases the problem-solving complexity in EVs.

II. PROPOSED METHODOLOGY

Electric vehicles are going to be the future transport. In order to increase the efficiency of the charging station and to reduce the charging time we made the charging station by utilizing the renewable and non-renewable energy to increase it's efficiency and with fast charging technology through wired or wireless modes to reduce the charging time. The charging station should have a separate battery pack from which the electric vehicles are to be charged by using DC to DC rapid charging technology through wired connection or wirelessly.Using IOT all the details i.e power consumption, cost are updated in the charging station and thus the efficiency of the charging station is increased with reduced charging time. It's performance can be increased by installing charging ports or wireless charging pads in the parking of hotel, parks, theatre, malls and in traffic signals with renewable energy sources. We know that EV charging involves renewable energy generated from solar panels utilized by all manufactures today for industrial and domestic purpose. The estimation of energy generated can be predicted even though it is not as accurate and it is time-varying and limited. By considering the charging requirements for a particular vehicle and the expected power generated from the solar generation a local energy storage unit can be introduced. In order to automatically control the storage unit in vehicles, charging station provides sufficient flexibility. So that it can increase the stations introducing energy storage. Like our ordinary electricity bill, it can charge for the storage utilized per unit energy whether it is charged or discharged and by this, charging station can be benefited by making extra cost. Whenever energy state of the storage chargers changes, they exclude the installation cost of the storage and charge for the appropriate capacity of the storage

to fulfill this task as an energy buffer. To make the entire vehicle as automated, power storage is in control by the charging station which decides when to charge or discharge the storage unit. Accurate value will be maintained by proper usage of storage unit, with the help of various monitoring sensors.

III. BLOCK DIAGRAM.



Figure 1

Figure 1 shows the block diagram of an electric vehicle charging system. The main part or the heart of the system is the microcontroller which controls the functions of the devices connected according to the requirement. We will be using the ESP32 processor with programming in Embedded C. The below figure 2 the

different sensors will be used in the system.



Figure 2

The two sources of input are solar panel [11], grid supply. Mostly solar cells available in different voltages and current ratings and when it absorbs sunlight it generates electricity. Current sensor is used to measure the amount of current in a wire and generates a signal which is directly proportional to the current. The output signal is used to display the measured current using ammeter, or can be utilized for further analysis. Another important sensor is the Voltage Sensor which is mainly used to converts voltage measured into a physical signal and it is directly proportional to the voltage. Radio Frequency Identification system [12-14] has two main parts, a tag attached to an object which is to be identified, and a Transceiver called as Reader. The Reader consists of a RF module and an antenna which produces high frequency electromagnetic field.



Figure 3

Figure 3 shows the front view of Esp32, OLED. Organic Light Emitting Display is a LED in which the emissive electroluminescent layer is a film of organic compound that emits light in response to an electric current. In between two electrodes organic layer is present and at least one of the electrodes is transparent. an IOT platform includes firmware which runs on the ESP32 Wi-Fi module. The IOT module can be controlled from local Wi-Fi network or from the internet source. The ESP-32 module consists of GPIO pins which is programmed to turn ON/OFF the LED or a relay through the internet. We can use any operating systems to write code and upload such as Windows, Mac OS, and Linux.

IV. CONTROLLER.



- 1. 18A Analog-to-Digital Converter (ADC) channels10 Capacitive sensing GPIOs
- 2. 3 UART interfaces
- 3. 3 SPI interfaces
- 4. 2 I2C interfaces
- 5. 16 PWM output channels
- 6. 2 Digital-to-Analog Converters (DAC)
- 7. 2 I2S interfaces

The integration of Bluetooth, Bluetooth LE and Wi-Fi ensures that a wide range of applications can be targeted, and that the module is future proof: using Wi-Fi allows a large physical range and direct connection to the internet through a Wi-Fi router, while using Bluetooth allows the user to conveniently connect to the phone or broadcast low energy beacons for its detection. The sleep current of the ESP32 chip is less than 5 μ A, making it suitable for battery powered and wearable electronics applications. ESP32 supports a data rate of up to 150 Mbps, and 20.5 dBm output power at the antenna to ensure the widest physical range. As such the chip does offer industry-leading specifications and the best performance for electronic integration, range, power consumption, and connectivity.

V. DISCUSSION.

Wireless Battery Charger mainly works on the principle of mutual inductance. Power is transferred from transmitter to the receiver wirelessly based on the principle of inductive coupling. By considering this, we are designing an electric vehicle charging station and it is controlled through IOT. The efficiency of the charging station will be increased by utilizing the power from non-renewable resources and by DC to DC rapid charging method the charging time was also increased by wireless charging method in the vehicle parking areas. The user get details about the charging time, charging voltage and the cost for charging in the charging station as well as the owner of the vehicle can also check these details in the electric vehicle charging webpage.

VI. ACKNOWLEDGMENT.

Special thanks to our Guide *Prof. Aarti naik* for assisting us to partially complete our project on "IOT based Electric vehicle charging station". Her expertise and talent in circuit designing and troubleshooting and logical regression helped us effectively to partially complete this project. We would also like to thank our Head of Department *Prof. Manjiri M. Gogate* madam for providing us online/offline facility and labs, which helped us constantly in increasing our technical knowledge, and to write this report. We are also thankful to our Principal *Dr. S. Ram Reddy* sir for his continuous encouragement throughout the process. Now, last but not the least special thank to all the staff of Electronics Engineering Department for their technical support and constant motivation, without which this work would not have become successful.

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AURDINO BASED SANITIZATION ROBOT USING UV LIGHT

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ABSTRACT

The global COVID-19 pandemic due to the novel coronavirus SARS-CoV-2 has challenged the availability of traditional surface disinfectants. It has also stimulated the need of different cleaning and sanitization methods by companies and institutions Bacteria and viruses survive on inanimate surfaces in hospitals for up to several days and longer. The global COVID-19 pandemic due to the novel coronavirus SARS-CoV-2 has challenged the availability of disinfectants Shortages in surface disinfectants, although worrying, is not the only aspect that matters in providing clean environments in healthcare showed that only 50% of surfaces in hospital rooms are sufficiently cleaned between patients stays. Thus, the hospital environment is a possible source for the transmission of pathogens in the healthcare environment .As we're going towards robotic world we can use Arduino based automatic robot consisting of UC-C light. As we talk about robots, They may be defined as machines programmed by humans to perform tasks and navigate themselves through space and time on their own. The most widely applied technology focusses on surface disinfection by applying ultraviolet UV-C radiation. All types of UV-disinfection robots offer a non-touch technology, delivering disinfection by irradiation of effective intensity to kill microorganisms. This robot can be advocated as a simple solution for the immediate disinfection of rooms and spaces of all surfaces in one process and as such they seem attractive to hospital, airports malls and other managements, As it can work automatically it can reduce cleaning staff. As it uses UV-C light for sanitization which less harmful when compared with other types of UV light. It will also replace the harmful chemicals based sanitizers which prove harmful for our kids and pets

Keywords — Arduino UNO, UV-C Light, HC-SR04 Sensor, COVID-19.

INTRODUCTION

Coronavirus disease (COVID-19) is an infectious disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2), COVID-19 has affected nearly 12.2 million people and has claimed the lives of 552, 112 people from all over the world. This disease affects different people in different ways. Some people may develop mild to moderate illness and recover without special treatment or hospitalization, while some may develop severe illness and even die. The incubation period of this virus, on average 5-6 days but it could also be up to 2 weeks. During this period, the person may not experience any symptoms but could still be contagious. The person will be a virus carrier and easily spread it when he/ she does not take any precautionary measures. Coronavirus has spread rapidly and many countries have been affected by this pandemic. While some countries are recovering, other countries are still in lockdown and some are suffering from the second wave of coronavirus. This study presents a comprehensive overview of the robotics potential in medicine and allied areas with special relation to the control of the COVID-19 pandemic. Effective management of COVID-19 can significantly reduce the number of infected patients and casualties as witnessed in the case of the Chinese outbreak. Since, it has currently turned out to be a global challenge, technologically advanced countries can aid others by donating support equipment and robotic infrastructure to enable a good outcome in controlling this disease. This review substantiates that the introduction of medical robotics has significantly augmented the safety and quality of health management systems compared to manual systems due to healthcare digitization. Classification of medical robots is only done using application-based categories to fit every aspect of hospital service ranging as well as fault tolerant control and dependable architectures for reliable and safe operation within the healthcare facilities.

MOTIVATION AND OBJECTIVE

As we all are suffering from ongoing pandemic from past 2 years, At start of pandemic we have faced shortage of sanitizers and masks but after sometime time sanitizers were available in market some reputed brands are there which are expensive compare to local brands, Local brands are cheap but we don't know which chemicals were use which can be harmful and now government have started lifting restriction on various public place such as malls, theatre, schools, colleges, religious places etc with mandatory standard operating procedures (SOP) in every SOPs we can see sanitization as important aspect of SOP so to save same money organization can use cheap quality sanitizers which can prove harmfuls to us our childrens as well as our pets to so our main motive

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behind this is to avoid harmful chemical based sticky sanitizers with Arduino base sanitizing robot using UV light

PROJECT OUTLINE

The robot can disinfect and kill diseases, viruses, bacteria, and other types of harmful organic microorganisms in the environment, with ultraviolet light, by breaking down their DNA-structure. Currently, several countries have tested these robots successfully to disinfect their hospitals, public transports, office spaces, and other public places. We have implemented this UV robot in a cost-effective way to expand the disinfection process to public places

HARDWARE AND SOFTWARE REQUIREMENT

Aurdino Uno



ARDUINO PRO MINI board is one of the application boards. Since it is an application board, it does not have an in-built programmer. USB port and other connectors are also removed. Because once it is placed in an application programmer and connectors are basically useless. ARDUINO PRO MINI is of two types; they are differentiated based on CONTROLLER working voltage. One is +3.3V and another is +5V.

WHERE TO USE ARDUINO PRO MINI

All the ARDUINO boards are popular because of ease of understanding and application. Also, the ARDUINO is an open source platform where one can get all related data and original module schematics. In this platform, one can customize the system depending on the need. There are many ARDUINO boards in the market. They are available with various features and packages. One can choose appropriate board depending on the need. There are few cases where PRO

MINI is chosen over other Arduino boards:

Case1: Where system is permanent installation. In permanent applications, the board only needs to be programmed once, and that is all. In those cases features provided like USB programmer, I/O connectors and other supporting hardware is

useless. The PRO MINI is specifically designed for those systems. This board has only basic hardware just enough for those applications.

Case2: For convenience. This board is one of the smallest boards of ARDUINO. With its comfort size, it can be used in mobile applications.

Case3: With basic hardware the cost of board is considerable lesser.

Case4: With 32Kbytes memory, the PRO MINI can accommodate most application programs.

Using PRO MINI is similar to any other development board. All you need to do is program the controller and provide the appropriate peripheral to get system running.

Algorithm:

First you need to get a programmer. As mentioned earlier, the PRO MINI does not have an inbuilt programmer, so you cannot connect PRO MINI directly to PC to program it.

2 Download and install ARDUINO IDE software.

3 List the functions to be performed by PRO MINI.

4 Write the functions as program in IDE. Remember the program is written in 'C' language.

5 Connect the programmer and establish a communication between IDE and PRO MINI.

6 Run the program to PRO MINI through IDE.

7 Disconnect the programmer. Provide the power and attach the necessary peripherals. After reset, the control executes the program and provides the desired output.

HC-SR04 ULTRASONIC SENSOR



The HC-SR04 Ultrasonic Distance Sensor is a sensor used for detecting the distance to an object using sonar. It's ideal for any robotics projects your have which require you to avoid objects, by detecting how close they are you can steer away from them! The HC-SR04 uses non-contact ultrasound sonar to measure the distance to an object, and consists of two ultrasonic transmitters (basically speakers), a receiver, and a control circuit.

The transmitters emit a high frequency ultrasonic sound, which bounce off any nearby solid objects, and the receiver listens for any return echo. That echo is then processed by the control circuit to calculate the time difference between the signal being transmitted and received. This time can subsequently be used, along with some clever math, to calculate the distance between the sensor and the reflecting object! We have this sensor and along with our Ultrasonic mounting kit you can easily attach this sensor to your project and get measuring distances. Using an UltraBorg you can connect up to 4 of these HC-SR04 sensors to obtain precise

distance measurements without effecting CPU load or alternatively you can connect one directly to your Aurdino pro mini using a few resistors; The HC-SR04 is great, as it's low cost, The HC-SR04 has a 5V output.

The HC-SR04 sensor works best between 2cm - 400 cm (1" - 13ft) within a 30 degree cone, and is accurate to the nearest 0.3cm.

Features

- Input Voltage: 5V
- Current Draw: 20mA
- Digital Output: 5V
- Digital Output: 0V
- Working Temperature: -15°C to 70°C
- Sensing Angle: 30° Cone
- Angle of Effect: 15° Cone
- Ultrasonic Frequency: 40kHz
- Range: 2cm 400cm

Dimensions

- Length: 43mm
- Width: 20mm
- Height (with transmitters): 15mm
- Centre screw hole distance: 40mm x 15mm
- Screw hole diameter: 1mm (M1)
- Transmitter diameter: 8mm

L293D MOTOR DRIVER:



L293D IC is a typical Motor Driver IC which allows the DC motor to drive on any direction. This IC consists of 16-pins which are used to control a set of two DC motors instantaneously in any direction. It means, by using a L293D IC we can control two DC motors. As well, this IC can

drive small and quiet big motors. This L293D IC works on the basic principle of H-bridge, this motor control circuit allows the voltage to be flowing in any direction. As we know that the voltage must be change the direction of being able to rotate the DC motor in both the directions. Hence, H-bridge circuit using L293D ICs are perfect for driving a motor. Single L293D IC consists of two H-bridge circuits inside which can rotate two DC motors separately. Generally, these circuits are used in robotics due to its size for controlling DC motors.

Pin Diagram



Pin-1 (Enable 1-2): When the enable pin is high, then the left part of the IC will work otherwise it won't work. This pin is also called as a master control pin.

Pin-2 (Input-1): When the input pin is high, then the flow of current will be through output 1.

Pin-3 (Output-1): This output-1 pin must be connected to one of the terminals of the motor.

Pin4 &5: These pins are ground pins.

Pin-6 (Output-2): This pin must be connected to one of the terminals of the motor.

Pin-7 (Input-2): When this pin is HIGH then the flow of current will be though output 2.

Pin-8 (Vcc2): This is the voltage pin which is used to supply the voltage to the motor.

Pin-16 (Vss): This pin is the power source to the integrated circuit.

Pin-15 (Input-4): When this pin is high, then the flow of current will be through output-4.

Pin-14 (Output-4): This pin must be connected to one of the terminals of the motor.

Pin-12 & 13: These pins are ground pins

Pin-11 (Output-3): This pin must be connected to one of the terminals of the motor.

Pin-10 (Input-3): When this pin is high, then the flow of current will through output-3.

Pin-9 (Enable3-4): When this pin is high, then the right part of the IC will work & when it is low the right part of the IC won't work. This pin is also called as a master control pin for the right part of the IC.

Working

There are 4 input pins for 1293d, pin 2,7 on the left and pin 15,10 on the right as shown. Left input pins will regulate the rotation of motor connected across left side and right input for motor on the right hand side. The motors are rotated on the basis of the inputs provided across the input pins as LOGIC 0 or LOGIC 1. In simple you need to provide Logic0 or 1 across the input pins for rotating the motor.

Voltage specifications

VCC is the voltage that it needs for its own internal operation 5v; L293D will not use this voltage for driving the motor. For driving the motors it has a separate provision to provide motor supply VSS (V supply). L293d will use this to drive the motor. It means if you want to operate a motor at 9V then you need to provide a Supply of 9V across VSS Motor supply. The maximum voltage for VSS motor supply is 36V. It can supply a max current of 600mA per channel. Since it can drive motors Up to 36v hence you can drive pretty big motors with this l293d.

N20 Motor Wheel:



N20 Geared Motor Rubber Wheel Kit consists of Metal Gearbox Motor, Wheel 3mm Shaft and connecting parts. This is a DC Mini Metal Gear motor and it is ideal for making small robots.

Its a lightweight and high torque motor. It has fine craftsmanship, it is durable, not easy to wear with excellent stall characteristics, can climb hills easily, you can also easily mount the wheels on motors shaft. The N20 Micro Gear 12V 100RPM DC Motor (High Torque) is lightweight, high torque, and low RPM motor. It is equipped with gearbox assembly so as to increase the torque of the motor. It has a cross-section of 10×12 mm, and the D-shaped gearbox output shaft is 9 mm long and 3 mm in diameter. It has a very small size so as fit in complex spaces of small-scale applications. One can connect this Micro Gear 100RPM 12V DC Motor (High Torque) has small volume, torsion big, all metal gear, durable, not easy to wear. Great replacement for the rusty or damaged DC geared speed reduces motor on the machine.

Features

- This is a DC Mini Metal Gear Motor, ideal for making robots
- Lightweight, high torque and low RPM
- Fine craftsmanship, durable, not easy to wear
- With excellent stall characteristics, can climb hills easily
- You can also easily mount a wheel on the motor's output shaft

7805 VOLTAGE REGULATOR:



Voltage regulator like IC7805 belongs to the 78xx series ICs. In the 78xx series, xx represents the fixed output voltage value and 7805 is a fixed linear voltage regulator. Batteries provide a voltage of 1.2V, 3.7V, 9V, and 12V. This voltage is good for the circuits which voltage requirements are in that range.

The regulated power supply in this regulator is +5V DC. The 7805 voltage regulator is a three-terminal voltage regulator IC. In various applications, a 7805 voltage regulator with a fixed output voltage is used.

Pin 1: Input

This is an input pin and the voltage range should be between 7V to 35V. an unregulated voltage is applied to this input pin for regulation. The pin will receive its maximum efficiency at 7.2V input

Pin 2: Ground

it means the ground is connected to this pin. Input and output are common to it.

Pin 3: Output

Where the regulated output is taken by this pin. It is about 5V(4.8V to 5.2V)here Energy is exhausted in the form of heat In IC 7805 voltage regulator. The heat released is the input and output voltage difference. If the difference is less in between input voltage and output voltage, the heat generation will be low and if the difference between the input and output voltages are high, the more heat is generated. due to this heat malfunction occurs even without a heat sink.

Application

- Regulated dual supply
- Current regulator
- Fixed output regulator
- Reverse bias projection circuit
- Adjustable DC voltage regulator etc.

This 7805 IC is used in building circuits for a phone charger, infrared remote control extension, UPS power supply, and even portable CD player

Sterilize Viruses and BACTERIA using uv light

The primary function of the robot is to disinfect a room or a flat surface using ultraviolet germicidal irradiation. The robot has ultraviolet LEDs which is responsible for killing the

virus. Bio-organisms such as bacteria, viruses are known to be deactivated when exposed to UV light. Ultraviolet light destroys the genetic material in pathogens—DNA in bacteria

and RNA in viruses thus preventing them from reproducing. Virus-like COVID-19 can remain active on surfaces for a long time, and UV light has been proven to destroy the

RNA in viruses, thus killing it in the process, which reduces the chance of transmission.



CIRCUIT DIAGRAM AND DESCRIPTION Working

Working

This robot is completely automatic and it will detect obstacles and avoid those before a collision happen. there are many options to detect an obstacle, but for this project, we have chosen to do it with an ultrasonic sensor module because it has a lot more advantages over conventional IR based obstacle avoidance sensors, first is the range, it has a longer range compared to the range of an IR based proximity sensor. Second, like the IR sensor,

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sunlight doesn't interfere with the sensing capabilities of the sensor. The HC-SR04 ultrasonic distance sensor module has 4 pins VCC, Trigger, Echo, and Ground. It has one ultrasonic transmitter and one receiver. The working is very simple, first module transmits ultrasonic wave which travels through air, hits an obstacle, and bounce back that is when the receiver receives that wave. To measure the distance of an object, we need to calculate the time taken to bounce back the wave. We can calculate this time with the help of a microcontroller and with the help of this equation Distance= speed of sound*time taken, we can calculate the distance of the obstacle. In this robot, we have three ultrasonic sensors for detecting obstacles in the left, right, and front. When an obstacle comes in front of any sensor (at a certain distance) the robot will turn in to the opposite side and avoid that obstacle for example if an obstacle comes in front of the left sensor robot moves to the right. While the robot is powered ON, the UV LEDs will stay ON and the sterilization process will continue. It has a total of Uv Led (Two on each side and two on the downside) so this gives a 360°+ downside sterilization. This robot is 100% safe to operate and it will detect items in the environment for its operation and the safety of operators (obstacle avoidance). The robot is fully autonomous when UV irradiation is being performed this robot has a full 360-degree movement.

CONCLUSION

This study presents a comprehensive overview of the robotics potential in medicine and allied areas with special relation to the control of the COVID-19 pandemic. Effective management of COVID-19 can significantly reduce the number of infected patients and casualties as witnessed in the case of the Chinese outbreak. Since, it has currently turned out to be a global challenge, technologically advanced countries can aid others by donating support equipment and robotic infrastructure to enable a good outcome in controlling this disease. This review substantiates that the introduction of medical robotics has significantly augmented the safety and quality of health management systems compared to manual systems due to healthcare digitization. Classification of medical robots is only done using application-based categories to fit every aspect of hospital service ranging as well as fault tolerant control and dependable architectures for reliable and safe operation within the healthcare facilities.

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IMAGE RETRIEVAL BASED ON SIMILARITY SCORE FUSION USING CHAOTIC FUZZY GENETIC ALGORITHM

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ABSTRACT

This paper proposes an image retrieval method based on colour, texture and shape feature similarity score fusion. For checking similarity score we'll use genetic Algorithm. Single feature describes image content only from one point of view, which has a certain limitations. Fusing multifeature similarity score will improve the system's retrieval performance. In this paper, the retrieval results from color, texture and shape feature are analyzed, and the method of fusing multi-feature similarity score is described. For the purpose of assigning the fusion weights of multi-feature similarity scores reasonably, the genetic algorithm is applied. For comparison, other three methods are implemented. They are image retrieval based on color feature, texture feature and fusion of color-texture feature similarity score with equal weights. The experimental results show that the proposed method is superior to other methods.

Keywords: image retrieval; color feature, texture feature, shape feature, feature fusion; genetic algorithm

1. INTRODUCTION

Imaging science gives a lot of importance to image processing. Now before discussing what image processing is all about, let's try and see if we do actually come across it in the real world. Now what happens when you go out? Suppose you're on a holiday somewhere very beautiful place and you pick up the phone and you call your friend up and your friend is like oh wow nice place. You're talking about tell me more about it and you try and describe the whole view in front of you by using some sort of characteristic features of that place. You tell about couple of palm trees here and there. We know everyone has got a smartphone these days. Everyone can just click a picture and send it over to wherever they want. But it's not that situation for understanding sake. Let us think that we are back in older times and we are trying to tell a friend what this place looks like. So when we are giving out information about the whole image of the place, that is in front of us our friend is analyzing that information.

Image speaks louder than words. Researchers have been consistently working on developing image processing techniques which shall provide more features and better accuracy with increased speed of processing the image. Thanks to the available high speed processing engine which are affordable ass well these days. Also, storage has become much cheaper than what it was earlier which enables everyone to store more images. An image be it a digital or a still image, all of it is nothing but a binary representation of some visual information. The visual information can be a simple drawing, photographed pictures, and recorded graphs, logos of the organizations or anything of this sort. All these digital images have something in common. They all can be stored and saved for future use electronically in any storage device. Assume a human watching a traffic signal on the road. Immediately, his eyes will start capturing the content and brain shall interpret what the signals signify. Based on the understanding, he would make a move further. In digital Image Processing, the same image shall be fed in as an input to the system and the system shall interpret and understand the content to let the further actions happen. The algorithms developed shall play a major role in understanding the content with higher accuracy.

When it comes to machine vision application, the purpose of image processing techniques is different. Here, we are not much interested in improving the visual quality. But here, what we are interested in is processing the images to extract some description or some features which can be used for further processing by a digital computer and such a kind of processing can be applied in industrial machine vision for product, assembly and inspection. It can be used for automated target detection and tracking. This can be used for finger print recognition. This can also be used for processing of aerial and satellite images for weather prediction, crop assessment and many other applications. Let us look at this different applications one after another. Let us consider application of automation of a bottling plant here. What the plant does is it fills of some liquid, some chemical into a bottle and after it fill up the bottle, the bottles are carried away by the conveyor belts and after that these are packed and finally sent to the customers. So, here checking the quality of the product is very important and in this particular application, the quality of the product indicates that whether the bottles are filled properly or some bottles are coming out empty or partially filled. So naturally, the application will be that if we can find out that some bottles are partially filled or some bottles are empty, then naturally we do not want those bottles to be delivered to the customers because if the customer gets such bottles, then the good will of that company will be lost. So, detection of the empty bottles or partially filled bottles is very important and here

image processing techniques can be used to automate this particular process. So naturally, we want to detect the particular unfilled / partially filled bottle and remove it from the production line so that finally when the bottles go to the customer, no empty bottle or no partially filled bottle are given to the customers.

Whenever we talk about an image, the image usually shows 3 kinds of redundancies. The first kind of redundancy is called a pixel redundancy. The second kind of redundancy is called a coding redundancy and third kind of redundancy is called a psycho visual redundancy. So, these are the 3 kinds of redundancy which are present in an image. So, whenever we talk about an image, the image contains 2 types of entities. The first one is information content of the image and the second one is the redundancy and these are the 3 different kinds of redundancies. So, what is termed for image compression purpose is you process the image and try to remove the redundancy present in the image, retain only the information present in the image. So, if we retain only the information; then obviously, the same information can be stored using a much lower space. The applications of this are reduced storage as we have already mentioned. If we want to store this image on a hard disk or if we want to store the video sequence on a hard disk, then the same image or the same digital video can be stored in a much lower space. The second application is reduction in bandwidth. That is if we want to transmit this image over a communication channel or if I want to transmit the video over a communication channel, then the same image or the same video will take much lower bandwidth of the communication channel. Now, given all these applications, this again shows that what we get after compression. So here, we find that we have the first image which is the original image. The second one shows the same image but here it is compressed 55 times. So you find, if we compare the two images; we find that the visual quality of the 2 images is almost same at least visually we cannot make much of difference. Whereas, if we look at another image which is compressed 156 times; now if you compare this third image with the original image, you find that in the third image there are a number of blocked regions or blocky, these are called blocking artifacts which are clearly visible when you compare it with the original image. The reason is as we said that the image contains information as well as redundancy. So, if we remove the redundancy, maintain only the information; then the reconstructed image does not look much different from the original image. But there is another kind of compression techniques which are called lossy compression. In case of lossy compression, what we remove is not only the redundancy but we also remove some of the informations so that after removing those informations, the quality of the reconstructed image is still acceptable.

2. PROBLEM STATEMENT

In expensive image-capture and storage technologies have allowed massive collections of digital images to be created in lots of application areas such as medicine, remote-sensing, entertainment, education and on-line information services. Storing of such images is relatively above-board, but an accessing and searching image database is intrinsically difficult and key challenging problems with image retrieval. Image retrieval is done by two ways,

- 1] Text-based approach
- 2] Content based approach.

In text-based approach, image is search through image databases using manual keyword annotations and keyword indexing. Although this approach can be useful, there are two rigorous problems with it. First, textual tagging of images requires a lot of user effort and is also a very tedious task. If the database is very large, then it is not practically feasible to annotate each image with textual tags. Second is that there is no standard vocabulary that is used for textual tagging. The perception of images may vary from person to person, resulting in different tags for images that are otherwise similar. Also the vocabulary that is available may not be sufficient to completely describe the image. Therefore, new ways of indexing, browsing and retrieval of images are needed, which can automatically generate descriptors for images.

Content-based image retrieval (CBIR) is a technique in which images are extracted directly based on their visual descriptor such as colour, texture, and edge. An image has several types of features; every feature has different effect on image retrieval. How to organize these features and properly assign weights to get satisfying retrieval results is a one of the challenge in Content-based image retrieval (CBIR).

3. IMPLEMENTATION

The proposed methodology process flow is given below,

1. Initially a database is created with the images - The image database downloaded from 'http: //wang.ist.psu.edu/docs/related/' website. These databases have thousands of images having a same resolution.

2. Then utilize the deep CNN (Convolutional Neural Network) to extract the image feature. In traditional CBIR systems, low-level features such as the colour, shape and texture features are usually extracted to construct a feature vector for describing images and then, based on a proper similarity measure, images are retrieved by comparing the feature vector corresponding to the query image and those corresponding to images in the data set. Many researchers devote most of their attention to the selection of appropriate feature extraction method. However, they usually fail to extract the internal structure contained in the features which is crucial for distinguishing data points. In our paper, we aim to find this internal structure from the original data space. Moreover, deep learning paradigm is that features need not to be extracted from the raw data beforehand, but the raw data themselves are processed by the network that produces an internal feature representation of the data suited for the task at hand. The CNN can also serve as good descriptors for image retrieval.

4. PROCESS FLOW DIAGRAM



Fig. Process Flow

5. RESULT

We select an image of monument from the database of nearly 1000 images of different types. We use MATLAB for simulation purpose i.e. for finding similar images with respect to input image.



Fig. Input Image Retrieval Images



Fig. Output Image

We select a particular animal (Elephant) as an input image. Using MATLAB we found the output as follows.



Fig. Input Image



Fig. Output Images

Now we consider a landscape with mountain in background and a water body in front. The result using MATLAB coding is as follows.



Fig. Input Image



Fig. Output Images

Now we consider food image like vegetables, fruits image as an input image and try to find similar images from the database relevant to input image using MATLAB.



Fig. Input Image

 Reserved Images

 Image: Second Image
 Image: Second Image

 Image: Second Image
 Image: Second Image

Fig. Output Images

6. CONCLUSION

Image library is used to evaluate the proposed algorithm. It contains different categories, each of which has about 100 images. The total number of images is about 600. They are Alphabets, Flower, Landscapes, Dinosaurs, Automobiles, Animals and so forth. The color feature and texture feature of every image are extracted to build feature database.

The method based on color feature is better than the method based on texture feature. However, relative to the color based image retrieval method, performance of other image retrieval methods based on multi-feature similarity score fusion doesn't increase much. This is mainly due to that compared with image retrieval method based on color feature; the performance of image retrieval method based on texture feature is poor. There are two possible reasons for it. One is that the color difference of different images in this image library is more obvious, and the performance of image retrieval method based on color feature is better. The other is that for this image library, the extracted texture feature may be insufficient to reflect the differences between different classes, which make performance of image retrieval based on texture feature poor. Better performance of image retrieval method based on texture feature is expected to increase the performance of image retrieval method based multi-feature similarity score fusion.

This project proposed an image retrieval method based multi-feature similarity score fusion. For a query image, multiple similarity score lists based on different features are obtained. Then using genetic algorithm, multi-feature similarity scores are fused, and better image retrieval results are gained. In this project, when we evaluated the fitness of an individual, we considered only the occurrence frequencies of an image in retrieval result, and not the location of an image in retrieval result.

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PREPARATION OF PAPERS - KINETIC ENERGY HARVESTING

Shweta Singh, Janhavee Khot, Shubham Nikam, Prof. Abhijit Somnathe (Guide)

ABSTRACT—

This paper is an effort to research kinetic energy harvesting as a potential power source for local wireless applications. Harvesting devices are often used as resonant devices where the output power depends on the inertial weight size, frequency and magnitude of the vibration drive, the available magnitude for bulk displacement and mitigation. In this paper, we will discuss what kinetic energy harvesting is and what are the various methods of harvesting kinetic energy that go into waste. The main aim of this paper is kinetic energy generators or also called as kinetic energy generators which convert energy in the form of motion present in our day to day environment and turn it into electrical energy.

Keywords—Kinetic energy, kinetic energy harvesting, methods of harvesting kinetic energy, kinetic energy generators and converters

I. INTRODUCTION

The recovery of kinetic energy which is wasted during the normal operation in various fields is paving a new way for enabling a huge number of applications. One of the main selected technologies that meet the harvested power levels, usually a few hundred microwatts, can be wireless nerve networks (WSNs). Acceleration, temperature, pressure, the toxicity of the air, biological parameters, magnetic field, light intensity and so on are sensed and communicated via this technology which consists of a grid of spatially-distributed wireless nodes, among each other and up to the end-user through a fixed server. In the next few years, a wide range of applications such as structural monitoring, industrial sensing, remote healthcare, military equipment, surveillance, logistic tracking and automotive monitoring will massively employ WSNs in them. As a matter of fact, harvestation of energy directly from the surroundings not only represents a realistic means to integrate or substitute batteries but is the only way for enabling many present and future wireless applications that will be all used and applied into the so-called "internet of things". In fact, WSNs already have the characteristics of ubiquity, self-organizing and self-healing but they would not be deployable unless they are also able to empower themselves. Technically and practically, it is quite expensive and impossible to replace batteries in most expected systems. For long-term operations in locations that are harsh, unreachable and inaccessible, energy harvesting can be a potential and key solution. For example, long-term environmental, structural health of buildings or bridge monitoring and control would require hundreds or thousands of integrated sensors which are impossible to be replaced or maintained. The possibility for chronically ill patients to be continuously monitored without changing, replacing or constantly monitoring the batteries would represent a significant improvement in their life quality. Among the various renewable energy sources in the solar system, radio frequency RF, temperature and biochemical differences, kinetic energy in the form of mechanical vibrations or motions are considered the most attractive, in the low-power electronic environment, due to density, flexibility and abundance. This type of energy source is located in industries, buildings, vibrating machinery, transportations vehicles, ocean waves and human beings, and it can be converted to power mobile devices. The power consumption of wireless sensors has been largely reduced in the last years because of the Ultra-Low-Power electronics. Typical power needs of mobile devices such as wristwatches, RFID, MEMS sensors and actuators can range from a few microwatts up to hundreds of milliwatts for MP3, mobile phone and GPS applications. For 99.9% of their operation time these devices are usually in a sleep state and only wake up for a few milliseconds to communicate or transfer data. In order to match the power density capability of current generators which is usually 100-300 microwatts per cubic centimetre, their average power consumption has been reduced below 10µW. Embedded vibration energy harvester (VEH), multiple-sensor module, microcontroller and a transceiver are commonly included by the integrated vibration-powered wireless sensor. Due to the variable nature of vibrations in their intensity and frequency, the device can also contain an AC/DC voltage regulation circuit that can recharge a provisional storage system which is mostly a super-capacitor or a thin film Lithium battery. Capacitors are usually preferred as temporary storage systems for their long lifetime, fast recharging and higher power density. However, In some applications, a storage system is not even necessary. The vibration module for energy harvesting is usually in respect to a specific system and source vibration source: harmonic excitation, random sound or pulse movement.



Fig.1 Wireless sensor network and vibration-driven wireless node

II. CONVERSION TECHNIQUES

There are three main systems of kinetic-to-electrical energy conversion: electrostatic, electromagnetic and piezoelectric.

A. Electrostatic

Electrostatic harvesters basically include a variable capacitor in which one electrode is attached to an oscillating mass suspended by beams and the other electrode is fixed somewhere else in the support structure. When a force is applied to the mass either the overlap surface of electrodes or the dielectric gap varies depending on the moving direction: the first case is an in-plane gap-closing converter while the second case is an overlap varying converter. As a result, the capacitance changes and additional charges occur at the electrodes which in turn balances the bias voltage. Hence a current flows through a load shunted to plates during the movement of the proof mass. A similar method for fixed bias voltage can be charge constrained where a constant charge is held onto the plates via a battery or another capacitor.

One major disadvantage of electrostatic vibration harvesters would be the need for an external voltage source to be previously charged. This fact contrasts with the goal of energy recycling from the surroundings, but it makes sense if the source comes from the energy storage which is associated with the harvester. In that situation, the generator only needs to be kick-started at the beginning of the conversion process. This problem can be overcome by using electrets to provide the pre-charge bias voltage in some designs.



Fig.2 (A) comb gap-closing electrostatic VEH (B) MEMS in-plane overlap electrostatic VEH

B. Electromagnetic

Electromagnetic technology is easily identifiable, according to Faraday's law, by combining a permanent magnetic field produced by a permanent magnet and a solenoid in a related motion - one that often acts as a stator; the other as a mover. Complementary behaviour is shown in the system in terms of frequency bandwidth and optimal load. They are recommended for lower frequencies (2-20 Hz), small impedance and medium size. In addition, their cost is smaller than other solutions. Most of the commercial solutions are available at centimetre scales because of the higher power density than piezoelectric devices that are exhibited by them.

While the integration of electromagnetic harvesters into micro-electro-mechanical systems (MEMS) is difficult. Some of these limitations have been overcome to date.



Fig.3 (A) em-VEH (B)Moving magnet across coil arrangement (C) Microfabricated em-VEH

C. Piezoelectric

Piezoelectric transducers use electrically polarized materials such as Zinc Oxide (ZnO), Barium Titanate (BaTiO3) and Lead Zirconate Titanate (Pb[ZrxTi1-x]O3), known as PZT which is commonly considered one of the best materials for high electromechanical coupling. French physicists Jacques and Pierre Curie in 1880 discovered the direct piezoelectric effect used for energy harvesting. It occurs when an electric charge is generated within a material in response to an applied mechanical force. The strain and coupling coefficients in the fundamental piezoelectric equations are in general much lower in 31 modes than in 33. Whereas the 33 mode of bulk crystal corresponds to very high natural frequencies (~1 to 100 kHz), while on the other hand longitudinal strain that is easily produced within a cantilever beam resonates at lower frequencies (~100 Hz).

Piezoelectric systems are capable of high voltage levels (from 2 to several volts) resulting in a well adaptable compact size and better in terms of power density per unit of volume. But piezoelectric coupling decreases very rapidly on a micrometric scale and large load barriers are required to reach the proper working environment.



Fig.4 (A) Direct piezoelectric effect with 33 and 31 (B) Polarization process scheme (C) Bimorph piezoelectric cantilever beam.

However, other problems such as ageing, depolarization and brittleness must also be considered. Polymer-based materials (e.g. dielectric elastomers) constitute a valid alternative to ceramics because of their flexibility, inexpensiveness and durability for low-frequency applications, such as those related to wearable sensors.

III. BEYOND LINEAR ENERGY HARVESTING

It has been reportedly studied that the linear oscillators which are designed as the energy harvesters match their resonant frequencies of the environment to reach the maximum power.

When the excitation frequency is known and stable in time at such condition it can be performed easily. It chooses the harvester dimension and the correct geometry for matching frequencies.

When the encompassing excitation frequency is unknown, the previous condition is not guaranteed.

Thus a harvester with a fixed resonant frequency is not able to reach an optimal output power.

To increase the bandwidth of vibration-based harvesters many strategies have been investigated.

There are three main categories: Multimodal oscillators, Resonance frequency tuning and frequency upconversion.

A. Multimodal Oscillator

This multimodal consists of a multi-vibration harvester which is thus plotted to be excited when the natural frequency reaches out to the one natural frequency of the harvester. A combination of more transduction mechanisms all together is one of the ways to plan and design a multimodal harvest.

It consists of a cantilever beam with piezoelectric crystal plates joined on it at a regular fixed distance from each other, at the cantilever tip a permanent magnet is attached which is oscillating within a coil. At the cantilever first mode (at 20 Hz) the electromagnetic transducer generates high output power, also at the cantilever second mode (at 300 Hz) the piezoelectric transducer generates high power due to this combination in the device, it is capable of significantly improving the harvester response hiding two frequency ranges. Combining the output power from two different mechanisms is difficult, hence it requires two separate converting circuits. A wide vibration bandwidth can be exploited if the geometric parameters of the harvesters are appropriately selected.

The multimodal increases the weight of the harvester and also increases its bandwidth and volume which leads to reducing the energy density. In the cantilever array, the subset or the only one cantilever are active at the same time producing some amount of power and the others are at off-resonance mode. Hence the harvester has to be designed carefully to prevent efficient loss.

B. Resonance Frequency Tuning

Two different excitation frequencies such as passive and active have been demonstrated in the resonance frequency of an oscillator in some cases. For the passive mode, sporadic power input is thus required to tune and to check the system till the frequency is completely matched, then zero power is required since the excitation frequency changes again. For the active mode, a huge amount of power is required for tuning the system as long as it requires continuous power for it to work, thus higher power consumption is used to increase the harvester efficiency. Mechanically the tuning mechanism uses the piezoelectric material and the springs or screws with magnets around it.

C. Frequency Up-Conversion

This technique was carried out in few applications like for generators for low and variable speed rotary machines. This can be executed by integrating various oscillators and interaction mechanisms, such as electrostatic, magnetic or nurturing its fundamental principles.

This method of working is a path to break down the harvester vibration one such as their results are inconsiderate to the excitation frequency considering it is lower than the resonant frequency of the harvester.



Fig.5 Schematic of an Up-conversion VEH

The elastic constant k of an oscillator has a resonance frequency in a minor region with respect to the resonant frequencies of the piezoelectric beams. The cantilevers proceed to oscillate at their instinctive frequency when the tooth moves and strikes the cantilever tip. Hence the oscillating mass m (primary vibrating unit) has a low frequency vibration which hence further proceeds to the higher frequency vibration of the piezoelectric cantilevers (secondary vibrating unit).

Thus the transduction elements of high frequency structures supply a strong low frequency harvesting.

IV. CONCLUSION

In this paper we have tried to discuss the various strategies that are developed for kinetic energy harvesting. For the aspects of linearity and nonlinearity a very specific reference has been discussed. In this paper we have tried to show that even if various techniques have been developed to increase the bandwidth, the linear resonant systems clearly have restrictions in their practical applications. It has been exhibited that in a number of realistic energy harvesting scenarios, more complex VEHs based on non-linear mechanical oscillators can outperform them. In fact, from the relative work and papers that have been lately published and done, it comes to light that nonlinear monostable and bistable structures are the best options for enhancing the overall performances and improving the flexibility of vibration powered electronics.

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AUTOMATED VISITOR COUNTER FOR PANDEMIC SITUATION

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ABSTRACT

This paper presents the design and construction of an Automated visitor counter for pandemic situation. This is a reliable circuit that takes over the task of counting number of persons / visitors in the room very accurately and beeps a warning alarm when the number of visitors exceeds the capacity limit of the auditorium/hall. When somebody enters the room then the counter is incremented by one (+1) and when any one leaves the room then the counter is decremented by one (-1). The total number of persons inside the room is also displayed on the LCD (Liquid Crystal Display). The microcontroller is used for detecting an entry or exit action and computing the figures (addition and subtraction) to acquire accurate results. It receives the signals from the sensors, and this signal is operated under the control of embedded programming code which is stored in ROM of the microcontroller. The microcontroller continuously monitors the Infrared Receivers. When any object passes through the IR Receiver's then the IR Rays falling on the receivers are obstructed. The obstruction occurs under two circumstances, either you obstruct sensor 1 (i.e., outside the building) before sensor 2 (i.e., which is inside the building) this shows that you are entering the building or you do it the other way round, which is obstructing sensor 2 before sensor 1 to indicates an exit movement. This obstruction is sensed by the Microcontroller, computed and displayed by a 16x2 LCD screen.

Keywords—Microcontroller, Infrared Sensor, LCD, Buzzer.

INTRODUCTION

Visitor counting is simply a measurement of the visitor traffic entering and exiting conference rooms, malls, sports venues, etc. With the increase in standard of living, there is a sense of urgency for developing circuits that would ease the complexity of life. Over the years, the usage of Visitor counters has become very positive in terms of monitoring crowd behavior at a particular place. It began with a mechanical tally counter which was introduced to replace the use of tally stick. A tally (or tally stick) was an ancient memory aid device used to record and document numbers, quantities, or even messages. Historical reference is made by Pliny the Elder (AD 23–79) about the best wood to use for tallies, and by Marco Polo (1254–1324) who mentions the use of the tally in China. Tallies have been used for numerous purposes such as messaging and scheduling, and especially in people counting, financial and legal transactions, to the point of being accuracy. The substitute of the tally stick was the mechanical tally counter, it is a device used to incrementally count something, typically passing. One of the most common things tally counters are used for is counting people, animals, or things that are quickly entering and existing a location. As times went on, an electronic tally counter was introduced which used an LCD screen to display the count, and a push button to advance the count. Some also have a button to decrement the count in case of a miscount. Now, due to technology advancement, various type of people counter has been introduced to automatically count the number of people entering and exiting a building at a particular time. Some of these are laser beam, thermal imaging, video camera and the infra-red sensor. All these sensors play their role respectively as visitor detector. These devices are very reliable and accurate in terms of performance as compared to the mechanical tally counter. The primary method for counting the visitors involves hiring human auditors to stand and manually tally the number of visitors who enter or pass by a certain location. The human auditing application or the human-based data collection was unreliable and came at great cost. For instance, in situations where a large number of visitors entering and exiting buildings such as conference rooms, law courts, libraries, malls and sports venues, going for human auditors to manually tally the number of visitors may result in inaccurate data collection. For this reason, many organizations have tried to find solutions to mitigate the inaccurate traffic monitoring issues. It is our intention to design and construct this Automated visitor counter with maximum efficiency and make it very feasible for anyone who wants to design and construct the prototype. Building this circuit will provide information to management on the volume and flow of people in a building. Procedure for Paper Submission

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MOTIVATION AND OBJECTIVES

If This section introduces the methodology involved in the design and construction of the Automated visitor counter. Using the Takoradi Polytechnic Library crowd management situation as a case study, it was realized that the library's capacity often gets exceeded during its peak usage period (examination period) and therefore makes the environment uncomfortable for learning. This problem was studied by visually observing students' reaction anytime the library's capacity was exceeded. The microcontroller-based visitor counter is designed to respond to the flaws in the operations of the existing counters. The design in its sense has four (4) main sections and circuits as shown in Figure 1. These include detection section (IR sensor circuitry), microcontroller section, alerting section (LCD and Buzzer) and power supply circuit.

PROJECT OUTLINE

Our main objective in this paper includes designing and constructing a visitor counter which will make a controller-based model to count and compute the number of visitors in a building at a particular time. It is also our objective that this controller base model beeps a warning alarm when the capacity of the building is exceeded. The significance of the design and construction in this paper is enshrined in the fact that it provides the assurance of the health and safety of the occupants in a building at all time, since the visitors are guaranteed of traffic decongestion. It also provides accurate data for various research and analytical purposes as it generates the hourly, daily, monthly, and yearly report. The device helps to reduces pressure on building facilities by prompting the security, when the capacity of the building is exceeded. It goes a long way to assist rescue team or security services to come up with strategic procedure in dealing with emergency issues like people trapped in a structure as a result of hijacks and collapsed. It is the usual norm that the design and this paper, our device might count more than two people as one when they interrupt the infrared beam at the same time in a linear direction. For this reason, the device must be installed at a narrow entrance/exit where one person enters at a time. Another limitation can be linked to the inability of sensor in the device to differentiate between human being and objects interrupting the IR signal. Finally, the device will fail to function in case of any power interruption, which might lead to a miscount or provide inaccurate data when power is restored.

Hardware and software requirements

Infrared Led:

Fig 1: LED's

This comprises the IR sensor which consists of a transmitter (white LED) and a receiver (black LED). The emitter passes an infrared beam which is detected by an IR receiver (phototransistor). When a person walks by, he "breaks" the beam. Upon this event, the phototransistor no longer can detect infrared light and another event is triggered (door opens). The infrared emitter generates a source of light energy (invisible) in the infrared spectrum. There are several sensors that may be used for the detection of visitor's presence, but the preferred one used in this project is the infrared sensor. The infrared sensor also called IR sensors consists of two parts, namely, IR transmitter circuit and IR receiver unit. The transmitter unit consists of an infrared LED and its associated circuitry as well as the receiver. Since the human eye cannot see the infrared radiations, it is not possible for a person to identify whether the IR LED is working or not, unlike a common LED. To overcome this problem, the camera on a cell phone can be used. The camera can show us the IR rays being emanated from the IR LED in a circuit. To test if the sensors were functioning, the sensor circuit was connected to a power source. The circuit was built with 2 resistors with different Ohm value ratings. A 1k Ω resistor connected to a Light Emitting Diode (LED) served as the transmitter whereas a $3k\Omega$ resistor connected to a transistor was used as the Receiver. The circuit is then powered by a 5V DC supply and grounded.

Microcontroller Section:



Fig 2: Microcontroller

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The microcontroller section consists of the PIC16F877A Microcontroller which is a powerful (200 nanosecond instruction execution) easy-to-program (only 35 single word instructions) CMOS FLASH-based 8-bit microcontroller packs Microchip's powerful PIC architecture into a 40-pin package and is upwards compatible with the PIC12CXXX and PIC16C7X devices. The PIC16F877A features 256 bytes of EEPROM data memory, self-programming, an ICD, 2 Comparators, 8 channels of 10-bit Analog-to-Digital (A/D) converter. It has a voltage operating range of 2v to 5.5v, with a temperature range of -40° C to 85° C. There are three basic memory blocks in the PIC16F877 namely; the Read Only Memory (ROM), the Data Memory also called the randomaccess memory (RAM), the Electrically Erasable Programmable Read Only Memory, (EEPROM), and the data memory. The Program Memory (ROM) is used to permanently save the program being executed. The PIC16F877 has 8 kb of ROM (in total of 8192 locations). Since this ROM is made with FLASH technology. The PIC16F877 EEPROM has 256 bytes of memory locations for permanently saving results obtained and used during its operation. The EEPROM as the name suggests is a type of ROM which contents may be changed during program execution (similar to RAM), but remains permanently saved even after the loss of power (similar to ROM). It is often used to store values created and used during operation (such as calibration values, codes, values to count up to, etc.), which must be saved after turning the power supply off. The RAM is the third and the most complex part of any microcontroller memory. It is partitioned into multiple banks which contain the general-purpose registers (GPRs) and special-function registers (SFRs). These registers are basically used for temporarily storing data and intermediate results created and used during the operation of the microcontroller. The content of this memory is cleared once the power supply is off. The Central Processing Unit (CPU) monitors and controls all processes within the microcontroller and the user cannot affect its work. The PIC16F877 CPU consists of several smaller sub-units, of which the most important are Instruction Decoder, Arithmetic Logic Unit (ALU) and Accumulator (or Working Register). The Instruction Decoder is a part of the electronics which recognizes program instructions and runs other circuits on the basis of that. Whilst the ALU performs all mathematical and logical operations upon data, the Accumulator or Working Register is an SFR closely related to the operation of ALU. It is a kind of working desk used for storing all data upon which some operations should be executed. The PIC16F877 has a 10-bit multi-channel Analog-to-Digital Converter. Apart from a large number of digital I/O lines, the PIC16F877 contains 14 analogy inputs. They enable the microcontroller to recognize, not only whether a pin is driven to logic zero or one (0 or +5V), but to precisely measure its voltage and convert it into a numerical value, i.e., digital format. PIC16F877 has a total of thirty-three input/output pins. The pins can be organized into five ports; A, B, C, D and E. Some pins for these input/output ports are multiplexed with an alternate function for peripheral features on the microcontroller. Port A is 6-bit wide and bidirectional; Ports B and C are 8-bit wide and bidirectional; Port D is also 8-bit wide with Schmitt Trigger input buffers. Port D can also be configured as an 8-bit microprocessor port (parallel slave port). Port E is just 3-bit wide and also bidirectional. The Bidirectional Visitor Counter requires only port A and B on the microcontroller to send and receive signal for the counting operation.

Fig.3: Illustration of the 40 pins arrangement on the microcontroller.

Figure 3 shows the pin diagram of the PIC that was used in this project. With Vss or Vdd being the input voltage signals connected to a 5v DC supply unit. The remaining pins indicate the general purpose I/O peripheral ports that include the Digital I/O, the In-circuit debugger, the ICSP programming clock (PCG) and the ICSP.

Alert Section:

The alert section consists of the Liquid Crystal Display (LCD) and Buzzer as shown in Figures 8 and 10. The LCD screen is an electronic display module with a wide range of applications. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD.



Fig 4: Pictorial view of the LCD

A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The LCD screen displays the present the exact number of visitors in a building, and operates in 4-bit 'nibble' mode to save I/O pins. For this project, the LCD is connected directly to Port B of the microcontroller. A 50 k Ω potentiometer is connected to pin 2 of the LCD for adjusting the contrast of the display. The LCD screen will display "Capacity Full" when the microcontroller detects that the required number of visitors supposed to occupy a particular building is exceeded.



Fig 5: Schematic view of an LCD screen



Fig 6: Buzzer

The piezo buzzer is a device or a transducer which converts electrical energy to sound energy. When electrical energy is applied to it, it buzzes or sounds until the energy applied to it is stopped. The buzzer used in this project alert user of the event corresponding to capacity changes by producing a noisy sound irrespective of the voltage variation applied to it. The buzzer has two terminals (positive and ground).

Power Supply:

Power supply block consists of following units: Step down transformer; Bridge Rectifier Circuit, Input Filter and Voltage Regulator. The step-down transformer is used to step down the supply voltage of 240v ac from mains to lower values such as 6v and 9v, as the various ICs used in this project require reduced voltages.



Fig 7: Pictorial view of step-down transformer

The Rectifier Unit is purposely for alternating current (AC) to direct current (DC) conversion. A diode bridge is an arrangement of four diodes connected in a bridge circuit. That provides the polarity of output voltage of any polarity of the input voltage. The diagram describes a diode-bridge design known as a full wave rectifier. The bridge rectifier makes use of four diodes in a bridge arrangement to achieve full wave rectification.

Fullwave Bridge Rectifier Chari

Fig 8: Full wave bridge rectifier



The KA78XX/KA78XXA is a series of voltage regulators made up of three-terminals, namely input, output, and ground. The type of voltage regulator used in this application is a KA7805 which provides 5v dc as output voltage for the entire circuit.

Circuit diagram and description

Fig 11: Circuit Diagram of the Automated visitor counter The Vero board was marked out to indicate the position of each component. The components were mounted on the board, and their terminals were soldered diagonally to ensure that the components were well fitted on the circuit board for the necessary connection to be done. Components which required testing were tested to ensure they were in good condition. The output of the 6V step-down transformer was connected to the bridge rectifier built with four diodes. Both positive and negative end of the rectifier were connected to the positive and negative terminals of the electrolytic capacitor respectively for filtering. The voltage regulator's (5V) input and ground terminal were connected to the positive and negative terminals of the capacitor respectively. Its output pin served as the positive supply whiles the ground terminal of the voltage regulator serves as the ground to the circuit. The anode terminal of the IR transmitter LED and a resistor was connected in series to the supply. This was to ensure that a minimum current of 20mA was flowing through the IR transmitter. At receiving end, the receiving sensor, serving as the phototransistor had its anode, a diode and a resistor connected in series to base terminal of the BC577 transistor. The emitter of the transistor was connected to the 5v supply, whiles the collector was connected to one end of the resistor; its other side was grounded with the cathode of the phototransistor (IR receiver). The entire circuit was energized with the 5V dc power supply. Two similar circuits were constructed to serve as sensor one (1) and sensor two (2). The output of the two receivers from the collector of the BC577 transistor was connected to pin 4 and 5 of port A on the microcontroller. The base of the transistor which controls the buzzer was connected to pin 6 of port A, whiles the two LED's (green and red for indicating entry and exit respectively) were also connected to pin 2 and 3 of port A on the microcontroller. The data pins, E, RW, and S pins of the LCD were all connected to port B of the microcontroller. The crystal oscillator has three terminals, however, the first and third terminals were connected to pin 13 and 14 of the



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microcontroller whiles the second terminal was grounded. The testing, validation and verification were accomplished by connecting the device to a power supply and switched on. The LCD back light turned ON and displayed "Automated Visitor Counter" for few seconds, and later displayed "VISITORS REMAINING: 0" permanently. The IR sensors also started their transmission. A finger was used to interrupt the signal from the IR sensors in the form of entering. The number of visitor's displayed on the LCD was increased (+1) and the green LED blinked to indicate the current action (entering). The finger was also used to interrupt the signal in the form of exiting and the number displayed on the LCD screen decreased (-1) and the red LED blinked to confirm the current action (exiting). After the number of visitor's registered on the LCD exceeded the limit at which the project was programmed, it displayed "MAXIMUM CAPACITY EXCEEDED BY the buzzer is activated and beeps at an interval of one second. While the capacity is full and people continue to enter or exit, the displayed number also increase and decrease respectively, but when the device is operating under a full capacity mode, every entry action causes the buzzer to beep for a second. A plastic material was used to design a housing package for the circuit board. Some of the components such as the LCD, LED's and the IR sensors which were directly mounted on the circuit board, had to be displayed outside the casing. However, cavities were created to ensure that those components pop up and fit perfectly into it. To implement the operation of the bidirectional visitor counter, IR sensors are to be positioned at the entrance and wired to the circuit board which consists of the LCD, buzzer and the LED indicators all mounted directly on the board. The housing package which contains the circuit board is placed in the security room or office for easy monitoring of the human traffic flow. The operation of the device follows a programming procedure. In the detection section, the infrared sensor signal is interrupted by a passing visitor. The interruption of the signal from the IR transmitter, it sends another signal to the microcontroller. The PIC16F877A microcontroller works as an Analogue to Digital Converter (ADC), thus it processes the analogy data by converting the analogy signal to digital. Then, the appropriate signals are sent to the output devices of the system to ensure optimum functionality. The microcontroller also sends data to the LCD screen to inform the user on the state of the system. The first step in the software development is deciding the serial number, which indicates the number of input/output ports and the memory size of the microcontroller to be used. Programming flow for software development is provided by designing a flow chart. The software that is used in this design is WIZ-C for the

As a first precautionary step, appropriate load resistance for the phototransistor were carefully selected because operating current of the infrared diode will differ based on the application, if the proper load resistance is not used the circuit will not operate. An equally important measure considered was that DC bias was not applied to the piezoelectric buzzer because insulation resistance may become low and affect the performance. Also, no mechanical force is applied to the piezoelectric buzzer because the case may deform and result in improper operation. Further, no shielding material is placed in front of the sound release hole of the buzzer because the sound pressure may vary and result in unstable buzzer operation. More importantly, the pad and component legs are heated with tip of the iron simultaneously and careful precaution is taken not to burn the printed circuit board or any plastic or insulation. Last but not least, the crystal oscillator was placed nearer a controller so as to avoid any interference on lines on which microcontroller is receiving a clock.

RESULTS Block Diagram



Fig 12: Block Diagram

CONCLUSION

We conclude and make recommendations in this section based on our results. We re-iterate the following as noted from our discussions of the results in the above section:

• In demonstration of the project, the infrared sensing part used to detect the passage of visitors worked.

• Microcontroller was very efficient in its task performance, thus computation of counts and controlling I/O devices.

• Also, the LCD, led and the buzzer were effective in alerting and notifications.

• Hence the whole purpose of the bidirectional visitor counter was successfully achieved and is applicable in the wider scope. Finally, we conclude that the proposed system will count visitors effectively and efficiently by reducing the rate at which error occurs when counting visitors Appendix

Appendixes, if needed, appear before the acknowledgment.

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MOTION DETECTION, IMAGE CAPTURING AND LIVE CAMERA USING ESP-32 MODULE

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ABSTRACT

Nowadays CCTVs are installed at many places like banks safe. The closed-circuit television (CCTV) is one of the devices used to monitor the secured area for any intruders. The use of traditional CCTV to monitor the secured area have three limitations, which are requiring a huge volume of storage to store all the videos regardless there are intruders or not, does not notify the users immediately when there are motions detected, and users must always check the CCTV recorded videos regularly to identity any intruders. Therefore, a smart surveillance monitoring system is proposed to solve this problem by detecting intruders and capturing image of the intruder. Notifications will also be sent to the user immediately when motions are detected. This smart surveillance monitoring system only store the images of the intruders that triggered the motion sensor, making this system uses significantly less storage space. The proposed Arduino UNO is connected with a passive infrared (PIR) motion sensor, a webcam and internet connection, the whole device can be configured to carry out the surveillance tasks. The objectives of this project are to design, implement and test the surveillance system using the Arduino UNO. This proposed surveillance system provides the user with live stream of video feed for the user. Whenever a motion is detected by the PIR motion sensor, the web camera may capture an image of the intruder and alert the users (owners) through Short Message Service (SMS) and email notifications. By using motion detection, it saves the monitoring time and cost.

Keywords: Arduino UNO, PIR sensor, Wi-Fi, Telegram, ESP32 camera, Arduino IDE

I. INTRODUCTION:

Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator (CSTCE16M0V53-R0), a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. You can tinker with your Uno without worrying too much about doing something wrong, worst-case scenario you can replace the chip for a few dollars and start over again. Therefore, this project will propose a smart surveillance monitoring system using Arduino UNO that will monitor an area. It can detect motion and sends notifications to the user through SMS and Email. The image of the intruder is captured as well when the motion sensor is triggered. The objectives of this project are:

- To design a surveillance system using the Arduino.
- To implement the surveillance system using the Arduino.
- To test the surveillance system using the Arduino.

The scope of this project is that this proposed surveillance system support for only a single user, which is the owner of the home. This proposed system is suitable to provide surveillance for a room, preferably the entrance door. The surveillance system using the Raspberry Pi is developed to fulfil all the required modules.

Module	Description
Motion detection	Detect motions (by human) using the passive infrared
	(PIR) motion detector
Email notification	Sends an image to the user's telegram with the captured image
module	when motion is detected
Image capturing	Capture image of the intruder when the intruder triggers the
	motion detector
Live video feed	Provide live video
	feed of the webcam to the user

II. LITERATURE REVIEW

Surveillance is very useful to governments and law enforcement to maintain social control, recognize and monitor threats, and prevent/investigate criminal activity. The final step of an intelligent visual surveillance system is not to record whole content of the video and just to identify important events in a scene. The main goal is to detect the object efficiently[3].

The aims are to reduce the cost and to increase efficiency in the security systems. The user can define the threshold according to the characteristics of the received images and objects that must be followed to have. It is

clear that by reducing this threshold rate, obtained image will have more details and also more noises[1][4]. It's an open-source physical computing platform based on a simple microcontroller board which consists of an ATmega328p micro-controller, and a development environment for writing software for the board. Arduino can be used to develop interactive objects, taking inputs from a variety of switches or sensors controlling a variety of

An Arduino microcontroller is also pre- programmed with a boot loader that simplifies uploading of programs to the on-chip flash memory, compared with other devices that typically need an external programmer

III. METHODOLOGY

lights, motors and other physical outputs[1][5].



IV. HARDWARE DESCRIPTION

A. Arduino UNO

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development



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Environment), via a type B USB cable. It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts. It is similar to the Arduino Nano and Leonardo. The hardware reference design is distributed under a Creative Commons Attribution Share-Alike 2.5 license and is available on the Arduino website. Layout and production files for some versions of the hardware are also available. The word "uno" means "one" in Italian and was chosen to mark the initial release of Arduino Software.[1] The Uno board is the first in a series of USB-based Arduino boards; it and version 1.0 of the Arduino IDE were the reference versions of Arduino, which have now evolved to newer releases.[4] The ATmega328 on the board comes preprogramed with a bootloader that allows uploading new code to it without the use of an external hardware programmer. While the Uno communicates using the original STK500 protocol, it differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it uses the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.

Based on Figure Arduino UNO has a built-in LED driven by digital pin 13. When the pin is high value, the LED is on, when the pin is low, it is off. VIN: The input voltage to the Arduino board when it is using an external power source (as opposed to 5 volts from the USB connection or other regulated power source). You can supply voltage through this pin, or, if supplying voltage via the power jack, access it through this pin. 5V: This pin outputs a regulated 5V from the regulator on the board. The board can be supplied with power either from the DC power jack (7 - 20V), the USB connector (5V), or the VIN pin of the board (7-20V). Supplying voltage via the 5V or 3.3V pins bypasses the regulator, and can damage the board. GND: Ground pins. Reset: Typically used to add a reset button to shields that block the one on the board.

B. Motion Detector Technology

Motion detector or sensor spots moving objects, are used for detecting humans' motions. Motion detectors can be used widely for security purposes that monitors a specific location for unauthorized access. Motion detector also plays a big role in the security such as a burglar alarm. For example, when the motion detector is triggered, a security camera is activated to capture a video footage or image of the intruded area and notify the users. The proposed system uses a Passive Infrared (PIR) motion detector which works by reacting to the changes of infrared energy level, caused by objects such as human's and animal's movement.

C. ESP32 Module

The ESP32-CAM is a small size, low power consumption camera module based on ESP32. It comes with an OV2640 camera and provides onboard TF card slot. The ESP32-CAM can be widely used in intelligent IoT applications such as wireless video monitoring, Wi-Fi image upload, QR identification, and so on.

D. Closed-Circuit Television

The closed-circuit television or CCTV is considered as a video surveillance. The CCTV transmit signals to a place such as a CCTV control room by using the video camera devices. CCTV's signal is not openly transmitted. The CCTV is widely used on various areas such as military secure areas, banks, casinos, hotels, airports, schools, hospitals, restaurants, convenience stores and many more. The other specialized usage of CCTV is at the industrial plants. This is where the CCTV is installed at locations where locations are not suitable for humans' presence such as radioactive exposed places. The human can monitor the location from the central CCTV control room.



The CCTV system requires a collection of hardware devices such as cameras, Digital Video Recorder (DVR) Unit, local monitor, network router, and remote devices. Figure 2 shows the connections between the devices in a CCTV system. From the DVR Unit, users can view the recorded the video footage from a local display monitor. The display monitor should be connected to the DVR. Unit using coaxial cable as well. Users also able to view the recorded video footage remotely. This can be done by connecting the DVR Unit to a network router using the CAT5 cable. The router is then connected to the internet with a static IP address. The user can use the
IP to view the video footage on their remote devices such as smartphones, tablets and laptops. This allow users to view the video footage at anywhere wirelessly if they are not physically at the DVR Unit.

E. Comparison Between Existing CCTV System and Proposed Arduino UNO Surveillance System

There are differences and similarities between the existing CCTV systems and the proposed Arduino UNO surveillance system.



Properties		Existing CCT	V	Proposed Arduino UNO		
		Systems		Surveillance System		
St	orage usage	Inefficient, storing	all video	Efficient, storing	only images when	
		recordings		motion	is	
				triggered		
Alerts	/Notifications	Unavailable (pas	sive)	Available (SMS / Email		
		_		/ Teleg	gram)	
Power consumption		High		Lo	W	
Portability		Static		Can	be	
				moved/shifted eas	ily according to	
				current	needs	

F. Circuit Diagram of Proposed Arduino UNO Surveillance system



V. SOFTWARE DESCRIPTION

The Arduino Integrated Development Environment (IDE) is a cross-platform application (for Windows, macOS, Linux) that is written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards, but also, with the help of third-party cores, other vendor development boards. The source code for the IDE is released under the GNU General Public License, version

2. The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User- written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main() into an executable cyclic executive program with the GNU toolchain, also included with the IDE distribution. The Arduino IDE employs the program avrdude to convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware. By default, avrdude is used as the uploading tool to flash the user code onto official Arduino boards.

Arduino IDE is a derivative of the Processing IDE, however as of version 2.0, the Processing IDE will be replaced with the Visual Studio Code-based Eclipse Theia IDE framework.

Telegram a messaging application is used a bot is created on telegram for receiving the image of intruder, sent by proposed Arduino UNO surveillance system through Wi-Fi.

VI. EXPECTED RESULT

Since the proposed Arduino system uses two camera, the first camera is use to see the LIVE feed. You get the IP address from Serial Monitor after running the code on Arduino IDE software. As soon as the IP address is provided on output, paste the address on any browser to see the LIVE footage of the place where camera is installed.



The Second camera is connected with the PIR sensor which detect the motion of INTRUDER and wakes the ESP32 cam which in turn take the picture of intruder and sends the image to owner through telegram using Wi-Fi. Owner can also demand for image even if the motion is not detected by sending the command "/image" and the camera can also take decent image at night since inbuilt flash is already present on ESP32

VII. ADVANTAGES / DISADVANTAGES OF PROPOSED ARDUINO UNO SURVEILLANCE SYSTEM

Advantages:

Installation of Arduino based surveillance camera is easy.

Saves monitoring time and cost Sends intruder image as notification. No external storage is required.

Cheaper than device available in market

Disadvantages:

PIR sensor is volatile, it is easily roasted if high voltage is passed

Not able to see the old footage

Image is transferred through Wi-Fi so if Wi-Fi goes down whole device won't work

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A REVIEW PAPER ON ACCIDENTS AVOIDANCE USING VEHICLE TO VEHICLE (V2V)

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ABSTRACT

Visual light correspondence or Li-fi was developed by Professor Harald Haas of college of Edinburgh. This is the most recent innovation in present day correspondence framework which utilizes LEDs, Light Emitting Diodes that aide in the transmission of information considerably more quicker and adaptable than the information that can be communicated through Wi-Fi. It is fundamentally a 5G innovation of apparent light correspondence framework which uses light emanating diodes as a mechanism of rapid correspondence in comparable way as Wi-Fi. Arduino is utilized to encode the information and communicate it through drove and interpret the got and show it. Here ultrasonic sensor is utilized to detect the distance among article and sensor. The distance information is communicated through li fi innovation.

Keywords-IoT, Accident Detection, Embedded system, Wireless Standards.

INTRODUCTION

The presence of gadgets in a car that interface the gadget to other gadget inside the vehicle or gadgets organizations and administrations outside the vehicle including other vehicle, home, office or framework. Associated vehicles wellbeing applications are intended to expand circumstance mindfulness for mishaps however vehicle to vehicle (V2V) and Vehicle to Infrastructure (V21) correspondences. This undertaking has thought of avoidance of mishaps. In this Project this correspondence is finished with IOT (Internet of things). The IOT Technology can be utilized for giving correspondence and Interaction among vehicles and Infrastructure along the street side. By interfacing vehicles and street side Infrastructure to the Internet ongoing correspondence, checking, controlling and notices (early admonition framework) can be accomplished. In this venture 2 arduino uno board is utilized, one for transmitter side and second is beneficiary side. Ultrasonic sensor and drove is interfaced with transmitter side arduino. Ultrasonic sensor will give information about the distance among sensor and object to arduino and arduino will change over this information into paired. Paired information is sent through drove by making it on and off. Collector side photodiode is interfaced with arduino, which will get the information from drove into parallel arrangement. Collector side Arduino will interpret the information got from photodiode and it will show the determined distance on LCD. As indicated by distance, DC engine will get worked through engine driver. Assuming the distance is more, engine will be in its typical speed, in the event that distance diminishes, engine speed will likewise get diminished. Assuming the distance is extremely less, engine will stop.

HARDWARE AND SOFTWARE COMPONENTS

1. ARDUINO UNO:

The Uno is a microcontroller board dependent on the ATmega328P. It has 14 digitals input/vield pins (of which 6 can be utilized as PWM yields), 6 Analog sources of info, a 16 MHz quartz precious stone, a USB association, a power jack, an ICSP header and a reset button. Every one of the 14 computerized pins can be utilized as an info or yield, utilizing pin Mode (), advanced Write (), and computerized Read () capacities. They work at 5 volts. Each pin can give or get 20 mA as suggested working condition and has an interior draw up resistor (detached as a matter of course) of 20-50k ohm. A limit of 40mA is the worth that should not be surpassed on any I/O pin to keep away from extremely durable harm to the microcontroller Furthermore, a few pins have particular capacities: Sequential: 0(RX) and 1(TX). Used to get (RX) and Transmit (TX) TTL sequential information. Outer Interrupts: 2 and 3. These pins can be designed to trigger a hinder on a low worth, a rising or falling edge, or an adjustment of significant worth. PWM: 3, 5, 6, 9, 10, and 11. Furnish 8-bit PWM yield with the simple Write () work. SPI: 10(SS), 11(MOSI), 12(MISO), 13(SCK). These pins support SPI correspondence utilizing the SPI library. Driven: 13. There is an inherent LED driven by computerized pin 13. TWI: A4 or SDA pin and A5 or SCL pin. Backing TWI correspondence utilizing the wire library. The Uno has 6 simple sources of info, marked A0 through A5, every one of which provide10 pieces of goal. As a matter of course, they measure from ground to 5 volts, through is it conceivable to change the upper finish of their reach utilizing the AREF pin and the simple Reference () work. There are several different pins on the board: AREF Reference voltage for the simple data sources. Utilized with simple Reference. Reset. Bring this line LOW to reset the microcontroller. Ordinarily used to add a reset button to safeguards

Which Block The One On The Board

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Reset. Bring this line LOW to reset the microcontroller. Ordinarily used to add a reset button to safeguards which block the one on the board.

2. ULTRASONIC SENSOR:

At its center, the HC-SR04 Ultrasonic distance sensor comprises of two ultrasonic transducers. The one goes about as a transmitter which changes over electrical sign into 40 KHz ultrasonic sound heartbeats. The beneficiary tunes in for the sent heartbeats. On the off chance that it gets, it creates a yield beat whose width can be utilized to decide the distance the beat voyaged. As basic as pie! The sensor is little, simple to use in any mechanical technology task and offers great non-contact range location between 2 cm to 400 cm (that is about an inch to 13 feet) with an exactness of 3mm. Since it works on 5 volts, it tends to be snared straightforwardly to an Arduino or some other 5V rationale microcontrollers.

Here are some following Specifications:

Operating Voltage - DC 5V

Operating Current – 15mA

Operating Frequency – 40KHz

Max Range – 4m

 $Min \ Range-2cm$

Ranging Accuracy – 3mm

Measuring Angle - 15 Degree

Trigger Input Signal – $10\mu S$ TTL pulse

Dimension - 45 x 20 x 15mm

The HC-SR04 Ultrasonic sensor accompanies four pins specifically Vcc pin, Trigger pin, Echo pin, and Ground pin. This sensor is utilized to gauge the precise distance between the objective and the sensor. This sensor for the most part chips away at the sound waves.

At the point when the power supply is given to this module, it produces the sound waves to head out all through the air to hit the fundamental item. These waves strike and return from the item, then, at that point, gathers by the beneficiary module.

Here both the distance just as time has taken is straightforwardly relative in light of the fact that the time taken for more distance is high. On the off chance that the trigger pin is saved high for 10 s, the ultrasonic waves will be created which will go at the sound speed. So it makes eight patterns of sonic burst that will be assembled inside the Echo pin. This ultrasonic sensor is interfaced with Arduino to check the fundamental distance between sensor and item. The distance can be determined utilizing the accompanying.

3. LED:

LEDs offer advantages like little size, long light life, low hotness yield, energy reserve funds and solidness. They likewise permit uncommon plan adaptability in shading changing, darkening and conveyance by consolidating these little units into wanted shapes, tones, sizes and lumen bundles. LEDs are strong state semiconductor gadgets. Driven enlightenment is accomplished when a semiconductor gem is energized with the goal that it straightforwardly creates noticeable light in an ideal frequency range (shading). Driven units are little, normally 5mm. A Light transmitting diode intersection diode. At the point when transporters are infused across a forward-one-sided intersection, it transmits incongruous light. The vast majority of the business LEDs are acknowledged utilizing a profoundly doped n and a p Junction.

Light Emitting Diodes are the semi conductor light sources. Ordinarily utilized LEDs will have a removed voltage of 1.7V and current of 10mA. At the point when a LED is applied with its necessary voltage and current it sparkles with full power.

In this manner, LED is straightforwardly associated with the regulator. The adverse terminal of the LED is associated with the ground through a resistor. Worth of this resistor is determined utilizing the accompanying equation. R = (V-1.7)/10mA, where V is the info voltage. By and large, regulators yield a most extreme voltage of 5V. Along these lines the worth of resistor determined for this is 330 Ohms. Along these lines this can be associated either to the cathode or anode of the LED.

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4. LCD DISPLAY:

LCD (Liquid Crystal Display) screen is an electronic presentation module and track down a wide scope of utilizations. A 16x2 LCD show is extremely fundamental module and is regularly utilized in different gadgets and circuits. These modules are liked more than seven fragments and other multi portion LEDs. The reasons being: LCDs are prudent; effectively programmable; have no constraint of showing exceptional and even custom characters (not at all like in seven fragments), livelinesss, etc.

FEATURES:

5 x 8 dots with cursor

Built-in controller (KS 0066 or Equivalent)

+ 5V power supply (Also available for + 3V)

1/16 duty cycle

B/L to be driven by pin 1, pin 2 or pin 15, pin 16 or A.K (LED)

N.V. optional for + 3V power supply

16*2 Liquid Crystal Display which will show the 32 characters all at once in two columns (16 characters in a single line). Each character in the presentation of size 57 pixel framework, Although this lattice contrasts for various 162 LCD modules in the event that you take JHD162A this grid goes to 58. This grid won't be same for all the 162 LCD modules. There are 16 pins



PIN NO.	FUNCTION	NAME
1	Ground (0V)	Ground
2	Supply voltage; $5V (4.7V - 5.3V)$	Vcc
3	Contrast-adjustment; through a variable resistor	VEE
4	Selects command register when low; and data register when high	Register Seleect
5	Sends data to data pins when a high to low pulse is given	Enable
6	Low to write to the register; High to read from the register	Read/Write

For showing a person you ought to empower the empower (pin 6) by giving a beat of 450ns, in the wake of empowering the pin6 you ought to choose the register select pin (pin4) in compose mode. To choose the register select pin in compose mode you need to make this pin high (RS=1), in the wake of choosing the register select you need to arrange the R/W to compose mode that is R/W ought to be low (R/W=0).

5. PHOTODIODE (PHOTO -RECEIVER):

L14G2 is a NPN phototransistor. It goes about as a photodetector as in it can change over the occurrence light into electric reaction. They are regularly utilized as sensors normally combined with a light source like LED.

These are the bipolar semiconductors having a straightforward case. This straightforward case uncovered the base authority locale of semiconductor to outside light. At the point when light episodes on this intersection, electrons are produced by the photons. These electrons are infused in the foundation of phototransistor. The current addition of the semiconductor intensifies the subsequent photocurrent at the base authority intersection. In this way a phototransistor conducts within the sight of light and stays in off mode without any light. The greatest dull current is 100nA; while in light its current is 500A.

A phototransistor is unique in relation to a basic semiconductor in the way that in the last option, voltage applied to the base is supplanted by light striking it. Basically,

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A phototransistor intensifies varieties in the light striking it.

Phototransistors could possibly have a base terminal. On the off chance that a base terminal is accessible, it is utilized to predisposition its light reaction. Photodiodes can likewise be utilized for comparative capacity as phototransistors, yet they have a lot of lower gain and in this way lower photocurrent. Phototransistors can't recognize low powers of light however are more receptive to the uncovered light. Likewise, the semiconductor reaction goes on for a more extended period when contrasted with a photodiode.

The necessary light source is a gallium arsenide LED with top frequency is 940 nm. The producer lead is shown by a distending edge in the semiconductor case. The base is closest to the producer. The authority is at the other outrageous side of the packaging.

6. MOTOR DRIVER:

L293D Motor Driver IC

L293D Description

L293D is a regular Motor driver or Motor Driver IC which permits DC engine to drive on one or the other course. L293D is a 16-pin IC which can handle a bunch of two DC engines at the same time toward any path. It implies that you can handle two DC engine with a solitary L293D IC. Double H-span Motor Driver coordinated circuit (IC).

The l293d can drive little and calm large engines too, really take a look at the Voltage Specification toward the finish of this page for more information.

You can Buy L293D IC in any electronic shop effectively and it costs around 70 Rupees (INR) or around 1 \$ Dollar (approx Cost) or significantly lesser expense. You can observe the fundamental pin graph, working, a circuit chart, Logic depiction and Project as you read through. Idea

It deals with the idea of H-span. H-span is a circuit which permits the voltage to be flown one or the other way. As you most likely are aware voltage need to alter its bearing for having the option to turn the engine clockwise or anticlockwise way, henceforth H-span IC are great for driving a DC engine.

In a solitary 1293d chip there two h-Bridge circuit inside the IC which can pivot two dc engine autonomously. Due its size it is a lot of utilized in mechanical application for controlling DC engines. Given beneath is the pin outline of a L293D engine regulator.

There are two Enable pins on 1293d. Pin 1 and pin 9, for having the option to drive the engine, the pin 1 and 9 should be high. For driving the engine with left H-span you really want to empower pin 1 to high. What's more, for right H-Bridge you really want to make the pin 9 to high. Assuming anybody of the either pin1 or pin9 goes low, the engine in the relating segment will suspend working. Its like a switch.

TIP: you can basically interface the pin16 VCC (5v) to stick 1 and pin 9 to make them high.

L239D PIN DIAGRAM:

16 Voc Internal Voltage 5v Enable 1 Input A1 2 15 Input B1 1A AA: utput A1 14. Output B1 GND 13 GND - 4 GND1 GND3 GND 5 12 GND Output A1 .6 Output B2 Input A2 10 Input B2 Enable 2 VSS Motor Supply HEN

Working of L293D

There are 4 information pins for this 1293d, pin 2,7 on the left and pin 15,10 on the right as displayed on the pin graph. Left information pins will direct the pivot of engine associated across left side and right contribution for engine on the right hand side. The engines are pivoted based on the sources of info gave across the information pins as LOGIC 0 or LOGIC 1.

In straightforward you really want to give Logic 0 or 1 across the information pins for turning the engine.

L293D Logic Table.

Lets think about a Motor associated on left side yield pins (pin 3,6). For turning the engine clockwise way the info pins must be furnished with Logic 1 and Logic 0.

Pin 2 = Logic 1 and Pin 7 = Logic 0 | Clockwise Direction

Pin 2 = Logic 0 and Pin 7 = Logic 1 Anticlockwise Direction

Pin 2 = Logic 0 and Pin 7 = Logic 0 | Idle [No rotation] [Hi-Impedance state]

Pin 2 = Logic 1 and Pin 7 = Logic 1 | Idle [No rotation]

In a very much like manner the engine can likewise worked across input pin 15,10 for engine on the right hand side.

Voltage Specification

VCC is the voltage that it needs for its own inner activity 5v; L293D won't utilize this voltage for driving the engine. For driving the engines it has a different arrangement to give engine supply VSS (V inventory). L293d will utilize this to drive the engine. It implies assuming you need to work an engine at 9V then you really want to give a Supply of 9V across VSS Motor stock.

The most extreme voltage for VSS engine supply is 36V. It can supply a maximum current of 600mA per channel. Since it can drive engines Up to 36v consequently you can drive quite huge engines with this 1293d.

VCC pin 16 is the voltage for its own inner Operation. The most extreme voltage goes from 5v and up to 36v.

DC Motor:



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COMPARATIVE STUDY ON RECOMMENDATION SYSTEMS FOR FACIAL RECOGNITION -REVIEW PAPER

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ABSTRACT

This work aims to officially offer a general definition of a multimedia recommendation system, specifically a content-based MMRS (CB-MMRS), and to shed light on one-of-a-kind applications of multimedia content for fixing a variety of tasks associated with the recommendation. We would like to disambiguate the reality that multimedia recommendation isn't always only about recommending a specific media type (e.g., music, video), as a substitute there exists a whole lot of different applications in which the evaluation of multimedia input may be usefully exploited to offer recommendations of numerous forms of information.

Keywords: recommendation, system, types, and comparison

I. INTRODUCTION

The World Wide Web is a massive useful resource of virtual multimedia information. In the early years of the WWW, the available virtual sources had been particularly made from texts. For this reason, the primary search engines like google and yahoo and, later, content material-primarily based recommender structures relied simply on textual content analysis. On the Internet, where the variety of selections is overwhelming, there's a want to filter, prioritize and correctly supply applicable facts to be able to alleviate the trouble of facts overload, which has created potential trouble for plenty of Internet customers. Recommender systems resolve this trouble by looking through big volumes of dynamically generated information to offer customers customized content material and services.

Nowadays, the statistics available on the Web are provided by numerous distinctive media kinds, which consist of text, audio, video, and images. Moreover, distinctive media kinds can co-exist in files consisting of as an example Web pages. Vertical search engines like google and yahoo and recommender systems had been advanced to address the trouble of gaining access to or recommending particular media objects. While a few media kinds aren't associated with others (e.g., texts), different media kinds, consisting of videos, may be taken into consideration as structured entities, possibly composite of different media kinds; for example, a film is a video item composed of a sequence of images and can audio stream and might further likely bring a text (subtitles). The recommender system has the cap potential to predict whether or not a selected consumer could choose an object or is now no longer primarily based totally on the consumer's profile.

Recommender systems are useful to each service provider and customer. They lessen transaction prices of locating and choosing objects in a web purchasing environment. Recommendation systems have additionally proved to enhance decision-making processes and quality. In an e-commerce setting, recommender systems enhance revenues, for the truth is that they're powerful means of selling more products. In scientific libraries, recommender systems aid customers by letting them pass past catalog searches. Therefore, the need to apply efficient and correct recommendation techniques inside a system that will offer applicable and reliable tips for customers can't be over-emphasized.

The goal of this paper is twofold: on the one hand, we advocate a general definition of a content-based multimedia recommender system (CB-MMRS), which accommodates each system operating with one media type (vertical approach) and systems operating with more than one media type (e.g., films whilst exploiting the composite of an image, audio, and textual information). As a 2nd contribution, we talk about numerous duties in which MM content may be exploited for a powerful recommendation, and we categorize them alongside different axes.

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Fig 1: Structure of a Recommendation System

II. TYPES OF RECOMMENDATION SYSTEM

Recommender systems are described as recommendation inputs given through the people, which the system then aggregates and directs to suitable recipients. It may be in addition described as a system that produces individualized recommendations as output or has the impact of guiding the person in a customized manner to interesting objects in a larger area of possible options. The recommender system turns into an imperative part of the Media and Entertainment industry withinside the near future. There are majorly three types of recommender systems that work primarily in the Media and Entertainment industry:

- Collaborative Recommender system
- Content-based recommender system
- Hybrid recommender system

A. Collaborative Recommendation system

The motivation for collaborative filtering comes from the concept that human beings frequently get the best recommendations from a person with tastes just like themselves. Collaborative filtering encompasses strategies for matching human beings with similar interests and making recommendations on this basis. Collaborative recommender systems mixture ratings or pointers of items, understand commonalities among the customers on the idea in their ratings and generate new recommendations based on inter-consumer comparisons. The finest power of collaborative techniques is that they may be absolutely impartial to any machine-readable representation of the items being recommended and work properly for complicated items where variations in taste are chargeable for an awful lot of the variant in preferences. Collaborative filtering is primarily based totally on the idea that individuals who agreed in the past will agree in the destiny and that they'll like comparable styles of items as they preferred withinside the past.



Fig 2: Collaborative Filtering in Recommender Systems

The first step in sporting out Collaborative Filtering is to are expecting the users' unknown ratings. These predictions are primarily based totally on users' ancient behaviors; specifically, users' choice for a set of objects using past experiences. Collaborative recommender systems can vary from every other in the manner a rating is

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defined. A couple of essential algorithms that may be used for Collaborative Filtering are NormalPredictor and BaselineOnly. The normalPredictor algorithm predicts a random rating based on the distribution of the training set, which is believed to be expected. BaselineOnly algorithm indicates the baseline estimate for a given person and item.

There also are a couple of k-NN based algorithms. k-NN is a non-parametric, lazy learning method. It makes use of a database wherein the statistics factors are separated into numerous clusters to make inferences for new samples. k-NN does no longer make any assumptions at the underlying data distribution however it is based on item feature similarity. For example, while kNN makes an inference approximately a film, k-NN will calculate the "distance" among the goal film and every other film in its database, then it ranks its distances and returns the pinnacle k nearest neighbor films because of the maximum similar film recommendations. There are versions of this algorithm that take into account the mean ratings or z-rating normalization of every user.

Next, there are Matrix Factorization-based algorithms like Singular Value Decomposition (SVD), Singular Value Decomposition with an implicit rating, and Nonnegative Matrix Factorization. SVD algorithm is equivalent to Probabilistic Matrix Factorization. In this work, we use the SVD algorithm. In the following algorithm, the matrix of interactions is factorized into two small matrices one for users and one for items with a certain number of latent components (typically several hundred).

There are 2 main flavors in Collaborative Filtering: User-based Collaborative Filtering (UBCF) is visible in Figure 4 and Item-based Collaborative Filtering (IBCF) is denoted through Figure 5. As the names suggest, similarities are measured among customers and in the former and items in the latter. The fundamental idea at the back of this RS is if a consumer likes a certain object, he's maximum in all likelihood to like a similar object, and if customers are similar, they're maximum in all likelihood to have a common interest. In UBCF, the similarities are calculated among customers, and the unrated items are recommended by a similar consumer. In IBCF, the similarities are calculated and the unrated similar object is usually recommended to the active consumer.

1. User-Based Collaborative Filtering (UBCF)

The nearest neighbor approach exhibits that deciding on all of the users' rating information isn't always the maximum possible solution. Hence, we use only top-N similar users' statistics and make predictions which increase the accuracy of the model. In UBCF, the recommendations are generated by thinking about the options in the users' neighborhoods. It can be done in two steps:

1. Identify similar users based on similar user preferences

2. Recommend new items to an active user based on the ratings given by similar users.

Not can a simple example, if the user Ashley has rated 'Star Wars' and 'The Empire Strikes Back' movies with five stars and if the user Bob has rated 'Star Wars' with five stars too, then it is mostly liked for Ashley and Bob to be similar to each other and hence we can recommend the movie 'The Empire Strikes Back' to Bob.





2. Item Based Collaborative Filtering (IBCF)

The recommendations are created relative to the community of items. Unlike UBCF, we first discover similarities among items after which we advise non-rated objects which might be much like the items the active consumer has rated in the past. IBCF is built in steps: 1. Calculate the item similarity based on item preferences 2. Find the pinnacle similar items to the non-rated items via way of means of the active consumer Let us expect

that the similarity among Toy Story and Aladdin is calculated and that they manifest to be very similar, now while a new consumer likes both of those movies, the opposite film may be recommended to the consumer. Hence, we eliminate the cold-start problem in IBCF which is an issue that is generally confronted in UBCF. So, this sort of RS fails to advise the first-time customers whose statistics aren't available withinside the system.



Fig 5: Item Based Collaborative Filtering (IBCF)

Typically, the workflow of a collaborative filtering system is:

- 1. A consumer expresses his or her preferences by rating items (e.g. books, films, or song recordings) of the system. These ratings may be viewed as an approximate illustration of the consumer's interest withinside the corresponding domain.
- 2. The system matches this user's ratings against other users' and finds the people with the most "similar" tastes.
- 3. With similar users, the system recommends items that the similar users have rated highly but are not yet being rated by this user (presumably the absence of rating is often considered as the unfamiliarity of an item).

A key problem of collaborative filtering is the way to integrate and weigh the preferences of consumer neighbors. Sometimes, customers can immediately rate the endorsed items. As a result, the system gains an increasing number of correct representations of consumer preferences over time .For Collaborative Filtering, we are able to require a group of customers who've interacted with the application, the item information, and every customers' ratings of items. There isn't any requirement for distinct information about the items in Collaborative Filtering and for this reason it could be a clean beginning. However, this kind faces a cold-start problem whilst recommending to new customers who do now no longer have any rating information.

B. Content-based Recommendation system

The content-based method is a domain-dependent algorithm and it emphasizes the greater evaluation of the attributes of items so that it will generate predictions. When files that include web pages, publications, and news are to be recommended, the content-based filtering method is the maximum successful. These methods are great suited to conditions where there are known data on an item (name, location, description, etc.), however not at the consumer. Content-based recommenders deal with advice as a user-specific classification problem and study a classifier for the consumer's likes and dislike based on an item's features.

In this system, keywords are used to explain the items and a consumer profile is constructed to signify the sort of object this person likes. In different words, those algorithms try and recommend items that are similar to those that a consumer-preferred withinside the past, or is inspecting in the present. It does now no longer rely upon a consumer sign-in mechanism to generate this regularly temporary profile. In particular, numerous candidate items are as compared with items formerly rated by the consumer, and exceptional-matching items are recommended. This method has its roots in information retrieval and information filtering research.

The techniques use an item profile (i.e., a set of discrete attributes and functions) characterizing the item withinside the system. To summary, the functions of the items withinside the system, an item presentation algorithm is applied. An extensively used algorithm is the tf-idf representation (also known as vector space representation). The system creates a content-based profile of customers based on a weighted vector of item functions. The weights denote the significance of every function to the consumer and may be computed from personally rated content vectors using plenty of strategies.

Simple techniques use the average values of the rated item vector at the same time as other sophisticated techniques use machine learning strategies consisting of Bayesian Classifiers, cluster analysis, decision trees, and artificial neural networks so one can estimate the probability that the consumer goes to just like the item. A problem with content-based filtering is whether or not the system is capable of learning consumer alternatives from customers' actions concerning one content supply and using them throughout different content types. When the system is constrained to recommending content of the equal kind as the consumer is already using, the value from the recommendation system is substantially much less than whilst different content kinds from different services may be recommended. For example, recommending news articles based on surfing news is beneficial, however might be a whole lot extra beneficial while music, videos, products, discussions, etc. from special services may be recommended based on news surfing. To conquer this, maximum content-based recommender systems now use some form of hybrid machine.



Fig 6: Content-based Filtering in Recommender Systems

The content of an item may be a completely abstract component and consequently offers us plenty of alternatives in terms of variables that we cannot use. We can pick simply one or a mixture of those to apply in our algorithm. Once we choose the functions that we need to apply, we want to convert all these statistics right into a Vector Space Model, an algebraic representation of textual content files. This is typically carried out by the use of a Bag of Words model, that represents files ignoring the order of the words.TF-IDF representation is a particular implementation of a Bag of Words. This version combines how essential is the phrase in the report (nearby importance), with how essential is the word in the corpus (global significance). Information retrieval systems had been the use of the concepts of Term Frequency (TF) and Inverse Document Frequency (IDF) for quite a long and now Content-Based Filtering recommenders also are utilizing them. They may be used to discover the relative significance of something like a document or movie. Another essential idea right here is the similarity measure that may tell how similar items are with respect to each other. Cosine Similarity is one of the famous ones on this aspect.

1. Vectors

The fundamental idea is to convert the texts or words into a vector and represent them in a vector space model.

2. TF-IDF

TF- IDF stands for Term Frequency and Inverse Document Frequency.TF-IDF helps in evaluating the importance of a word in a document.

2.1 TF — Term Frequency

TF is represented below and it says how frequently the term 't' occurs in document d.

$(ft,d = \sum t \epsilon d f(t,d))$

Step 1 is to create a dictionary of words (additionally called a bag of words) present in the entire document space. Some common words are additionally known as stop words e.g. the, of, a, an, is, etc. are left out in this manner considering the fact that those words are pretty common and aren't of any assistance in selecting vital words. Step 2 is forming the vector. The Term Frequency allows us to become aware of how regularly the term or word seems in a document however there's an additional inherent problem, TF offers more significance to words/terms going on often at the same time as ignoring the significance of uncommon words/terms. This isn't a great situation as uncommon words incorporate more significance or signal. This problem is resolved by IDF.

2.2 IDF - Inverse Document Frequency

A simpler definition of IDF can be: IDF = log (Total number of documents)/ (Total number of terms in the document)

2.3 TF-IDF Weight

Now the final step would be to get the TF-IDF weight. The TF vector and IDF vector are converted into a matrix. Then TF-IDF weight is represented as TF - IDF Weight = TF(t, d) * (t, t)

3. Similarity Measures

The similarity measures may be represented on a plot, with every user (or item) denoted with the aid of using the coordinates. The distance among the 2 coordinates offers the similarity among them. The lesser the distance, the more might be the similarity. The first step is to locate similar users (or items) and those similarities are calculated by the ratings given by the users.

3.1 Cosine Similarity calculates the distance among n-dimensional vectors with the aid of using the angle among them in the vector space. When that is implemented to RS, we keep in mind the item (or user) to be the n-dimensional vector and the similarity among the 2 because of the angle among them. The smaller the angle, the extra similar are the items (or users).

C. Hybrid Recommendation system

Combining any of the 2 systems to fit a specific industry is referred to as the Hybrid Recommender system. Most recommender systems now use a hybrid approach, combining collaborative filtering, content-based filtering, and different approaches. There isn't any reason why numerous distinct strategies of the equal kind couldn't be hybridized. Hybrid approaches may be carried out in numerous ways: through making content-based and collaborative-based predictions one by one and then combining them; by including content-based skills to a collaborative-based approach (and vice versa); or through unifying the approaches into one model.

Several studies that empirically compare the overall performance of the hybrid with the pure collaborative and content-based strategies and validated that the hybrid strategies can offer extra correct tips than pure approaches. These strategies also can be used to conquer a number of the common problems in recommender systems which include cold start and the sparsity problem, in addition to the knowledge engineering bottleneck in knowledge-based approaches. This is the maximum sought-after Recommender system that many companies look after because it combines the strengths of more than Recommender systems and additionally gets rid of any weak spot which exists while the only recommender system is used.

There are several ways in which the systems can be combined, such as:

- Weighted: Combining the score of different recommendation components numerically.
- Switching: Choosing among recommendation components and applying the selected one.
- **Mixed:** Recommendations from different recommenders are presented together to give the recommendation.
- **Feature Combination:** Features derived from different knowledge sources are combined together and given to a single recommendation algorithm.
- **Feature Augmentation:** Computing a feature or set of features, which is then part of the input to the next technique.
- **Cascade:** Recommenders are given strict priority, with the lower priority ones breaking ties in the scoring of the higher ones.
- **Meta-level:** One recommendation technique is applied and produces some sort of model, which is then the input used by the next technique.



Hybrid Recommendations

Fig 7: Hybrid Recommendation System

Techniques	Description	Drawbacks		
Content-based	Recommends based on information about items	Incapable to finding user's interest in the direction of products or services. Impossible to find the product		
		quality		
Collaborative Filtering	Recommends by collecting and analyzing users' past behaviour preferences.	Suffer from gray sheep problem, cold start problem, shilling attack, and so on		
		Malicious user's ratings		
Hybrid Recommender	Combines the above Content- based and Collaborative Filtering techniques or individual approaches of each technique	An inappropriate mixture of recommendation strategies results in bad recommendations or decreased precision results.		

III. COMPARISON OF RECOMMENDER SYSTEMS

Table 1: Table of Comparison

IV. CONCLUSIONS AND FUTURE WORK

In this study, we've got explored distinct recommendation systems consisting of Collaborative Filtering, Content-Based Filtering, and Hybrid recommendation system. We devised our very own assessment technique at the side of the traditional approach. We found out that during each instance a hybrid recommendation system performs relatively better. There are possibilities for similar evaluation following the footsteps of this work. For example, we did not take into account any demographic-based information about the consumer in the recommendation system. However, considering this can upload any other layer of refinement in the hybrid recommendation system. Furthermore, a contrast amongst distinct Collaborative Filtering based techniques and similarity measures can be interesting.

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STUDY OF MICROSTRIP PATCH ANTENNA PARAMETERS AND THERE COMPARISION

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ABSTRACT

Satellite communication and Wireless communication has been developed rapidly in the past decades and it has already a dramatic impact on human life. In the last few years, the development of wireless local area networks (WLAN) represented one of the principal interests in the information and communication field. Thus, the current trend in commercial and government communication systems has been to develop low cost, minimal weight, low profile antennas that are capable of maintaining high performance over a large spectrum of frequencies. This technological trend has focused much effort into the design of Microstrip (patch) antennas (MSA) [1].

An MSA in its simplest form consists of a radiating patch on one side of a thin dielectric substrate backed by a ground plane. The radiating patch could be of any arbitrary shape but generally regular shapes are considered for ease of analysis and design. One of the simplest and widely used configurations is rectangular MSA. A rectangular patch is defined by its length L and width W. For a simple microstrip line the width is much smaller than the wavelength. However, for the RMSA, the width is comparable to the wavelength to enhance radiation from edges. The thickness is much smaller than the wavelength. The objective of this paper is to study the effect of various parameters on the antennas characteristics like return loss and impedance. For this purpose a simple rectangular micro strip antenna (RMSA) is considered for ease of analysis. To start with, first a RMSA is designed and then its various parameters are changed to study effects of it on antennas characteristics.

Index Terms – Micro Strip Antenna (MSA)

I. INTRODUCTION

In the era of 1950's microstrip antennas (MSA) are invented but serious research had begun only after significant research of printed technology in the era of 1970's [14]. Researchers are attracted towards printed antennas due to low profile of these antennas.On the printed circuit board (PCB) there is always a conducting plane on a substrate that can radiates if properly feed and grounded at bottom. This is the basic principle of MSA also known as patch antennas.

An MSA in its simplest form consist of substrate sandwiched between radiating patch and ground plane [4]. In this configuration, in this configuration, the upper conducting layer or "patch" is the source of radiation where electromagnetic energy fringes off the edges of the patch and into the substrate. The lower conducting layer acts as a perfectly reflecting ground plane, bouncing energy back through the substrate and into free space. The configuration is shown in the fig.1.1.



Fig. 1.1 Simple Structure of Micro strip Antenna

II. FEEDING OF MSA

The maximum power transfer theorem states that, "to obtain maximum external power from a source with a finite internal resistance, the resistance of the load must equal the resistance of the source as viewed from its output terminals". This theorem is also valid in case of antennas. That's why feeding technique of MSA influence its input impedance characteristics.

2.1 CO-AXIAL FEEDING TECHNIQUE:

This type of feed is the common technique used for the feeding of the Microstrip patch antennas. Coupling of the power through a probe is one of the basic studies that can be seen in the transfer of the microwave power. In

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This Feeding Technique the external or the outer conductor is connected to the ground plane and the inner conductor of the coaxial connector extends through the dielectric and is soldered to that of the radiating patch. The coaxial probe in this feed would be an inner conductor of the coaxial line or this can be used as the power transfer from the strip line to the MSA from the slot in the ground plane. Unlike from the other feed techniques, here the advantage is that it has the flexibility to place the feed anywhere in the inside the patch in order to match the input impedance. This gives an easy way for the fabrication and it haw low spurious radiation. With the connector extending out of the ground plane, this results in non-planar surface to the substrates which are thick, i.e. having a height that is greater than 0.02λ . With the extended or the increase probe length the input impedance.

2.2 MICROSTRIP FEED TECHNIQUE:

This type of feed technique excitation of the antenna would be by the Microstrip line of the same substrate as the patch that is here can be considered as an extension to the Microstrip line, and these both can be fabricated simultaneously. This conducting strip is directly connected to the edge of the Micro strip patch. This type of structure has actually an advantage of feeding the directly done to the same substrate to yield a planar structure as said above. The coupling between the Microstrip line and the patch is in the form of the edge or butt-in coupling. However as the thickness of the dielectric substrate being used, increases, surface waves and spurious feed radiation also increases, which hampers the bandwidth of the antenna. The feed radiation also leads to undesired cross polarized radiation [5].

2.3 APERTURE COUPLED FEEDING TECHNIQUE:

This type of feed technique comes under the non-contacting feed techniques and here the radiating patch and the micro strip feed line are being divided by the ground plane. The main features in this particular feed technique is that it has a wider bandwidth and the shielding of the radiating patch from the radiation gets from the structure [14].

From the fig.3.4 below it can be seen that the configuration of this feed and as said above the radiating patch and Microstrip feed line are separated by the ground plane.

The coupling between the patch and the feed line is trough aperture in the ground plane i.e. the line feed on the lower substrate of coupled electromagnetically to the patch through the aperture. The amount of coupling depends on the size, shape and also the location of the aperture.

There is minimization of the spurious radiation as the ground plane separates the feed line and the patch; this can be achieved when there is a usage of thin, high dielectric material for the lower substrate and thick, low dielectric constant material for the upper substrate.

2.4 PROXIMITY COUPLING FEEDING TECHNIQUE:

This is one of the non-contacting non coplanar Microstrip feed technique. In this particular configuration, the patch antenna is on the upper layer substrate and the Microstrip feed line on the lower layer substrate as its uses 2 layers of substrate. There is an open end to the feed line beneath the path. This feed technique is also known as electromagnetically the current coupled (proximity coupled Microstrip feed). A particular feature of this differs from the other feed techniques i.e. the coupling capacitive in nature between the patch and the Microstrip [6].

2.5 COMPARISON OF VARIOUS FEEDING TECHNIQUES

Characteristics	Co-axial Feed	Microstrip Feed	Aperture	Proximity
			Coupling	Coupling
Configuration	Non-Planer	Planer	Planer	Planer
Spurious Feed Radiation	More	More	More	More
Polarization Purity	Poor	Poor	Poor	Excellent
Ease of Fabrication	Etching and	Etching Requires	Alignment	Alignment Requires
	Drilling		Requires	
	Requires			

Table.2.1 Comparison of Feeding Technique

III. DESIGN OF RECTANGULAR MICROSTRIP ANTENNA

3.1 DESIGN CONSIDERATIONS

Three important parameters for designing the RMSA are:

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- 1. Frequency of operations (*fr*): The main aim for designing the MSA is to design it for some application. International Telecommunication Union (ITU) decides frequency for every application e.g. GPS satellite transmits data on two frequencies L1 i.e. 1.57GHz and L2 1.22GHz [2]. Thant means application decides frequency of operation also called as resonance frequency (*fr*). Let's design a RMSA for GPS frequency i.e.1.57 GHz.
- 2. Dielectric Constant (ε_r) of Substrate: A dielectric material is a substance that is a poor conductor of electricity, but an efficient supporter of fields. The dielectric constant is the ratio of the permittivity of a substance to the permittivity of free space. It is an expression of the extent to which a material concentrates electric flux, and is the electrical equivalent of relative magnetic permeability. Let's consider glass epoxy (FR4) as a substrate for designing the antenna. It's ε_r is 4.47.
- **3.** Height of Substrate (h): As we fixed substrate as glass epoxy, commonly used glass epoxy has height 1.56mm.

Hence essential parameters for designing RMSA are:

$$fr = 1.57 \text{GHz}$$

 $\varepsilon_r = 4.47$

h=1.56 mm

IV. DESIGN PROCEDURE

Figure 4.1 shows the front view of RMSA. The transmission line model explained in chapter 3 is used for designing the RMSA. Let's design it step by step as given below.



Fig.4.1 Front View of RMSA

STEP 1. Calculation of the Width (W): The width of the Microstrip (0,0) patch antenna is given byequation (3.5) as:

$$W = \frac{c}{2f_r \sqrt{\frac{\varepsilon_r + 1}{2}}} \tag{4.1}$$

Substituting, $c = 3e^8$ m/s; $\varepsilon_r = 4.47$ and $f_r = 1.57e^9$ Hz

We get, W = 57 mm

STEP 2. Calculation of Effective dielectric constant (ε_{eff}): The ε_{eff} is given by the equation 3.3 as:

$$\varepsilon_{eff} = \frac{(\varepsilon_r + 1)}{2} + \frac{(\varepsilon_r - 1)}{2} \left[1 + \frac{12 h}{W} \right]^{-\frac{1}{2}}$$
(4.2)

Substituting $\varepsilon_r = 4.47$, h = 1.56 mm and W = 57 mm

We get;
$$\varepsilon_{eff} = 4.24$$

STEP 3. Calculation of the Effective length (L_{eff}): From Equation 3.2 we have

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$$L_{eff} = \frac{c}{2f_r \sqrt{\varepsilon_{eff}}} \tag{4.3}$$

Substituting $c = 3e^8$ m/s; $\varepsilon_{eff} = 4.24$ and $f_r = 1.57e^9$ Hz we get;

$L_{eff} = 46.34mm$

STEP 4. Calculation of the length extension (ΔL): From equation 3.3 we have;

$$\Delta L = 0.412h \left[\frac{(\varepsilon_{eff} + 0.3) \left(\frac{W}{h} + 0.264 \right)}{(\varepsilon_{eff} - 0.258) \left(\frac{W}{h} + 0.813 \right)} \right]$$
(4.4)

Substituting h=1.56 mm, $\varepsilon_{eff} = 4.24 \text{ and } W= 57 \text{ mm}$ we get;

$\Delta L = 0.7184 \, mm$

STEP 5. Calculation of the actual length (L): It is given by equation 4.4

 $L = L_{eff} + 2\Delta L$

Substituting $L_{eff} = 46.34mm$ and $\Delta L = 0.7184 mm$ we get;

STEP 6.Calculations of finite plane dimensions (W_g and L_g): The transmission line model is applicable to infinite ground planes only. However, for practical considerations, it is essential to have a finite ground plane. It has been shown by [15] that similar results for finite and infinite ground plane can be obtained if the size of the ground plane is greater than the patch dimensions by approximately six times the substrate thickness all around the periphery. Hence, for this design, the ground plane dimensions would be given as:

 $L_g = 6h + L = 6(1.56) + 47.77 = 57.13 \text{ mm}$

 $W_g = 6h + W = 6(1.56) + 57 = 114.13 \text{ mm}$

For studding effect of various parameters on antenna characteristics like return loss, impedance, etc. parametric study is carried out in next subtopic. Here above designed antenna is used for study.

4.2 SIMULATION TOOL

Electromagnetic simulation is an advanced technology to yield high accuracy analysis and design of complicated microwave and RF printed circuit, antennas, high speed digital circuits and other electronic components. IE3D is an integrated full-wave electromagnetic simulation and optimisation package for the analysis and design of 3D and planer microwave circuits, MMIC, RFIC,RFID, antennas, digital circuits and high speed printed circuit boards (PCB). Since its formal introduction in 1993 IEEE international Microwave Symposium (IEEE IMS 1993), the IE3D has been adopted as an industrial standard in planer and 3D electromagnetic simulation. Much improvement has been achieved in the IE3D has become the most versatile. Easy to use, efficient and accurate electromagnetic simulation tool [7].

V. PARAMETRIC STUDY OF RMSA

A coaxial-fed RMSA of L = 4.55 cm and W = 5.5 cm is considered to study the effects of various parameters on its performance. The probe diameter is taken as 0.12 cm for the 50 Ω coaxial probe feed using an SMA connector. The usbstrate parameters are $\varepsilon_r = 2.55$, h = 0.156 cm, and tan $\delta = 0.01$. The antenna has been analysed using commercially available IE3D software basedon MoM. Fig.4.2 shows designed antenna on IE3D simulation tool.



Fig.4.2 Proposed RMSA

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5.1. EFFECT OF FEED LOCATION

The feed-point should be located at a point on patch where input impedance is 50 at resonance frequency. Return loss at different locations on the patch is compared and a point where return loss (RL) is most negative is selected as a feed-point. The centre of the patch is taken at origin and feed-point location is given by coordinates (Xf, Yf) with respect to origin. There exists a point along length where RL is minimum [1].Fig.4.3 shows the return loss plot. The feed point at (10, 8) giving most negative RL while from smith chart feed at (10, 8) giving 50 Ω of impedance.



Fig.4.3. Effect of Feed Location on Return Loss

5.2. EFFECT OF HEIGHT

The RL plots for two different values of h (15 mm and 3 mm) are shown in Fig.5 for L = 55 mm, W = 44.5 mm, $\varepsilon r = 4.4$ and feed at (10,08). Fig.4.4 shows the effect of height on return loss. With an increase in h from 1.5 mm to 3 mm, following effects are observed:

- With the increase in h, the fringing fields from the edges increase, which increases the extension in length L and hence the effective length, thereby decreasing the resonance frequency.
- On the other hand with the increase in h, the W/h ratio reduces which decreases e and hence increases the resonance frequency. However, the effect of the increase in ΔL is dominant over the decrease in ϵr . Therefore, the net effect is to decrease the resonance frequency.
- The input impedance plot moves clockwise (i.e., an inductive shift occurs) due to the increase in the probe inductance of the coaxial feed.
- The BW of the antenna increases. However, for the thicker substrate, this BW is not the maximum [8].



Fig.4.4. Effect of Height on Return Loss

5.3. EFFECT OF WIDTH

With an increase in W from 43.5 mm to 44.5 mm, the following effects are observed:

The resonance frequency decreases from 1.64 GHz to 1.57 GHz due to the increase in ΔL and ϵr . From fig.4.5 it is clear that, the BW of the antenna increases; however, it is not very evident from these plots, because the feed point is not optimum for the different widths. Accordingly, a better comparison will be obtained when the feed point is optimized for the individual widths [2].

5.4. EFFECT OF ER

For RMSA with L = 55 mm, W= 44.5 mm and feed at (10, 08), when ε is decreased to 1, the resonance frequency increases. A better comparison of effect of ε is obtained when the antenna is designed to operate in the same frequency range for different values of ε [1]. Fig.4.6 shows effect ε on return loss and bandwidth.



Fig.4.5. Effect on width on return loss and bandwidth.



Fig.4.7. Effect of loss tangent on return loss

5.5. EFFECT OF LOSS TANGENT (TAN Δ)

For RMSA with L = 55 mm, W = 44.5 mm and feed at (10, 08), when tand is decreased from 0.01 to 0.001 the resonance frequency decreases. Also it is found that lesser the loss tangent less the loss in probe giving the wider bandwidth. Fig.4.7 shows effect of loss tangent on return loss and bandwidth.

VI. RESULTS AND DISCUSSION

The table below show the above comparisons in a tabular format so that we can conclude the effect of parameters on resonance frequency and bandwidth.

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Parameters	Resonance Frequency	Bandwidth
Feed Location	No shift	No Chage
Height	Increases	Increases
Width	Decreases	Decreases
Er	Decreases	Decreases
Loss Tangent	Increases	Decreases

A comparative study of effect various parameters on bandwidth and return loss of patch antenna is presented in this chapter. It was observed that, to increases resonance frequency height and loss tangent is to be increased whereas width and ε to be decreases. For increasing bandwidth, height is to be increased whereas width, ε , loss tangent is to be decreased.

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LUNG CANCER DETECTION USING MODIFIED FCM ALGORITHM & MULTINOMIAL MULTIVARIABLE BAYESIAN CLASSIFIER

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ABSTRACT

Medical image enhancement & classification plays an important role in medical research area. The manual analysis of CT (Computed Tomography) scan images is a very time consuming, inaccurate and requires skilled person to avoid diagnostic errors. In this paper we focus on the classification of CT scan lung images into normal and abnormal category. Classification of images mainly depends on texture-based features such as GLCM (Gray Level Co-occurrence Matrix) feature. Totally 12 different statistical features are extracted, to select the required features among them we use sequential forward selection algorithm. Thereafter we prefer multinomial multivariate Bayesian classifier for the classification stage which gives perfect classification as compare to Fuzzy C-Mean (FCM) clustering algorithm. For segmentation of affected portion from the abnormal image we use modified FCM algorithm. The effectiveness of the modified weighted FCM algorithm in terms of computational rate is improved by modifying the cluster center and membership value updating criterion. The quantitative procedure is very helpful for earlier detection of lung cancer.

Keywords—Histogram Equalization, feature extraction, sequential forward selection, Image segmentation, fuzzy c-means algorithm

INTRODUCTION

Lung cancer is considered to be the main cause of cancer death worldwide, and as known everyone it is difficult to detect lung cancer in its early stages because symptoms appear only at advanced stages causing the mortality rate to be the highest among all other types of cancers. More people die because of lung cancer than any other types of cancer such as: breast, colon, and prostate cancers. There is significant evidence indicating that the early detection of lung cancer will decrease the mortality rate. The most recent estimates according to the latest statistics provided by world health organization indicates that around 7.6 million deaths worldwide each year because of this type of cancer. Furthermore, mortality from cancer are expected to continue rising, to become around 17 million worldwide in 2030 [1]. Early detection of lung cancer in its primary stage is a challenging problem, due to the complicated structure of the cancer cells, where most of the cells are overlapped to each other [1]. Previously the HNN used as a basis for a Computer Aided Diagnosis system for early detection of lung cancer [1]. In this paper we use a Bayesian decision theory for the detection of the lung cancer cells. The performance of Bayesian classifier is based on the classification of the classifier.

The reminder of this paper is organized as follows.

In section II we had preprocessed the given test image for reducing noise and to enhance the contrast by using Contrast Limited Adaptive Histogram Equalization (CLAHE). Afterwards, in section III texture features (GLCM) is extracted from the test image. In feature extraction stage, statistical measurements are calculated from the gray level co-occurrence matrix for different directions and distances. Among the various features extracted we have to select the distinct features that will be utilized for classification purpose. For the selection of features SFS (Sequential Forward Selection) is used. In section IV Kernelised bayesian is used to classify whether the test image comes under normal or abnormal category.

System Architecture

System architecture is the conceptual model that defines the structure, behavior, and more views of a system. System architecture is as given in below figure 1. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures of the system. Into the system architecture flow of the work is given into the right side of the architecture one test image is taken, as test image has noise we have to preprocess the given test image for reducing noise and to enhance the contrast. Preprocessing has been done by using The Contrast Limited Adaptive Histogram Equalization (CLAHE) then texture features (GLCM) will be extracted from the test image. By using sequential forward selection feature subset is obtained and then processed towards the Multivariate multinomial Bayesian classifier for classification whether it is normal one or abnormal. Same data sequence flow is used for the training set of images into the left side of the architecture

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Figure1. System architecture

II. PRE-PROCESSING OF CT SCAN IMAGE TO ENHANCE THE CONTRAST

The Contrast Limited Adaptive Histogram Equalization (CLAHE) is an improved version of adaptive histogram equalization. The contrast limited adaptive histogram equalization algorithm partitions the images into contextual regions and applies the histogram equalization to each one. This evens out the distribution of used gray values and thus makes hidden features of the image more visible. The amount of contrast enhancement for some intensity is directly proportional to the slope of the Cumulative Distribution Function (CDF) at that intensity level. Hence contrast enhancement can be limited by limiting the slope of the CDF. The slope of CDF at a bin location is determined by the height of the histogram for that bin. Therefore the height limitation of the histogram results in limiting the slope of the CDF and hence the amount of contrast enhancement [2].

III. FEATURE EXTRACTION AND SELECTION

A. Extraction of Texture Feature

Amongst the four approaches (Structural, Statistical, Model based and Transform) here we go with Statistical approach for texture analysis. The statistical approach does not presume in terms of primitive but it draws on the general set of statistical tool. It is the widely used and commonly applied method because of its high accuracy and less computation time. A gray level co-occurrence matrix (GLCM) contains information about the positions of pixels having similar gray level values [5]. GLCM is also called as Gray level Dependency Matrix. It is defined as "A two dimensional histogram of gray levels for a pair of pixels, which are separated by a fixed spatial relationship." GLCM of an image is computed using a displacement vector d, defined by its radius δ and orientation θ .

Following notations are used to explain the various textural features:

$$g_{ij} = (i, j)^{th}$$
 entry in GLCM

 $g_x(i) = i^{th}$ entry in marginal probability matrix

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obtained by summing rows of
$$g_{ij} = \sum_{j=1}^{N_g} g(i,j)$$

 N_g = Number of distinct gray levels in the image.

$$g_{y}(i) = \sum_{i=1}^{N_g} g(i,j)$$

$$g_{x+y}(k) = \sum_{i=1}^{N_g} \sum_{j=1}^{N_g} g(i,j)$$
 Where $i+j = k = 2,3,...,2N_g$

$$g_{x-y}(k) = \sum_{i=1}^{N_g} \sum_{j=1}^{N_g} g(i,j) \text{ Where } i-j = k = 0,1, \dots, N_g - 1$$

From the co-occurrence matrix obtained, one can extract the 12 different statistical features. These features are:

1. Contrast

Contrast is a measure of the local variations present in an image.

$$Contrast = \sum_{i} \sum_{j} (i-j)^2 g_{ij}$$
(1)

Where values (i, j) lying at distance d in the image. A low contrast image presents GLCM concentration term around the principal diagonal and features low spatial frequencies.

2. Sum of Squares, Variance

$$Variance(var) = \sum_{I} \sum_{j} (i - \mu)^2 g_{ij}$$
(2)

Where μ is the mean of g_{ij} . Variance increases when the gray level values differ from their mean.

3. Correlation

Correlation is a measure of image linearity

$$Correlation = \frac{\sum_{i} \sum_{j} (ij) g_{ij} - \mu_x \mu_y}{\sigma_x \sigma_y}$$
(3)

Where

 μ_x , μ_y , σ_x and σ_y are the means and standard deviations of g_x and g_y . The correlation feature is a measure of gray tone linear dependencies in the image.

4. Energy

One approach to generating texture features is to use local kernels to detect various types of texture. After the convolution with the specified kernel, the texture energy measure (TEM) is computed by summing the absolute values in a local neighborhood:

$$Energy = \sum_{i} \sum_{j} g_{ij}^{2}$$
(4)

Energy reaches a maximum value equal to one. High energy values occur when the gray level distribution has a constant or periodic form. Energy has a normalized range. The GLCM of less homogeneous image will have large number of small entries.

5. Maximum Probability

This is simply the largest entry in the matrix, and corresponds to the strongest response. This could be the maximum in any of the matrices or the maximum overall.

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$$C_m = MAX \ g_{ij} \tag{5}$$

6. Dissimilarity

$$\sum_{i,j=1}^{G} g_{ij} |i-j|$$
 (6)

Dissimilarity is a measure that defines the variation of grey level pairs in an image. It is the closest to Contrast with a difference in the weight – Contrast unlike Dissimilarity grows quadratically

7. Autocorrelation

Other statistical approaches include an autocorrelation function, which has been used for analyzing the regularity and coarseness of texture by Keizer. This function evaluates the linear spatial relationships between primitives. The set of autocorrelation coefficients shown below are used as texture features large value of MD indicates test image is of poor quality. Ideally it should be zero.

$$C(p,q) = \frac{MN}{(M-p)(N-q)} \frac{\sum_{i=1}^{M-p} \sum_{j=1}^{N-q} f(i,j) f(i+p,j+q)}{\sum_{i=1}^{M} \sum_{j=1}^{N} f^{2}(i,j)}$$

(7)

8. Inverse different Moment

IDM is also influenced by the homogeneity of the image. Because of the weighting factor IDM will get small contributions from inhomogeneous areas. The result is a low IDM value for inhomogeneous images, and a relatively higher value for homogeneous images.

$$IDM = \sum_{i=0}^{G-1} \sum_{j=0}^{G-1} \frac{1}{1 + (i-j)^2} g_{ij}$$
(8)

9. Entropy

Entropy is a measure of information content. It measures the randomness of intensity distribution.

$$C_e = -\sum_i \sum_j g_{ij} \ln g_{ij} \tag{9}$$

10. Homogeneity

A homogeneous image will result in a co-occurrence matrix with a combination of high and low P [i,j]'s.

$$C_{h} = \sum_{i} \sum_{j} \frac{g_{ij}}{1 + |i - j|}$$
(10)

11. Cluster Prominence

$$PROM = \sum_{i=0}^{G-1} \sum_{j=0}^{G-1} \{i + j - \mu_x - \mu_y\}^4 \times g_{ij}$$
(11)

The selected feature is the normalized cluster prominence based on gray level co-occurrence matrices (GLCM).

12. Cluster Shade

$$SHADE = \sum_{I=0}^{2G-2} (i - 2\mu)^3 H_s(i | \Delta x, \Delta y)$$
(12)

Where

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$$\mu = \frac{1}{2} \sum_{i=0}^{2G-2} i H_s(i | \Delta x, \Delta y)$$

Cluster shade and cluster prominence are measures of the skewness of the matrix, in other words the lack of symmetry. When cluster shade and cluster prominence are high, the image is not symmetric. In addition, when cluster prominence is low, there is a peak in the co-occurrence matrix around the mean values. For the image, this means that there is little variation in gray-scales.

B. Feature Selection

- C. Feature selection algorithms are important to recognition and classification systems because, if a feature space with a large dimension is used, the performance of the classifier will decrease with respect to execution time and to recognition rate. The execution time increases with the number of features because of the measurement cost. The recognition rate can decrease because of redundant features and of the fact that small number of features can alleviate the course of dimensionality when the training samples set is limited, leading to overtraining. On the other hand, a reduction in the number of features may lead to a loss in the discrimination power and thereby lower the accuracy of the recognition system.
- D. In order to determine the best feature subset for some criterion, some automatic feature selection algorithm can be applied to the complete feature space, varying the number of selected features from 1 to m.
- E. The basic feature selection algorithm is shown in the following.

Algorithm 1: for Feature selection

- 1. Start with the empty set $Y_0 = \{\varphi\}$
- 2. Select the next best feature X^+ = argmax [J (Y_k+X)]; x¢Y_k
- 3. Update $Y_{k+1}=Y_{k+1}+X^{+}$; k=k+1
- 4. Goto 2
- F. SFS (Sequential Forward Selection) performs best when the optimal subset has a small number of features. When the search is near the empty Set, a large number of states can be potentially evaluated. Towards the full set, the region examined by SFS is narrower since most of the features have already been selected. The search space is drawn like an ellipse to emphasize the fact that there are fewer states towards the full or empty sets. As an example, the state space for 4 features is shown. Notice that the number of states is larger in the middle of the search tree. The main disadvantage of SFS is that it is unable to remove features that become obsolete after the addition of other features.

IV. MULTINOMIAL MULTIVARIATE BAYESIAN CLASSIFICATION

Among the various features which are extracted in previous section, we had selected the distinct features that will be utilized for classification purpose. It is a generative (model based) approach, which offers a useful conceptual framework for Glaucoma images. Any kind of abnormalities can be classified, based on a probabilistic model specification. Features that describe data instances are conditionally independent given the classification hypothesis. Multivariate multinomial distribution for discrete data that fit assumes each individual feature follows a multinomial model within a class. The parameters for a feature include the probabilities of all possible values that the corresponding feature can take.

Bayes Rule is stated as follows,

$$P\left(\frac{h}{d}\right) = P\left(\frac{d}{h}\right)P(h)P(d)$$
(13)

Where

d= data, h= hypothesis (model). By rearranging the above equation

$$P\left(\frac{h}{d}\right)P(d) = P\left(\frac{d}{h}\right)P(h)$$
(14)

 $P\left(\frac{h}{d}\right)$ Probability of instance d being in class h, this is what we are trying to compute. $P\left(\frac{d}{h}\right)$ Probability of generating instance d given class h, we can imagine that being in class h, causes you to have feature d with some probability. P (h) probability of occurrence of class h this is just how frequent the class h, is in our

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database, p (d) probability of instance d occurring, this can actually be ignored, since it is the same for all classes

$$Max\left[P\left(\frac{h}{d}\right)\right] = Max\left[P\left(\frac{d}{h}\right)P(h)\right]$$
$$P(d,h) = P(d,h)$$
(15)

The same joint probability on both sides. This gives the proper classification of CT scan image into the normal or abnormal

V. SEGMENTATION

After the classification of CT scan image, we have to project the affected portion for segmentation by using modified FCM (Fuzzy C-means) algorithm. FCM is a method of clustering which allows one piece of data to belong to more than one cluster In other words; each data is a member of every cluster but with a certain degree known as membership value. Membership values are in the range 0 to 1 and membership values for each data from all the clusters will add to 1. Choose the number of clusters, C and degree of fuzziness m, typically 2.

Feature 1



Algorithm for the segmentation is as follows

Algorithm 3: For Segmentation of cancerous portion.

- 1. Initialise all u_{ij} , membership values randomly matrix U^0
- 2. At step k: Compute centroids, c_j using

$$C_{j} = \frac{\sum_{i=1}^{N} u^{m}{}_{ij} x_{i}}{\sum_{i=1}^{N} u^{m}{}_{ij}}$$
(16)

3. Compute new membership values, u_{ij} using

$$u_{ij} = \frac{1}{\sum_{k=1}^{c} (\frac{x_i - c_j}{x_i - c_k})^{\frac{2}{m-1}}}$$
(17)

- 4. Update $U^{k+1} \leftarrow U^k$
- 5. Repeat steps 2-4 until change of membership values is very small, $U_{k+1}-U_k \leq \epsilon$ where ϵ is some small value, typically 0.01.

Clustering can also be thought of as a form of data compression, where a large number of samples are converted into a small number of representative prototypes or clusters. High dimensional feature space based image segmentation is time intensive than in one dimensional feature spaces. The modified FCM algorithm is based on the concept of data compression where the dimensionality of the input is highly reduced. The data compression includes two steps: quantization and aggregation. The quantization of the feature space is performed by masking the lower 'm' bits of the feature value.

$$C_{j} = \frac{\sum_{j=1}^{n} u_{ij}^{m} y_{j}}{\sum_{j=1}^{n} u^{m}_{ij}}$$
(18)

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$$u_{ij} = \frac{1}{\sum_{k=1}^{c} (\frac{d_{ij}}{d_{kj}})^{2/(m-1)}}$$
(19)

Where $d_{ij} = y_j - c_i$; y= reduced datase

The quantized output will result in the common intensity values for more than one feature vector. In the process of aggregation, feature vectors which share common intensity values are grouped together. A representative feature vector is chosen from each group and they are given as input for the conventional FCM algorithm. Once the clustering is complete, the representative feature vector membership values are distributed identically to all members of the quantization level. Since the modified FCM algorithm uses a reduced dataset, the convergence rate is highly improved when compared with the conventional FCM.

VI. RESULTS AND DISCUSSIONS

The images have been acquired from the CT scan department of Smt. Kashibai Navale hospital and medical college, Narhe, Pune. To avoid any effects on the parameters of images like change in dimensions, change in texture values due to different sources, we have taken all the images from the same source and same CT scan machine.

. In a result analysis first image is a input test CT scan image in figure 3 which has a many cells overlapped on each other needs to reduce noise and to enhance the contrast, after that pre-processed filter image in figure 4 in which we reduce the noise, then we plot histogram of before and after equalization of test image in figure 5 by using The Contrast Limited Adaptive Histogram Equalization (CLAHE). Grey level distribution of test image and filter image is calculated in figure 6 & 7 then total 12 different texture features are extracted in figure 8, after that by comparing 12 features with each other we select the best one by using SFS algorithm then shape features are calculated in figure 9 and classification of test image is obtained in figure 10.



Figure 3.a Test image



Figure 3.b Filtered Image

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Figure 5.b Gray level distribution for filtered image

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	Autocorrelation		18	.6640			





Figure6.b Shape Feature



Figure 7 Classification dialogue box



Figure 8 Segmented Image

FIgures and Tables

Figures and Tables.

	Figures and Desription								
Fig	Description	Subhe ad	Subhe ad						
3.a	Test Image								
3.b	Filtered Image								
4	Histogram Equalisation								
5.a	Gray level distribution for test image								
5.b	Gray level distribution for filtered image								
6.a	Texture Features								
6.b	Shape Feature								
7	Classification Dialogue Box								
8	Segmented Image								

^aSample of a Table footnote. (*Table footnote*)

Fig. 1. Table for figures

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LPG GAS LEAKAGE DETECTOR

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ABSTRACT

As we know, security has been major issue in today's scenario. Accidents are on increasing day by day. Here, we are talking about those accidents that are being occurred due to combustible gases, i.e., LPG, CNG. Frequently we hear, explosion in cylinder of household and vehicles. Several people have been injured and some got dead. Mostly fire accidents happen due to bad quality rubber tube usage or when the regulator is not turned off properly. So we are making this project for security purpose that will detect combustible gases and alert candidates. Now a day's, LPG Gas leakage detector's comes in the market with the LPG sensor that only senses any gas leakage and sends a SMS to the mobile no. provided to it and alerts the user via audio or visual indications. The sensor we are using here has excellent sensitivity combined with a quick response time. The sensor can also sense iso-butane, propane, LNG and cigarette smoke

Keywords — Arduino Uno, MQ-135 gas sensor, GSM Module, Jumper wires, Arduino IDE

INTRODUCTION

LPG was first produced in 1910 by Dr. Walter Snelling as a mixture of Propane and Butane having saturated as well as unsaturated hydrocarbons. Because of the flexible nature of LPG, it is used for many needs such as domestic fuel, industrial fuel, automobile fuel, heating, illumination etc. and the demand for LPG is increased day by day. The leaked gases when ignited may lead to causality. The number of causality due to the explosion of gas cylinders has been increasing in recent years. Thus, there is a requirement of a system that can detect and also prevent leakage of LPG. Early before 1980s and 1990s the development of electronics gas detectors, the presence of LPG gas was detected with chemically infused paper that changed its color when exposed to the gas. Since then, many technologies and devices had been developed to detect, monitor, and alert the leakage. Hence the requirement of an efficient system is needed, which may be used for domestic purposes, security, house hold and many more). Here we intend to propose a arduino based system where a gas sensor,

MQ135 The air quality sensor detects ammonia, nitrogen oxide, smoke, CO2, and other harmful gases detect dangerous gas leaks. This unit is incorporated into an alarm unit, to sound an alarm indication of the LPG leakage. The sensor has good sensitivity combined with a quick response time at low price.

Problem Of Statement

Gas leakage leads to various causality resulting into both financial loss as well as human life. In human's daily life, environment plays a vital role in health issues. The risk of fires, suffocation, explosion all are based on their physical properties such flammability, toxicity etc. The number of deaths figures due to explosion of gas cylinders has been increasing in recent years. The main reason for such explosion is due to substandard cylinders, worn out regulators, old valves and lack of awareness using gas cylinders add to risks.

Necessity Of Detection

The consumers have to upgrade their safety standards, act in accordance with statutory requirement on Environmental commitments and most importantly the Basic function being prevented by accidents and protect life and property from disasters. As a solution for the problem, a monitoring system of gas detector, alarm system to alert the user along prevention is developed.

Objective

- To design and develop a LPG Gas leakage monitoring & alert system using Arduino.
- To display the leakage alarm on a display board and send an alarm notification on SMS to any predefine mobile number

LITERATURE SURVEY

The design of a LPG leakage monitoring system is proposed for home safety. The system detects the leakage of the LPG and alerts the consumer about the leak. An added feature of the system is that it will automatically shut off stove knob if leakage occurs whenever the system detects the increase in the concentration of the LPG it immediately alerts by activating an alarm and simultaneously the regulator will get off. This device ensures the

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safety as well as prevents suffocation and explosion due to gas leakage. Safety plays a vital role in today's world and it is necessary that good safety systems are installed in places of education and work. This work modifies the previous safety systems installed in industries and this system also be used in homes and offices. The main aim of the work is to Design in microcontroller based toxic gas detecting and prevention system

The hazardous gases like LPG and propane were sensed if these gases exceed the normal level then an alarm is generated immediatelyand stove knob will turn off. The advantage of this system over the manual method is that it offers quick response time and accurate detection of an emergency and in turn leading faster diffusion of the critical situation.

In this system MQ-135 gas sensor used to sense poisonous gas and has high sensitivity to LPG and also response to natural gas. This work modifies the old safety model installed in industries. It offers quick response time as well as accurate detection. Gas leakage is a major concern with residential, commercial premises and gas powered transportation vehicles.

• CLK Speed is 16 MHz

MQ-135 Gas Sensor

MQ135 gas sensor has high sensitivity to ammonia gas, sulfide, benzene series steam, also can monitor smoke and other toxic gases well. It can detect kinds of toxic gases and is a kind of low-cost sensor for kinds of applications.

The MQ-135 Gas sensor can detect gases like Ammonia (NH3), sulfur (S), Benzene (C6H6), CO2, and other harmful gases and smoke.

Similar to other MQ series gas sensor, this sensor also has a digital and analog output pin.

The MQ135 air quality sensor module operates at

5V and consumes around 150mA.



Related theory

Arduino Uno

The ATmega328 is one kind of single-chip microcontroller formed with Atmel within the mega AVR family. The architecture of this Arduino Uno is a customized Harvard architecture with 8 bit RISC processor core. Other boards of Arduino Uno include Arduino Pro Mini, Arduino Nano, Arduino Due, Arduino Mega, and Arduino Leonardo.



Feature Of Arduino Uno Board

- The operating voltage is 5V
- The recommended input voltage will range from 7v to 12V
- The input voltage ranges from 6v to 20V

- Digital input/output pins are 14
- Analog i/p pins are 6
- DC Current for each input/output pin is 40 mA
- DC Current for 3.3V Pin is 50 mA
- Flash Memory is 32 KB
- SRAM is 2 KB
- EEPROM is 1 KB

Features of the MQ-135 include the following.

- □ Operating Voltage: 2.5V to 5.0V.
- \Box Power consumption: 150mA.
- Detect/Measure: NH3, Nox, CO2, Alcohol, Benzene and Smoke.
- □ Typical operating Voltage: 5V.
- Digital Output: 0V to 5V (TTL Logic) 5V Vcc.
- □ Analog Output: 0-5V 5V Vcc.

GSM Module

GSM modem or GSM module is **a** hardware device that uses GSM mobile telephone technology to provide a data link to a remote network. From the view of the mobile phone network, they are essentially identical to an ordinary mobile phone, including the need for a SIM to identify themselves to the network.

GSM GPRS Modules are one of the commonly used communication modules in embedded systems. A GSM GPRS Module is used to enable communication between a microcontroller (or a microprocessor) and the GSM / GPSR Network.


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The features of the GSM module include the following.

- □ Improved spectrum efficiency.
- International roaming.
- Compatibility with integrated services digital network (ISDN)
- □ Support for new services.
- SIM phonebook management.
- □ Fixed dialing number (FDN)
- Real-time clock with alarm management.
- ☐ High-quality speech.

Jumper Wires



METHODS OF IMPLEMENTATION Hardware Requirement Arduino UNO

Pin Diagram And Its Explanation



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Numbers 3,5,6,9,10 and 11 are used as a PWM pin.

- **SPI Pins:** This is the Serial Peripheral Interface pin, it is used to maintain SPI communication with the help of the SPI library. SPI pins include:
- 1. SS: Pin number 10 is used as a Slave Select
- 2. MOSI: Pin number 11 is used as a Master Out Slave In
- 3. MISO: Pin number 12 is used as a Master In Slave Out
- 4. SCK: Pin number 13 is used as a Serial Clock

LED Pin: The board has an inbuilt LED using digital pin-13. The LED glows only when the digital pin becomes high.

• **AREF Pin:** This is an analog reference pin of the Arduino board. It is used to provide a reference voltage from an external power supply. MQ-135 Gas sensor Pin Description



- □ Vin: This is the input voltage pin of the Arduino board used to provide input supply from an external power source.
- **5V:** This pin of the Arduino board is used as a regulated power supply voltage and it is used to give supply to the board as well as onboard components.
- □ **3.3V:** This pin of the board is used to provide a supply of 3.3V which is generated from a voltage regulator on the board
- **GND:** This pin of the board is used to ground the Arduino board.
- **Reset:** This pin of the board is used to reset the microcontroller. It is used to Resets the microcontroller.
- \square Analog Pins: The pins A0 to A5 are used as an analog input and it is in the range of 0-5V.
- **Digital Pins:** The pins 0 to 13 are used as a digital input or output for the Arduino board.
- □ Serial Pins: These pins are also known as a UART pin. It is used for communication between the Arduino board and a computer or other devices. The transmitter pin number 1 and receiver pin number 0 is used to transmit and receive the data resp.
- **External Interrupt Pins:** This pin of the Arduino board is used to produce the External interrupt and it is done by pin numbers 2 and 3.
- □ PWM Pins: This pins of the board is used to convert the digital signal into an analog by varying the width of the Pulse. The pin

Pin no.	Pin name	Description	
1	VCC supply	5V	
2 2	Ground	System ground	
3	D0	Digital output	
4	A0	Analog output	

GSM Module

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SIM900A is a 68 terminal device as shown in pin diagram SIM900A GSM MODULE Features

- Single supply voltage: 3.4V 4.5V
- Power saving mode: Typical power consumption in SLEEP mode is 1.5mA
- Frequency bands:SIM900A Dual-band: EGSM900, DCS1800. The SIM900A can search the two frequency bands automatically. The frequency bands also can be set by AT command.
- GSM class: Small MS
- GPRS connectivity:GPRS multi-slot class 10 (default), GPRS multi-slot class 8 (option)
- Transmitting power: Class 4 (2W) at EGSM 900, Class 1 (1W) at DCS 1800
- Operating Temperature: -30°C to +80°C
- Storage Temperature: -5°C to +90°C
- DATA GPRS: download transfer max is 85.6KBps, Upload transfer max 42.8KBps
- Supports CSD, USSD, SMS, FAX
- Supports MIC and Audio Input
- Speaker Input
- Features keypad interface
- Features display interface
- Features Real Time Clock
- Supports UART interface
- Supports single SIM card
- Firmware upgrade by debug port
- Communication by using AT commands

SOFTWARE REQUIREMENTS Arduino IDE

Arduino IDE(Integrated Development Environment) is the software for Arduino. It is used for writing code, compiling the code to check if any errors are there and uploading the code to the Arduino. It is a cross-platform software which is available for every Operating System like Windows, Linux, macOS.

Arduino is an open-source electronics platform based on easy- to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output activating a motor, turning on an LED, publishing something online.

Block Diagram



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STUDENT PERFORMANCE PREDICTION USING ANN/KNN

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ABSTRACT

One of the most challenging tasks in the education sector in India is to predict student's academic performance due to a huge volume of student data. In the Indian context, we don't have any existing system by which analyzing and monitoring can be done to check the progress and performance of the student mostly in Higher education system. Every institution has their own criteria for analyzing the performance of the students. The reason for this happing is due to the lack of study on existing prediction techniques and hence to find the best prediction methodology for predicting the student academics progress and performance. Another important reason is the lack in investigating the suitable factors which affect the academic performance and achievement of the student in particular course. So to deeply understand the problem, a detail literature survey on predicting student's performance using data mining techniques is proposed. The main objective of this article is to provide a great knowledge and understanding of different data mining techniques which have been used to predict the student progress and performance and hence how these prediction techniques help to find the most important student attribute for prediction. Actually, we want to improve the performance of the student in academic by using best data mining techniques. At last, it could also provide some benefits for faculties, students, educators and management of the institution.

INTRODUCTION

The student performance prediction is a very important issue for improving the educational process. The students' performance level may be affected by many factors related to father's job, gender, and their average marks in the previous years. The early prediction of student performance may help in improving the educational process. The performance prediction can be obtained by employing data mining techniques on educational data sets. The data classification is the most important technique in data mining research. It depends on categorization (giving a class) of data based on the values of the predicting attributes . Classifiers are represented by different kinds of models. And the variation of algorithms is great in some times for inducing classifiers from data. Some popular classification algorithms are K –Nearest Neighbors classifier, Naïve Bayes, Neural networks and Support

Vector Machine (SVM).

Algorithm

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Example?

In Nigeria, students are required to enter secondary school after spending a minimum of six years of Primary Education and passing a prescribed National Common Entrance Examination. A student then spends a minimum period of six years in Secondary School at the end of which he or she takes the General Certificate of Education Examination (GCE), also known as the Senior Secondary Certificate Examination (SSCE) or the Ordinary Level Exams. A maximum of nine and a minimum of seven subjects are registered for in the examination with Mathematics and English Language being compulsory. Nine possible grades are obtainable for each subject; these are A1, A2, A3 (distinctions grades) C4, C5, C6, (credit grades), P7, P8 (pass grades), and F9 (Failure).

Hence this study takes an engineering approach to tackling the problem of admissions by seeking ways to make the process more effective and efficient. Specifically, the study seeks to explore the possibility of using an Artificial Neural Network model to predict the performance of a student before admitting the student.

Intuitively one expects the performance of a student to be a function of some number of factors (parameters) relating to the background and intelligence of said student. It is however obvious that it will be quite difficult finding an analytical (or a mathematical) model that may acceptably model this performance/factors relationship. However one practical approach for predicting the performance of a student may be by 'extrapolating' from historical data of past students' background and their associated performances.

Limitations

- I. It only works on institutional level
- 2. The predetermined data which the user will give will be compared with particular stream valley

1 Advantages

- 1. Ease of understanding and implementing.
- 2. It is good when a sample of many class labels.
- 3. It is strong to noisy training data.

Disadvantages

- 1. It is strong to noisy training data.
- 2. It is sensitive to the local structure of the data.

PROBLEM DEFINITION

In the time where technology is emerging rapidly, there is a need of the technology is educational sector also. The necessity of technology is to examine students' performance in various aspects and for the overall institutional operations. Due to this there will be minimal Human interference and Maximum throughput.

Here in this system, we have attempted to make a neural network which will predict students' performance using Ann/knn with the predetermined data given by user. This will predict the performance of Student and will make the decision.

LITERATURE SURVEY

In Indian education system checking student's performance is a very essential in higher education. But we don't have any fixed criteria to evaluate the student performance. Some institutions student performance can be observed by using internal assessment and co-curriculum. In the Indian context, an institution with the higher degree of reputation using the good academic record as its basic criteria for their admissions [1]. There are lots of definitions of student academic performance prediction should be given in the literature. Different authors are using different student factors/attributes for analyzing student performance. Most of the author used CGPA, Internal assessment, External assessment, Examination final score and extra co-circular activities of the student as the student academic performance criteria. The final grades of any student depend on different attributes like internal assessment, external assessment, laboratory file work and viva-voce, sessional test. The performance of the student depends upon how many grades a student score in the final examination. Norlida Buniyamin, Pauziah Mohd Arsad et al. (2013) stated that what are the significance of academic analytics for an educational institution and how they work for the improvement of education. They also proposed an intelligent recommendation intervention system to improve the student's performance and achievement in education.

This system uses two different student attribute to measure the achievement and that is student grade and student information [2]. Zaidah Ibrahim and Daliela Rusli et al. (2007) stated that predicting student's performance is very critical for any educational institution because it is important for the formation of new rule and standards for the improvement of the education and reputation. They used CGPA and demographic attributes of the first year student to predict their result in the first year of education in engineering [3]. Data mining techniques which are used in mostly education are known as Educational data mining. There are lots of data mining techniques are available to predict the student performance. Education data mining help to find the hidden information from a huge database of education setting, because at present lots of data are generated in educational institution related to student [4]. Further, this hidden information can be used for performance, dropout and final result prediction of the students. Actually data mining help in the different field of education

sector [5]. So to properly understand the real meaning of the data mining in education we need to do a systematic literature review on different work done by the different researcher.

PAPER NAME	PAPER AUTHOR	PAPER DETAILS	POINTS TAKEN FROM PAPER
ARTIFICIAL NEURAL NETWORK (ANN) MODEL FOR PREDICTING STUDENTS' ACADEMIC PERFORMANCE	Usman, O.L., Adenubi, A.O.	October 2013, Vol. 1 No.2, PP. 23-37	The observed poor quality of graduates of some Nigerian Universities in recent times is traceableto non-availability of mechanism that would enable the University administrators to project intothe future performance of the concerned students.

Python [Coding Language.]

Python is an interpreted high-level general-purpose programming language. Its design philosophy emphasizes code readability with its use of significant indentation Its language constructs as well as its object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects.

Python is dynamically-typed and garbage-collected. It supports multiple programming paradigms, including structured (particularly, procedural), object-oriented and functional programming. It is often described as a "batteries included" language due to its comprehensive standard library.

Guido van Rossum began working on Python in the late 1980s, as a successor to the ABC programming language, and first released it in 1991 as Python 0.9.0.Python 2.0 was released in 2000 and introduced new features, such as list comprehensions and a garbage collection system using reference counting. Python 3.0 was released in 2008 and was a major revision of the language that is not completely backward-compatible. Python 2 was discontinued with version 2.7.18 in 2020.

4.2 Jupyter[Code Editor].

Project Jupyter is a project and community whose goal is to "develop open-source software, open-standards, and services for interactive computing across dozens of programming languages". It was spun off from IPython in 2014 by Fernando Pérezand Brian Granger. Project Jupyter's name is a reference to the three core programming languages supported by Jupyter, which are Julia, Python and R, and also a homage to Galileo's notebooks recording the discovery of the moons of Jupiter. Project Jupyter has developed and supported the interactive computing products Jupyter Notebook, JupyterHub, and JupyterLab.

Spyder[Code Editor]

Spyder is an open-source cross-platform integrated development environment (IDE) for scientific programming in the Python language. Spyder integrates with a number of prominent packages in the scientific Python stack, including NumPy, SciPy, Matplotlib, pandas, IPython, SymPy and Cython, as well as other open-source software. It is released under the MIT license.

Initially created and developed by Pierre Raybaut in 2009, since 2012 Spyder has been maintained and continuously improved by a team of scientific Python developers and the community.

Spyder is extensible with first-party and third-party plugins includes support for interactive tools for data inspection and embeds Python-specific code quality assurance and introspection instruments, such as Pyflakes, Pylint and Rope. It is available cross-platform through Anaconda, on Windows, on macOS through MacPorts, and on major Linux distributions such as Arch Linux, Debian, Fedora, Gentoo Linux, openSUSE and Ubuntu.

Spyder uses Qt for its GUI and is designed to use either of the PyQt or PySide Python bindings.[[] QtPy, a thin abstraction layer developed by the Spyder project and later adopted by multiple other packages, provides the flexibility to use either backend.

Kaggle[Data Set]

Kaggle, a subsidiary of Google LLC, is an online community of data scientists and machine learning practitioners. Kaggle allows users to find and publish data sets, explore and build models in a web-based data-science environment, work with other data scientists and machine learning engineers, and enter competitions to solve data science challenges.

Kaggle got its start in 2010 by offering machine learning competitions and now also offers a public data platform, a cloud-based workbench for data science, and Artificial Intelligence education. Its key personnel were Anthony Goldbloom and Jeremy Howard. Nicholas Gruen was founding chair succeeded by Max Levchin. Equity was raised in 2011 valuing the company at \$25 million. On 8 March 2017, Google announced that they were acquiring Kaggle.

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IOT SOCIAL DISTANCING AND MONITORING ROBOT FOR QUEUE

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ABSTRACT

During the current pandemic, social distancing is crucial because it helps limit the development of Covid due to the perceived distance between people who spread the disease. Currently, there is no option to place one person in each row 24/7 to monitor social distancing violations. Banks, authorities, shopping centers, schools, theatres, etc. There are often long queues for several hours a day. To verify the queuing social distance, we want to develop a social distance

I. INTRODUCTION

Since the end of 2019, the COVID19 pandemic has spread globally and may become a major health and safety issue for communities, health workers, and health systems around the world [1]. During the pandemic, there are plans to use robots around the world to improve patient care and reduce the burden on the medical system. People may have to coexist with the virus for a long time. In fact, one of the most important effective measures to control the Maintaining social distancing performs a important function in stopping the unfold of infectious diseases. Diseases much like COVID19. spread of the coronavirus is to maintain social distancing. By minimizing close physical contact between people, we reduce the chance of contracting the virus and spreading it throughout the community. Observing the norms of social distancing between people has become an important measure to prevent the spread of COVID19 [2].

Our goal is to introduce a unique method for mechanically observing a pair of people, in a crowded environment that does not comply with social distancing restrictions. Relative to the distance of two meters between them [3]. In order to test the social distance of the queue, we developed a robot with mandatory social distance. The robot consists of a four- wheel frame system used to drive the robotic vehicle. It uses the tail tracking principle to continuously queue and track behaviors that violate social distance [4]. The infrared sensor moves the stern left and right to monitor violations. Currently, the robot is equipped with ultrasonic obstacle detection sensors to detect obstacles in the vehicle path. The robotic vehicle uses another ultrasonic sensor to determine the distance between two people. The distance between people is

less than two meters, and the robot immediately beeps and warns of injuries [5]. In addition, it also sends these violation notices and camera images via WiFi via the Internet of Things to notify and notify superior departments/key workplaces. If there are signs of violations, they will be subject to disciplinary action immediately [6-7].

II. HARDWARE COMPONENTS REQUIRED

Ultrasonic Sensors: An ultrasonic sensor is a virtual device that measures the gap to a goal via way of means of emitting ultrasonic waves and changing the pondered sound into electric signals. Ultrasound travels quicker than audible sounds (that is, sounds that may be heard via way of means of humans). Ultrasonic sensors have simple components: transmitter (to ship sound via the piezoelectric crystal) and receiver (to come across sound after it enters and leaves an object). Figure 1 shows the ultrasonics sensor.



Figure 1 Ultrasonic Sensor

DC Motor: When a current-sporting conductor is located in a magnetic area, it transmits torque and hasan inclination to move, that is, whilst the magnetic area and the electrical area interact, mechanical pressure is generated. According to this principle. This is known as a motion action. It is as depicted in figure 2. A DC motor is any form of rotating motor that converts DC electric power into mechanical power [8,9].



Figure 2 DC Motor

Buzzer: A buzzer may be a valid sign instrument, which is probably mechanical, mechanical tool or piezoelectric. Typical makes use of for buzzers are alarms, timers, and affirmation of person input, collectively with mouse clicks or keystrokes. Figure 3 shows the buzzer.



Figure 3 Buzzer

IC: An integrated circuit (IC) is an electronic device that contains various diodes, transistors, resistors, and/or capacitors made from wafers or crystals of semiconductor materials. Integrated circuits are commonly used in robots and their control.



Figure 4 Integrated Circuit

Transistors: One of the foremost basic functions of an electronic transistor is to act as associate electronic switch. It is as shown in figure 5. We want the transistor to allow a small amount of current to flow from the collector to the emitter when it is "off," and to let as much current as possible through it. May be "on".



Figure 5 Transistor

Resistors: The foremost feature of resistors in a circuit is to manipulate the float of modern-day to different components. Figure 6 shows the resistor. Take an LED (light) for example. If an excessive amount of modern-day flows thru an LED it's far destroyed. So a resistor is used to restrict the modern-day.



Figure 6 Resistor

Capacitor: It is an electronic component whose function is to store electrical charges and then release them. A capacitor is a component that stores charge or energy when a voltage is applied as depicted in figure

7. Compared with batteries that generate new electrons through chemical reactions, capacitors behave exactly like electrons. Repositories, don't create them.



Figure 7 Capacitor

Diode: A diode is a tool that lets in current to waft in a single path however now no longer the other. This is accomplished with the aid of using the integrated electric powered field. Diodes are two-terminal gadgets that behavior power withinside an identical path. Figure 8 shows the diodes.



Figure 8 Diode

LED's: A crystal rectifier is an electronic component that emits light when current flows through it. It is a semiconductor-based light source as shown in figure 9. When current flows through the LED, electrons and holes recombine and then emit light.



Figure 9 Light Emitting Diode

PCB's: The circuit board connects electronic components through etched copper through holes and gives the robot circuit mechanical strength. Printed circuit boards are made of multiple layers of inorganic and organic dielectric materials. Figure 10 shows the PCB.



Figure 10 Printed Circuit Board

Wires and Connectors: Figure 10 shows the wires image. There are two main purposes for connecting robots: the first is to provide power to the robot's equipment, and the second is to provide a communication network for the many devices that make up the robot control system.



Figure 11 Jumper Wires

III. SOFTWARE SPECIFICATION

Raspberry Pi: The Raspberry Pi board is a small computer (approximately the scale of a credit score card) that may without difficulty hook up with the Internet and engage with many hardware components. Raspberry Pi is more and more utilized in robotics projects. Figure 12 shows the structure of Raspberry Pi [10,11].

Reasons to use Raspberry Pi:

Raspberry Pi is small and cheap Raspberry Pi is powerful Compatible with large communities Multiple I/O

Multiple connected devices: monitors, cameras, etc. Easy to use



Figure 12 Raspberry Pi

IV. CONCEPT OF LINE FOLLOWING ROBOT

The successor of this production line is an intelligent robot. Find the black line on the floor and trace it. The path is predefined, it can be a white line and black line, or the opposite (white line and black line). He can sing in the street through infrared sensors. The sensor has an infrared transmitter and an infrared receiver [12]. The infrared transmitter (infrared LED) emits moderate radiation, and the receiver (photodiode) emits moderate radiation. The time is seen from the ground. Although not all surfaces currently reflect moderate IR radiation, the best part is that a white background can completely reflect them, and black background can completely see them, as shown in the image below. Figure 13 & 14 shows the surface of black & white [13,14].







V. WORKING PRINCIPLE OF LINE FOLLOWIING robotin this line tracking robot, WE USE two infrared sensor modules, a left sensor and a right sensor. When the left and right sensors detect the target, the robot will move forward Figure 15. When the left sensor appears on the black line, the robot rotates to the left on the black line as shown in Figure 16. If the right sensor detects the black line, the robot will turn to the right until both sensors are on the white surface. When the white area appears, the robot moves forward again Figure 17. The sensor is displayed as a black

VI. LINE AND THE ROBOT STOPS SHOWN IN FIGURE 18



Figure 15Figure 16







Figure 18

VIII. WORKING OF THE PROJECT

Using ultrasonic sensors as shown in figure 19, the line repeater can detect the obstacle and stop until the obstacle is removed.



Figure 15 Ultrasonic Line Repeater

For example, if the article is ten cm far away from the sensing element and also the speed of sound is 340 m/s or $0.034 \text{ cm/}\mu\text{s}$, the acoustic wave must propagate for roughly 294 seconds [15]. as a result of the sound wave must move forward and replicate back, the scale of the pen should be doubled. Technical architecture is shown in figure 21. To get the space in centimeters, we tend to multiply the transit note value of the echo output by

0.034 and divide it by 2. Calculation done is as depicted in figure 20 [16].



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Figure 16 Calculation

IX. TECHNICAL ARCHITECTURE



Figure 17 Technical Architecture

X. ADVANTAGES AND DISADVANTAGES Advantages

- 1. Fully automatic monitoring
- 2. 24/7 operation
- 3. Automatic route tracking
- 4. No human error
- 5. Non-contact operation.

Disadvantages

- 1. Need to charge the battery
- 2. Internet connection required.

XI. CONCLUSION

We conclude and make recommendations in this section based on our results. We re-iterate the following as noted from our discussions of the results in the above section

- In demonstration of the project, the robot was successful in identifying the right distance between humans and update them on server
- Microcontroller was very efficient in its task performance, thus computation of counts and controlling I/O devices
- Hence the whole purpose of the social distancing for monitoring queue was successfully achieved and is applicable in the wider scope. Finally, we conclude that the proposed system will help in managing the distance between people hence keeping them safe.

ACKNOWLEDGEMENT

Special thanks to our Guide Prof. Rohini Rathod for assisting us to partially complete our project on "IOT SOCIAL DISTANCING AND MONITORING SYSTEMS FOR QUEUE". Her expertise and talent in circuit designing and troubleshooting and logical regression helped us effectively to partially complete this project.

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PREPARATION OF PAPERS – SMART BIKE

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ABSTRACT

A SMART BIKE is a bike in which we have used Fingerprint Scanner to recognize fingerprint and keypad input device to enter 4-digit PIN which make it highly secured bike. This Biometrics and keypad-based project focuses on fingerprint recognition and verification of PIN. The scanner which we have used in this project is Optical Fingerprint Reader and for PIN input we have used 4 X 4 keypad module. If bike parked at unsafe parking place at that point when a thief tries to steal our bike by using fake key or any other key at that time bike will ask to verify either fingerprint or 4-digit PIN to unlock the system. This is first privacy which is in our project. At the same time when a female rider is operating the bike and she has applied Mehendi on the finger at that time fingerprint will not recognize properly so to make it possible for that female rider we have made our bike smarter by making it antitheft by doing some series connection with engine fuel supply system. If thief try to do temper in circuit. Like cutting wire of sensor or ignition system. At that time series connected fuel injector which supply fuel to engine that will stop working then fuel will not reach to the engine. Simply it means engine will not start. And after tempering in circuit thief cannot start engine this make it more secured bike. Because we buy our bike at high cost so it should be more secured.

Keywords-LCD, Arduino IDE, LED, PIN, USB

INTRODUCTION

Fingerprint based Smart Bike is having functionality of reading users/owners fingerprint details and cross verified with recorded database data for the successful authentication. It also provides ignition start by the help of fingerprint sensors.

In the modern era of motor vehicle, theft is increases day by day, even from safe parking lot. Because we get only key to operate the bike. A single key to operate bike is not appropriate for bike's safety, At the point the bike can be only accessed using keys. This can be hijacked using cloned keys. Our device which is fingerprint based It provides more prevention to owners for their bike. This device record users fingerprint details by using fingerprint sensor and stores it. By using Arduino, it allows to operate the bike after verification of fingerprint recognition or 4-digit PIN recognition. This gives safety to owners for their bike.

1.1. ARDUINO UNO

Arduino is a single-board microcontroller meant to make the application more accessible which are interactive objects and its surroundings. The hardware features with an open-source hardware board designed around an 8-bit Atmel AVR microcontroller or a 32-bit Atmel ARM. Current models consists a USB interface, 6 analog input pins and 14 digital I/O pins that allows the user to attach The Arduino Uno board is a microcontroller based on the ATmega328. It has 14 digital input/output pins in which 6 can be used as PWM outputs, a 16 MHz ceramic resonator, an ICSP header, a USB connection, 6 analog inputs, a power jack and a reset button. This contains all the required support needed for microcontroller. In order to get started, they are simply connected to a computer with a USB cable or with an AC-to-DC adapter or battery. Arduino Uno Board varies from all other boards and they will not use the FTDI USB-to-serial driver chip in them. It is featured by the Atmega16U2

(Atmega8U2 up to version R2) programmed as a USB-to-serial converter.



There are various types of Arduino boards in which many of them were third-party compatible versions. The most official versions available are the Arduino Uno R3 and the Arduino Nano V3. Both of these run a 16MHz

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Atmel ATmega328P 8-bit microcontroller with 32KB of flash RAM 14 digital I/O and six analogue I/O and the 32KB will not sound like as if running Windows. Arduino projects can be stand-alone or they can communicate with software on running on a computer. For e.g. Flash, Processing, Max/MSP). The board is clocked by a 16 MHz ceramic resonator and has a USB connection for power and communication. You can easily add micro SD/SD card storage for bigger tasks.

1.2 LCD Display Module

The features of this LCD mainly include the following.

- The operating voltage of this LCD is 4.7V-5.3V
- It includes two rows where each row can produce 16-characters.
- The utilization of current is 1mA with no backlight
- Every character can be built with a 5×8 -pixel box
- The alphanumeric LCDs alphabets & numbers
- Is display can work on two modes like 4-bit & 8-bit
- These are obtainable in Blue & Green Backlight

It displays a few custom generated characters

Pin No.	Name	Function		
1	VSS	This pin must be connected to the ground		
2	VCC	Positive supply voltage pin (5V DC)		
3	VEE	Contrast adjustment		
4	RS	Resister selection		
5	R/W	Read or Write		
6	Ε	Enable		
7	DB0	Data		
8	DB1	Data		
9	DB2	Data		
10	DB3	Data		
11	DB4	Data		
12	DB5	Data		
13	DB6	Data		
14	DB7	Data		
15	LED+	Back light LED+		
16	LED-	Back light LED-		



1.3 4X4 KEYPAD MODULE

These Keypad modules are made of thin, flexible membrane material. The 4 x4 keypad module consists of 16 keys, these Keys are organized in a matrix of rows and columns. All these switches are connected to each other with a conductive trace. Normally there is no connection between rows and columns. When we will press a key, then a row and a column make contact.



1.4 ARDUINO IDE SOFTWARE

Arduino IDE (Integrated Development Environment) is the software for Arduino. It is a text editor like a notepad with different features. It is used for writing code, compiling the code to check if any errors are there and uploading the code to the Arduino. It is a cross-platform software which is available for every Operating System like Windows, Linux, macOS. It supports C/C++ language It is open-source software, where the user can use the software as they want it to. They can also make their own modules/functions and add them to the software. It supports every available Arduino board including Arduino mega, Arduino Leonardo, Arduino Ethernet and more. Word file is called a Document similarly, Arduino file is called a **Sketch** where the user writes code. The format of Arduino is saved as **.ino**

When a user writes code and compiles, the IDE will generate a Hex file for the code. (Hex file are Hexa Decimal files which are understood by Arduino) and then sent to the board using a USB cable. Every Arduino board is integrated with a microcontroller, the microcontroller will receive the hex file and runs as per the code written.

1.5 5V SINGLE CHANNEL RELAY

Sometimes you want your Arduino to control AC powered devices like lamps, fans or other household devices. But because the Arduino operates at 5 volts, it cannot directly control these higher voltage devices. That's where the relay module comes in. You can use a relay module to control the AC mains and Arduino to control the relay. A relay is an **electromagnetic switch** operated by a relatively small current that can control much larger current.



1.6 OPTICAL FINGERPRINT SENSOR

The fingerprint sensor is one kind of sensor which is used in a fingerprint detection device. These devices are mainly inbuilt in the fingerprint detection module and it is used for computer safety. The main features of this device mainly include accuracy, better performance, robustness based on exclusive fingerprint biometric technology. Both fingerprint scanner otherwise reader is an extremely safe & suitable device for safety instead of a secret word. Because the password is easy to scan and also it is hard to keep in mind.



There are different types of fingerprint modules available in the market like R305, R307. For a better understanding of this sensor, here we are going to discuss an overview of R305 fingerprint sensor module.

The R305 is one kind of fingerprint sensor module used in biometrics for security in fingerprint detection as well as verification. These devices are mainly used in safes where there is a high-powered DSP chip used in the rendering of image, feature-finding, searching and calculation by connecting it to any microcontroller with the help of TTL serial, & send data packets to get photos, notice prints, search and hash. The enrollment of new fingers can be stored directly within the flash memory of on board.

Result and Conclusion : As we have done practical implementation of this paper. Now let's see the result how it behaves when we use it. When key turns on the LCD display module turns on. And ask to verify the fingerprint or 4-digit pin. After verification of pin or fingerprint it allows to operate the system. If we have entered wrong pin or scanned unregistered fingerprint then it will ask again to verify. It allow 5 attempt to verify the security. If unsuccessful verification attempted 5 times then it will lock and ask for security code to take another 5 attempt.

Conclusion- In our project our main goal was to make our bike fully secured and antitheft. We have implemented a Arduino based smart bike. Currently there is no any security system except key. So our project make our vehicle fully secured. It gives antitheft security system to the costumers. Our project is very less costly that means high security in very low cost.

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MAN MACHINE INTERFACE

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ABSTRACT

Man-machine interaction (MMI) refers to the communication and interaction between a human and a machine via a user interface. Nowadays, natural user interfaces such as gestures have gained increasing attention as they allow humans to control machines through natural and intuitive behaviors. In gesture-based MMI, a sensor such as Microsoft Kinect is used to capture the human postures and motions, which are processed to control a machine. The key task of gesture-based MMI is to recognize the meaningful expressions of human motions using the data provided by Kinect, including RGB (red, green, blue), depth, and skeleton information. In this chapter, we focus on the gesture recognition task for MMI and introduce current deep learning methods that have been used for human motion analysis and RGB-D-based gesture recognition. More specifically, we briefly introduce the convolutional neural networks (CNNs), and then present several deep learning frameworks based on CNNs that have been used for gesture recognition by using RGB, depth and skeleton sequences.

Keywords—Recommendation systems, collaborative filtering, dataset, machine learning, user based recommendations

I. INTRODUCTION

The development of user interfaces has increased rapidly, especially in consumer devices. The use of the touch interface (e.g. touch screen) has commonly in today devices such as computer tablets, Smart Phones, and other control interface on an electronic device. The development of user interface are tends to the use of human body gesture, especially human hand as the main interface, which is more natural and intuitive. However, so far the user interface is still limited to movement on the two dimensions surface, such as the use of the mouse and touch screen.

Hand gesture recognition is performed with the use of blob detection. This recognition model allowing the implementation of an effective interface. Tracking and recognition of hand gestures motion, which is captured by web cameras, are used to control the computer cursor as a replacement of the mouse. Conduct research to develop a system using vision- based interface webcam cameras and computer vision technology that allows users to use their hand to interact with the computer. The development of user interfaces has increased rapidly, especially in consumer devices. The use of the touch interface (e.g. touch screen) has commonly in today devices such as computer tablets, Smart Phones, and other control interfaceon an electronic device.

1. TECHNIQUES USED IN METHODOLOGY

The methodology presented in this paper aims at developing smart user-machine interface that adapts the information load of the HMI and the automation capability of the machine to the physical, sensorial and cognitive capabilities of workers. The smart interface is based on three main modules, as shown in Figures.

- 1) Human capabilities measurement (Measure): the smart interface measures the human capability of understanding the logical organization of information and the cognitive burden she/he can sustain (automatic human profiling). The interface identifies also the real skill level of the user analysing how she/he operates in the common working processes (e.g. measuring the time needed to move among different screens of the HMI, measuring the eyes activity in seeking information, etc.);
- 2) Adapt interfaces to human capabilities (Adapt): the smart interface adapts the organization of information (e.g. the complexity of the information presented), the means of interaction (e.g. textual information, only graphics, speech, etc.), and the automation task (normal operation, adaptation to new processes, predictive maintenance, etc.) that are accessible to the user depending on her/his measured capabilities;
- 3) Teaching and training for unskilled users (Teach): the smart interface is used to teach the unskilled users how to interact with the machine. Depending on the skill level of theuser and the operation performed by the machine, the interface can train the user by using a step by step procedure, also supported by simulation on a virtual environment. This teaching mode can be on-line or off-line, depending on the level of automation and the criticality of the job operated by the machine or robot. Moreover, in this module, an industrial social network app (Android and iOS) is developed to facilitate the sharing of knowledge among the users about theindustrial processes and the machine operational modes.

2. Camera - Computer Vision

Computer Vision is related to MMI, such as object detection and tracking in which relates to gesture control whether that would be determining a hand, arm, leg or head motion. It can also detect intent from body language such as those that a criminal might portray before committing a crimeor before a suicide, this also links to emotions that can be detected - are you happy, sad, worried?

Computer vision allows machines to see, and sometimes see things that even we cannot see. The process behind computer vision is quite simple. You have a camera which is attached to an electronic device, usually something similar to a computer or a mobile phone. All the data from the camera is transmitted to this device for processing. To process the data, requires you to go through every pixels in the frame and perform some altering/anaylising function, which is quite intensive considering cameras can now have upwards of millions of pixels, just trying simple functions is going to takeconsiderable processing time, and that is just one frame. When you want to detect motion you have to use multiple frames.

The approach to motion detection is quite simple, it requires you to take one image and then compare it with the next to verify if anything has moved.



FIG 1.A



FIG 1.B

3. ALGORITHM



Fig -2: ALGORITHM

1. Global MMI Market

By Type

- Hardware
- Display
- Processor/Computer
- Others (Indicator, Joystick and Keypad)
- Software
- Services

By End-use Industry

- Healthcare and Pharmaceutical
- Automotive
- Manufacturing
- Oil & Gas
- Packaging
- Food & Beverage

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- Defense & Aerospace
- Metal and Mining
- Others (Retail and Transportation)

By Geography

- North America
- Europe
- Asia Pacific
- Middle East & Africa
- South America

Touchless HMI technologie	\$	Companies
1Camera-based gesture		58
2 Camera-based eye tracking		12
3 Ultrasound or radar based	gesture	10
4Voice recognition		30
5 Photodiode sensor		15
6Proximity touch screen		8
7 Motion sensor fusion	Source: Touch Display Rese	rch 49
8Short-range wireless for we	arable	26
Other touchless tech (musc 9wave, Lidar, etc)	le electric sensor, brain	26

CONCLUSION

In this study, an object tracking based virtual mouse application has been developed and implemented using a webcam.

The system has been implemented in MATLAB environment using MATLAB Image Processing Toolbox.

As an object a color sticker is used to make the detection easy and fast. Object detection and motion tracking worked very well.

Using the pointer moving the cursor and thesimulating the mouse click events also worked well.

FUTURE SCOPE

A. 1. Artificial vision

Increasing competition and the need to contain costs are forcing companies to achieve **zero-defect production**. This requires a more reliable and accurate quality control system, which guarantees the compliance of each piece. Including the integration of innovative technologies such as **artificial vision**, which will enable HMI devices to automatically perform control, measurement and classification functions.

B. 2. Wearable HMIs

The human-machine interface of the future will get even more interactive. The growing popularity of wearable devices in the consumer market (IDC estimates an average growth of over 20% per year) will also be reflected in the manufacturing sector. This is also due to the National Industry 4.0 Plan, which mentions arable devices among the technologies subject to hyper-depreciation. For example, operators will likely wear bracelets that alert them of alarms with a specific code so that they can intervene in a timely manner.

C. 3. Natural language processing

Natural Language Processing (NLP) technology is a hot topic in the industry, especially in relation to user interfaces. The language processing process makes it possible for the operators and systems to interact using verbal language.

This opens the door to highly interesting applications, making production more immediate and efficient.

D. 4. Blind HMI

Among the future HMI trends, human-machine interfaces might become **blind devices inside the panel**. In this case, operators will interact with the machine and display the production pages directly on their tablet. Alternatively, the display can be host inside the machine, while the operation will take place via an input device. For example, a tablet with a dedicated app.

E. 5. More efficiency

Production efficiency is one of Industry 4.0 priorities and this will affect the evolution of HMIs. Companies need technological solutions that simplify the interaction between men and machines to increase productivity and cut resources and time waste. One of the key factors to improve efficiency is device flexibility. Hence, it's important that HMIs will be highly customizable according to each company's needs.

Talking of configurability and efficiency, discover ERGO, our new concept of human-machine interface.

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ARM7 MICROCONTROLLER

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ABSTRACT

It has been designed to help professionals, students and amateurs to explore the capabilities of microcontrollers like LPC2148 and practice application development for various interfaces with minimal hardware configuration. The ARM memory interface has been designed to allow the performance potential to be realized without incurring high costs in the memory system. Speed-critical control signals are pipelined to allow system control functions to be implemented in standard low-power logic, and these control signals facilitate the exploitation of the fast local access modes offered by industry standard dynamic RAMs.

Keywords - ARM7, LPC2148 Microcontroller, I/O Ports, Configuration, Research Methodology

I. INTRODUCTION

ARM (stylised in lowercase as arm, previously an acronym for Advanced RISC Machines and originally Acorn RISC Machine) is a family of reduced instruction set computing (RISC) architectures for computer processors, configured for various environments. Arm Ltd. develops the architecture and licenses it to other companies, who design their own products that implement one of those architectures— including systems-on-chips (SoC) and systems-on-modules (SoM) that incorporate different components such as memory, interfaces, and radios. It also designs cores that implement this instruction set and licenses these designs to a number of companies that incorporate those core designs into their own products.

There have been several generations of the ARM design. The original ARM1 used a 32-bit internal structure but had a 26-bit address space that limited it to 64 MB of main memory. This limitation was removed in the ARMv3 series, which has a 32-bit address space, and several additional generations up to ARMv7 remained 32-bit. Released in 2011, the ARMv8-A architecture added support for a 64-bit address space and 64-bit arithmetic with its new 32-bit fixed-length instruction set.[3] Arm Ltd. has also released a series of additional instruction sets for different rules; the "Thumb" extension adds both 32- and 16-bit instructions for improved code density, while Jazelle added instructions for directly handling Java bytecodes, and more recently, JavaScript. More recent changes include the addition of simultaneous multithreading (SMT) for improved performance or fault tolerance.

Due to their low costs, minimal power consumption, and lower heat generation than their competitors, ARM processors are desirable for light, portable, battery-powered devices— including smartphones, laptops and tablet computers, as well as other embedded systems. However, ARM processors are also used for desktops and servers, including the world's fastest supercomputer. With over 200 billion ARM chips produced as of 2021, ARM is the most widely used instruction set architecture (ISA) and the ISA produced in the largest quantity.Currently, the widely used Cortex cores, older "classic" cores, and specialised SecurCore cores variants are available for each of these to include or exclude optional capabilities.[3]

ARM7 is a group of older 32-bit RISC ARM processor cores licensed by ARM Holdings for microcontroller use. The ARM7 core family consists of ARM700, ARM710, ARM710, ARM710a, ARM720T, ARM740T, ARM710T, ARM71DMI, ARM7TDMI-S, ARM7EJ-S. The

ARM7TDMI and ARM7TDMI-S were the most popular cores of the family.

Years	ARM7 Cores
1993	ARM700
1994	ARM710
1994	ARM7D1
1994	ARM7TDMI
1995	ARM710a
1997	ARM710T
1997	ARM720T
1997	ARM740T

Since ARM7 cores were released from 1993 to 2001, they are no longer recommended for new IC designs; instead ARM Cortex-M or ARM Cortex-R cores are preferred.

II. CORES

2001	ARM7TDMI-S
2001	ARM7EJ-S

Table 1

The original ARM7 was based on the earlier ARM6 design and used the same ARMv3 instruction set. The ARM710 variant was used in a CPU module for the Acorn Risc PC, and the first ARM based System on a Chip designs ARM7100 and ARM7500 used this core.

ARM7TDMI

The ARM7TDMI (ARM7 + 16 bit Thumb + JTAG Debug + fast Multiplier + enhanced ICE) processor implements the ARMv4 instruction set. It was licensed for manufacture by an array of semiconductor companies. In 2009, it was one of the most widely used ARM cores, and is found in numerous deeply embedded system designs.

Texas Instruments licensed the ARM7TDMI, which was designed into the Nokia 6110, the first ARM-powered GSM phone. This led to the popular series of Nokia phones using the processor, including the 3210 and 3310.

The ARM7TDMI-S variant is the synthesizable core.

ARM7EJ-S

The ARM7EJ-S (ARM7 + Enhanced + Jazelle - Synthesizable) is a version of the ARM7 implementing the ARMv5TE instruction set originally introduced with the more powerful ARM9E core.[2]



Fig 1. ARM7 microcontroller cores.

III. LPC2148 MICROCONTROLLER

The LPC2148 microcontroller is designed by Philips (NXP Semiconductor) with several in-built features & peripherals. Due to these reasons, it will make it more reliable as well as the efficient option for an application developer. LPC2148 is a 16-bit or 32-bit microcontroller based on the ARM7 family.

IV. FEATURES OF LPC2148

The main features of LPC2148 include the following.

i.) The LPC2148 is a 16 bit or 32 bit ARM7 family based microcontroller and available in a small LQFP64 package.

ii.) ISP (in system programming) or IAP (in application programming) using on-chip boot loader software.

iii.)On-chip static RAM is 8 kB-40 kB, on-chip flash memory is 32 kB-512 kB, the wide interface is 128 bit, or accelerator allows 60 MHz high-speed operation.

iv.)It takes 400 milliseconds time for erasing the data in full chip and 1 millisecond time for 256 bytes of programming.

Embedded Trace interfaces and Embedded ICE RT offers real-time debugging with high-speed tracing of instruction execution and on-chipReal Monitor software.

It has 2 kB of endpoint RAM and USB 2.0 full speed device controller. Furthermore, this microcontroller offers 8kB on-chip RAM nearby to USB with DMA.

One or two 10-bit ADCs offer 6 or 14 analogs i/ps with low conversion time as 2.44 µs/ channel.

Only 10 bit DAC offers changeable analog o/p. External event counter/32 bit timers-2, PWM unit, & watchdog.

Low power RTC (real time clock) & 32 kHz clock input.

Several serial interfaces like two 16C550 UARTs, two I2C-buses with 400 kbit/s speed.

5 volts tolerant quick general purpose Input/output pins in a small LQFP64 package. Outside interrupt pins-21.

60 MHz of utmost CPU CLK-clock obtainable from the programmable-on-chip phase locked loop by resolving time is 100 μ s.

The incorporated oscillator on the chip will work by an exterior crystal that ranges from 1 MHz-25 MHz

The modes for power-conserving mainly comprise idle & power down.

For extra power optimization, there are individual enable or disable of peripheral functions and peripheral CLK scaling.[1]

V. MEMORY

LPC2148 has 32kB on chip SRAM and 512kB on chip FLASH memory. This chip has built-in support for up to 2kB endpoint USB RAM. This memory is more than enough for almost all applications. Let's understand the function of this huge memory space in LPC2148.

FLASH Memory System: The LPC2148 has 512kB flash memory. This memory may be used for both code and data storage. The flash memory can be programmed by various ways

- Using serial built in JTAG Interface
- Using In-System Programming (ISP)
- By means of In-Application
- Programming (IAP) capabilities The application program, using IAP functions may also erase and/or program the FLASH while the application is running. When the LPC2148 on chip bootloader is used, 500kB of flash memory is available for user code.

RAM Memory System: LPC2148 provides 32kB of static RAM which may be used for code and/or data storage. It may be accessed as 8-bit, 16-bit and 32-bits.

VI. INPUT/OUTPUT PORTS (GPIO OF LPC2148)

Understanding IO Ports and how to use them is very important. It's because when we see microchip, we'll find a black box i.e. IC with some pins. LPC2148 has two IO ports each 32-bit wide, provided by 64 IO pins. Ports are named as P0 and P1. Pins of each port labeled as Px.y where "x" stands for port number, 0 or 1. Where "y" stands for pin number usually between 0 to 31. Each pin can perform multiple functions. For example: Pin no.1 which is P0.21 serves as GPIO as well as PWM5, AD1.6 (A/D converter1, input 6), CAP 1.3 (Capture input for Timer1, Channel 3).



Fig 2 . ARM LPC2148 Architecture

VII. CONFIGURE GPIO IN LPC2148:

- PORT 0 is a 32-bit I/O port with individual direction controls for each bit. Total of 28 pins of the Port 0 can be used as a general purpose bi-directional digital I/Os while P0.31 provides digital output functions only. The operation of port 0 pins depends upon the pin function selected via the pin connect block. Pins P0.24, P0.26 and P0.27 are not available.
- i) PORT 1 is a 32-bit bi-directional I/O port with individual direction controls for each bit. The operation of port 1 pins depends upon the pin function selected via the pin connect block. Pins 0 through 15 of port 1 are not available. PORT0 and PORT1 are controlled via two groups of registers explained below.

iii) IOPIN

This is the GPIO Port Pin value register. The Current State of the GPIO configured port pins

can always be read from this register, regardless of pin direction.

iv) IODIR

This is the GPIO Port Direction control register. This register individually Controls the direction of each Port Pin.

v) IOCLR

This is GPIO Port Output Clear registers. This register controls the state of output pins. Writing ones produces lows at the corresponding port pins and clears the corresponding bits in the IOSET register. Writing zeroes has no effect.

vi) IOSET

This is GPIO Port Output Set registers. This register controls the state of output pins in conjunction with the IOCLR register. Writing ones produces highs at the corresponding port pins. Writing zeroes has no effect.

These are the set of registers used to configure I/O Pins. Now let's move to individual registers in depth.

VIII. REGISTERS FOR C PROGRAMMING I.) IOSEL0

Port 0 has 32 pins (P0.0 to P0.31). Each pin can have multiple functions. On RESET, all pins are configured as GPIO pins. However we can re-configure using the registers IOSEL0 and IOSEL1.

IOSEL0 is used to select functions from P0.0 to P0.15. Each pin has up to 4 functions so 2 bits/pin in IOSEL0 is provided for selecting the function.

ii.) IOSEL1

IOSEL1 is used to select function of Pins P0.16 to P0.31

iii.) IOSEL2

IOSEL2 is used to select function of Pins P1.16 to P1.31

iv.) IO0DIR

IO0DIR is used to configure pins of Port 0-P0 as input or output pins.

1= Output Pin

0= Input Pin

Example: IO0DIR=0x0000FFFF means P0.0 to P0.15 are configured as output pins and P0.16 to P0.31 are configured as input pins.

V.) IO1DIR

IO1DIR is used to configure pins of Port 1-P1 as input or output pins.

1= Output Pin

0= Input Pin

Example: IO1DIR=0xAAAAAAAA means even pins (P1.0, P1.2, P1.4 etc.) are configured as input pins and odd pins (P1.1, P1.3, P1.5 etc.) are configured as input pins.

vi.) IO0SET

It is used to set pins of Port0-P0 to logic 1.

Example: IO0SET=0x0000FFFF will set pins P0.0 to P0.15 at logic 1. It will not affect other pins.

vii.) IOOCLR

It is used to set pins of Port0-P0 to logic 0.

Example: IO0CLR=0x0000FFFF will set pins P0.0 to P0.15 at logic 0. It will not affect other pins.

viii.) IO1SET

It is used to set pins of Port1-P1 to logic 1.

Example: IO1SET=0x0000FFFF will set pins P1.0 to P1.15 at logic 1. It will not affect other pins.

IX.) IO1CLR

It is used to set pins of Port1-P1 to logic 0.

Example: IO1CLR=0x0000FFFF will set pins P1.0 to P1.15 at logic 0. It will not affect other pins.

Once the use of above all registers is perfectly understood, you are good to go with programming.[4]

IX. CONCLUSION

ARM architecture is currently one of the most commonly used CPU architectures, especially in mobile devices such as in mobile phones, tablets, and games consoles. ARM has been designing 32-bit processors for over 20 years and in the last few years they have also started to offer 64-bit designs. In actual fact ARM is a company specialized in designing the processor architecture and they do not manufacture or sell

processor chips The next scope of our work will be introducing the more number of devices and various type of sensors as ARM7TDMI have more number I/P pin comparative to other microcontroller such as Arduino, Raspberry Pi (B+) for designing specifically for ASIC and ASSP integration and therefore leading into wide range of development tools from ARM and third party suppliers.

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ANALYSIS OF HELICAL ANTENNA BY PARAMETRIC VARIATION

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ABSTRACT

A helical antenna is made up of a conducting wire twisted in the shape of a helix. The helical antenna is suitable for satellite communications as well as aeroplanes. When helix is put into the cavity, the antenna's performance improves and the antenna's size is reduced. In this work, hexagonal shaped cavity backed helical antenna has been designed. To design compact size antenna performance is observed by varying physical parameters of helical antenna. Physical parameters such as number of turns ,pitch , and strip size is varied. At a time one parameter is varied by keeping remaining parameters constant .Bandwidth and gain is measured for each design. computer simulation tool is used for the design verification. The antenna is operating in the range of 3 to10GHz at center frequency 5.2 GHz. Antenna is designed for ISM band applications. The hexagonal shaped cavity is fabricated with Aluminum and helix is made of copper. The analysis shows that the number of resonant bands increases as the number of turns increases. The results also show that bandwidth improves as the number of turns increases. Because the amount of power and structure confinement remain constant as the number of helical turns rises, the gain remains comparable due to structure confinement. As the helical antenna pitch angle is raised, the resonant bands are only slightly pushed towards the lower spectrum area. This is because the entire structural height of the helix is increasing. Gain from pitching up is equivalent to gain from pitching down. A 1mm increase in strip width has little influence on frequency response since the space between the hollow walls and the helix structure is unchanged. The gain increases as the antenna strip size increases.

Keywords-cavity, Antenna, turns, pitch, strip size.

INTRODUCTION

The helical antenna was first introduced by J.D Kraus [1]-[3]. The helical antenna is an antenna consisting of a conducting wire wound in the form of helix. The helical antenna can be used in satellite communication and for the aircrafts. Both satellite communication and aviation can benefit from the helical antenna[4]-[7]. The main disadvantage of helical antennas for aircraft applications is the shape and size of the helix, which may affect the aircraft's aerodynamic properties; to solve this problem, the helix is loaded in the cavity so that it can be inside the plane surface and will not affect the aircraft's aerodynamic properties; to solve this problem, the plane surface and will not affect the aircraft's aerodynamic properties; to solve the plane surface and will not affect the aircraft's aerodynamic properties[8]-[10].

The antenna can be compared to a band pass filter. The helical loaded cavity supported antenna is built using the helical resonator principle due to its small size.

If helix is loaded in cavity it gives better performance and reduced size of antenna. Basic constriction of helical antenna is shown in fig.1.



Figure 1.Basic construction of Helix

- $D = diameter \ of \ helix$ S = Spacing between turnsN = number of turns
- $C = circumference \ of \ helix = \pi D$
- $A = Total \ axial \ length = NS$
- $\alpha = pitch angle$

ANTENNA DESIGN

Hexagonal cavity backed antenna design consists of design of cavity and design of helix. When helix is loaded in cavity it reduced size of antenna and increases bandwidth . Taking reference of Square and circular shaped cavity [11] hexagonal shaped cavity is designed. Hexagonal shape cavity adds the advantages of square and circular cavity. Size of antenna becomes conformal by use of cavity.fig.2 shows design of cavity. The cavity has a height of 25mm, and thickness of 2mm. Each side of hexagon is 15mm. The cavity is made up by material aluminum



Figure 2.Cavity design

Helical antenna is designed with its feeding pin as circular cylinder and the helix is made of a rectangular strip of thickness 1mm and strip width of 2mm. Rectangular strip is taken for proper impedance matching. Diameter of helix is 16mm. The copper is chosen for the construction of helix as it is a good electric conductor. The geometry of helix is shown in fig.3



Figure 3.Helix design

RESULTS AND DISCUSSION

Parameters of helix like number of turns, pitch, strip dimensions are varied to analyze bandwidth, gain of antenna. At a time one parameter is varied and remaining are kept constant. Each helix is placed in cavity and simulated.

NUMBER OF TURNS VARIATION





N=4



Figure 5 Comparative S11 plot for number of turns variation

Figure 5 shows comparative S11 plot for number of turns variation. Table 1 gives analysis for the same. The increase in number of turns from N=2 to N=4, significantly increases the number of resonant bands and bandwidth. So it can interpret that increase in helical turn eventually causes more amount of reflection from the cavity walls.

Sr.no	No.of	No.of	Band	Band	Band	Band	B.W
	turns	bands	1	2	3	4	(GHz)
1	2	3	4.7-	6.23-	7.85-		0.31
			4.11	6.34	8.02		
2	3	4	4.07-	5.86-	6.9-	9.16-	0.7
			4.19	6.14	7.09	9.27	
3	4	4	5.64-	6.5-	7.33-	9.72-	1.4
			5.9	6.73	7.45	10.2	
10 							
8-	Λ		:		XF	A	
6	$ \rangle$	s.V			1	1 12	
	IV	V.				5	
	1 1						
0°2	1						
4					-	- N=2	
°-					L-st.	- N=4	
-2		_					
3	4	5	6 Frequ	7 Jency(G	8 Hz)	9	10 11

Table 1 Bandwidth analysis for no.of turns variation:

Figure 6 Comparative gain analysis for number of turns variation

Comparative gain plots for number of turns variation are shown in Figure 6. The gain with increase in the helical turns remains comparable to each other due to confinement of the structure since the amount of power and structure. Comparative gain analysis is given in Table 2

Sr.no	No.of turns	Peak gain
1	2	8.71
2	3	8.73
3	4	8.93

Table 2 Gain analysis for no.of turns variation

B.Pitch variation

For pitch variation number of turns are 3,Diameter of helix is 16mm ,stripwidth is 1mm and strip thickness is 2mm.Pitch is varied as 6mm,7mm,8mm,9mm as shown in Figure 7.

Sr.no	Pitch (mm)	No.of bands	Band 1(GHz)	Band 2(GHz)	Band	Band 4(GHz)	B.W
					3(GHz)		(GHz)
1	6	4	4.07-4.19	5.86-6.14	6.9-7.09	9.16-9.27	0.7
2	7	4	3.97-4.13	5.75-6.12	6.84-7.1	9.68-10.	1.5
3	8	4	3.83-4.09	5.7-6.06	6.76-7.09	9.55-9.91	1.43
4	9	4	3.84-4.03	5.69-6.06	6.67-7.07	9.48-9.78	1.46

Table 3 Bandwidth analysis for Pitch variation



Pitch=6mm

Pitch=7mm



Pitch=8mm

Pitch=9mm





Figure 8.comparative s11plot of pitch variation

Figure 8 shows comparative s11 plots for pitch variation. Table 3 gives analysis for the same. The increase in helical antenna pitch angle only slightly shifts the resonant bands towards lower range of spectrum. This is due to increase the over overall structural height of helix.



Figure 9. Comparative gain plot for pitch variation

Figure 9 shows comparative gain analysis for pitch variation and table 4 gives analysis for the same. Gain with increase in the helical turns remains comparable to each other due to confinement of the structure since the amount of power and structure confinement is going to remain same only.

Sr. No	Pitch(mm)	Peak gain(dB)
1	6	8.73
2	7	8.74
3	8	9.1
4	9	9.28

Table 4. Gain analysis for Pitch variation

B.Strip width variation

For strip width variation , number of turns are 3,pitch is kept 6mm,Diameter of helix is 16mm .width of strip varied from 1m,2mm,3mm,4mm shown in figure 10



Fig.10 Stripwidth variation
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Figure 11 shows comparative S11 plot for strip width variation. Table 5 gives analysis for the same. Increase in the strip width by an offset of 1mm doesn't vary the frequency response greatly, because the spacing between the cavity walls and helix structure is constant.

Sr.no	Strip width(mm)	No.of bands	Band 1(GHz)	Band 2(GHz)	Band 3(GHz)	B.W
						(GHz)
1	1	3	4.12-4.23	5.89-6.19	6.96-7.12	0.57
2	2	3	4.14-4.23	6.03-6.15	6.98-7.09	0.33
3	3	3	4.02-4.12	5.86-6.1	6.85-7.03	0.48
4	4	3	4.02-4.1	5.84-6.03	6.78-6.96	0.35

Table 5 comparative bandwidth strip width variation



Fig.11 comparative gain plot for strip width variation.

Figure 11 shows comparative gain plots for stripwidth variation. Table 4-29 shows analysis for the same. The gain at respective resonance for the strip size variation is almost comparable.

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Table 6	comparati	ve gain	analysis	tor	strin	S170	variation
I UDIC U	· comparati	e gum	unuiyons	101	Surp	SILC	vai iacion

Sr. No	Strip width(mm)	Peak gain(dB)
1	1	10.81
2	2	14.87
3	3	8.54
4	4	12.3

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IV CONCLUSION

The findings demonstrate that as the number of turns grows, so does the number of resonant bands. The results also show that as the number of turns grows, bandwidth increases. The results reveal that when the number of helical turns increases, the gain remains comparable due to structure confinement, because the amount of power and structure confinement remain the same. The resonant bands are only marginally shifted towards the lower spectrum range as the helical antenna pitch angle is increased. This is due to the helix's total structural height increasing. Gain with pitch increase is comparable to gain with pitch decrease. Because the spacing between the hollow walls and the helix structure is constant, a 1mm increase in strip width has little effect on frequency response. As the antenna strip size grows, so does the gain.

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PREDICTION OF CRYPTOCURRENCY PRICE MOVEMENT USING SENTIMENT ANALYSIS

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ABSTRACT

The sentiment in Twitter about Bitcoin have direct or indirect influence on overall market value of the Bitcoin. This project is concerned with predicting the volatile price of Bitcoin by analyzing the sentiment in Twitter and to find the relation between them. The tweets of Bitcoin collected from different news account sources are classified to positive or negative sentiments. The obtained percentage of positive and negative tweets are feed to RNN model along with historical price to predict the new price for next time frame.

Keywords—Cryptocurrency, Sentiment Analysis, RNN, Bitcoin, Machine Learning.

PROBLEM STATEMENT

With less precision in predicting the movement of Stock Market, predicting the movement of extremely volatile Crypto-currency market becomes even more challenging. It has its own factors affecting accuracy, these factors include market sentiments, Supply and Demand etc.

Can we use social media posts to accurately score the public's overall sentiments on a topic and use this to improve existing Cryptocurrency Price prediction models

INTRODUCTION

Cryptocurrencies had a collective market capitalization of

2.6 trillion dollars by September 2021, according to market capitalization. The value of Bitcoin alone was over \$1.21 trillion. Because of the huge value of these currencies, some individuals see them as true currencies, while others see them as investment opportunities.

Cryptocurrency value volatility creates uncertainty for both investors and those who want to utilize it as a currency rather than an investment. Although some research focuses on both the problem of predicting stock market price fluctuations and the creation of profitable trading tactics, others do not.

The mood on Twitter about a Cryptocurrency has a direct or indirect impact on that Cryptocurrency's overall market value. In this project, we will use sentiment analysis and supervised machine learning methods to investigate the link between Cryptocurrency price movements and sentiments in tweets, which will be taken from Twitter and Reddit postings. We'll look at supervised learning and numerous machine learning methods to construct a prediction model and provide insightful analysis of future market behavior.



MOTIVATION AND OBJECTIVE

To investigate correlation between social media sentiments and crypto market volatility trends and to investigate if using sentiment data as an input feature for training a Machine Learning model can improve the model's prediction capabilities

LITERATURE REVIEW

In [1] the author analyzing the sentiment in Twitter and to find the relation between them. The tweets of Bitcoin collected from different news account sources are classified to positive or negative sentiments. The obtained percentage of positive and negative tweets are feed to RNN model along with historical price to predict the new price for next time frame. The accuracy for sentiment classification of tweets in two class positive and negative is found to be 81.39 % and the overall price prediction accuracy using RNN is found to be77.62%.

In [2] the author uses of an Artificial Neural Network (ANN) ensemble approach called Genetic Algorithm based Selective Neural Network Ensemble (GASEN). The ensemble will be used to solve a binary classification problem. To better understand and evaluate its effectiveness, back testing was done to see how a trading strategy based on the results of the ensemble can compare against a "previous day trend following" trading strategy as well as a trading strategy that follows the single, best MLP model in the ensemble.

In [3] the author specifically, we aim at investigating the couplings among the length of training period, the choice of ARIMA parameters (p; q; d), and the length of time window that the prediction is carried out over it, i.e. the bitcoin price for the day after the window is predicted.

In[4] the author use 1-minute interval trading data on the Bitcoin exchange website named bit stamp from January 1, 2012 to January 8, 2018, some different regression models with scikit learn & Keras libraries had experimented. The best results showed that the Mean Squared Error (MSE) was as low as0.00002 & the R-Square (R2) was as high as 99.2%.

In [5] the author implemented of a Bayesian optimized Recurrent Neural Network (RNN)and a Long Short Term Memory (LSTM) network. The LSTM achieves the highest classification accuracy of 52% and a RMSE of 8%. The popular ARIMA model for time series forecasting is implemented as a comparison to the deep learning models. As expected, the non-linear deep learning methods outperform the ARIMA forecast which performs poorly

PROPOSED SYSTEM AND PROJECT OUTLINE

To solve the problem of predicting cryptocurrency price changes several different data sources are considered as possible inputs to the model. The first input considered is sentiment analysis of collected tweets about Bitcoin or Ethereum. The second was Google Trends data. This section details how each of these data sources were gathered, cleaned, and adjusted when necessary.

The first step in collecting the desired tweets was to find the hashtag for the cryptocurrencies. For this we utilize Tweepy - an open-source Python library for accessing the Twitter API, to collect Twitter data. Tweepy allows for filtering based on hashtags or words. There are multiple ways in which the cryptocurrencies of interest may be referred to in tweets. The most direct way is by using a hastag ("#") followed by "bitcoin" or "Ethereum". Other likely possibilities are using a hashtag and either currencies abbreviation ("#btc" for Bitcoin, and "#eth" or Ethereum). Early collections of tweets using only the "#bitcoin" and "#ethereum" hashtags quickly provided a large data set.

Tweets contain a large amount of noise, such as hashtags, URLs, and emotions. These characters make Twitter sentiment analysis a challenging assignment. Preprocessing of the data is a very important step as it decides the efficiency of the other steps down in line for sentiment analysis.

With the data collected, cleaned, and adjusted where needed the data was analyzed to determine if it would be a valuable input to the final model. In the case of tweets there are two remaining issues after cleaning them. First it must be determined how many of the tweets actually have a sentiment at all. If most of the tweets are not objective in nature, then a sentiment analysis of them adds little. information to the model. Second, it has to be established that a relationship between the sentiment of tweets about cryptocurrencies and cryptocurrency price changes exists.

Not all tweets are posted by humans. A substantial number of users and tweets are actually from bots. Twitter has estimated that as many as 23 million of its active users are actually bots. If the bots were sending tweets which contained positive or negative sentiment about the cryptocurrencies then those tweets may still have an influence on people's demand to own cryptocurrencies, and therefore impact the prices. However, many of the tweets do not contain any sentiment and instead provide only facts or are serving the function of advertising. Beyond bots there is concern of the subject matter. Conversations about cryptocurrencies can be very neutral in nature.

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In this we have two phases relevant to data collection and preprocessing. Two different datasets were collected during the study; the first consisting of real-time Bitcoin price data and the other of tweets from Twitter and Reddit posts. These datasets were collected using API services from the dedicated server and allowing uninterrupted continuously real-time data.

For the first phase of this paper, we have collected Bitcoin values from four different databases: Coinmarketcap, Bitstamp, Coinbase, and Blockchain Info. We gathered Bitcoin historical and realtime price data using their publicly available API. From Coinmarketcap and Blockchain Info, we have collected 11 key features (see Table 1) relevant to the Bitcoin values for our research with their real-time feature (e.g. created date). In addition, from Bitstamp database, we also acquired 10 more transaction-based different level of details which are returned by API call for the pricing data (see Table 2). This dataset was gathered an interval length of every one-minute and it continued the data collection process. From Coinbase API we collected bitcoin real-time data in order to predict the fluctuation of the bitcoin price with others collected dataset. We collected bitcoin price data by building an automated web scraper which is real-time data pulled from Coinbase API over the course of weeks or months or years depending on program continuation. All these key features are connected with bitcoin network and important to real-time observation of moving prices.

Another part of the first phase is to collect data for the sentiment analysis using Twitter's streaming API was used in combination with Tweepy. Tweepy is an open source framework written in Python, facilitates tweet collection from Twitter's API. Tweepy allows for filtering based on hashtags or words, and as such was considered as an efficient way of collecting relevant data. The filter keywords were chosen by selecting the most definitive Bitcoin-context words, for example, "bitcoin" could include sentiments towards bitcoin, and so the scope must be tightened further to only include Bitcoin synonyms. These synonyms include: 'bitcoin', 'BTC'.

Tweets consist of many acronyms, emoticons and unnecessary records like images and URL's. So, tweets are pre-processed to symbolize accurate feelings of the public. For pre- processing of tweets, we employed 3 ranges of filtering: Tokenization, Stop words elimination, and Regex matching for removing special characters. 1. Tokenization: Tweets are split into character words primarily based on the gap and irrelevant symbols like emoticons are removed. We shape a list of individual words for each tweet. 2. Stop word elimination: Words that don't explicit any emotion is called Stop words. After splitting a tweet, words like a, is, the, with etc., are eliminated from the listing of phrases. 3. Regex matching for removing special characters: Regex matching in Python is completed to suit URLs and are changed through the time period URL. Regularly tweets consist of hashtags (#) and @ addressing other users. They may be additionally changed definitely. For instance, #Microsoft is replaced with Microsoft and @Billgates is changed with User. Extended word showing extreme feelings like coooooooool! is changed with cool! After those tiers, the tweets are ready for sentiment classification.

Tweets are classified based on the sentiment as Positive (polarity >0), Negative (polarity <0) and Neutral (polarity

=0). For individually tweet sentiment score, we used Text blob to automatically be passed the tweet text for analysis sentiment and gives polarity score. Besides that, we also used Haven OnDemand, an API service for analysis sentiment from the tweets automatically. Both methods were used for Twitter and Reddit tweets sentiment analysis purposes.

METHODOLOGY

LSTM



The long short-term memory network or LSTM addresses the common problem of disappearing gradients in the recurrent neural network. This is a type of recurrent neural network that is used in profound learning, as very large architectures can be trained. LSTM enables the network to learn more about many time steps by maintaining a more-steady error. This enables the network to learn long-term trust. LSTM cell contains forget and remember gates that allow the cell to decide which information to block or transmit based on its strength and importance. As a result, weak signals that prevent the gradient from disappearing can be blocked. The performance of the RNN and LSTM network is assessed to determine the model's efficiency. Elman's recent development of recurrent neural networks has gained popularity in network designs and increased computational power from graphical processing units. They are primarily useful with sequential data (in our case Bitcoins time series data) because each neuron or unit can access its internal memory to keep information about the previous input. Fig shows simple RNN Structure. One limitation of RNN is that it is influenced by the disappearing problem of the gradient. This problem is that since the layers and time steps of the network are interrelated, they are susceptible to exploding or disappearing gradients.

CONCLUSION

Previous efforts to predict cryptocurrency fluctuations relied on Twitter sentiment analysis to serve as a proxy for future cryptocurrency demand which would result in increasing or decreasing prices. We have shown that these results were in part due to the study occurring at a time when cryptocurrency prices were always going up. Additionally, Twitter sentiment with respect to cryptocurrencies tend to be positive regardless of future price changes. People who tweet about cryptocurrencies even when their prices drop have an interest in them beyond investment opportunity making the tweets biased towards positive. A more robust model would incorporate a measure of overall interest in terms of volume. This paper's recommendation is to use proxies for general interest such as Google Trends or tweet volumes. We have shown that the search volume index is highly correlated with cryptocurrency prices both when prices rise and when they fall, as are tweet volumes. With these inputs a multiple linear regression model, with the addition of lagged variables, accurately reflected future price changes. Future work should determine if these results continue to hold in varying pricing environments. Additionally, more complex models, and not just linear ones like we used, could be fit using Google Trends and tweet volumes as inputs to see if results could be improved further.

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DISTANCING AND MONITORING SYSTEM FOR QUEUE

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ABSTRACT

During the current pandemic, social distancing is crucial because it helps limit the development of Covid due to the perceived distance between people who spread the disease. Currently, there is no option to place one person in each row 24/7 to monitor social distancing violations. Banks, Authorities, Shopping Centers, Schools, Theatres, etc. There are often long queues for several

I. INTRODUCTION

Since the end of 2019, the COVID-19 pandemic has spread globally and may become a major health and safety issue for communities, health workers, and health systems around the world [1]. During the pandemic, there are plans to use robots around the world to improve patient care and reduce the burden on the medical system. People may have to coexist with the virus for a long time. In fact, one of the most important effective measures to control the Maintaining social distancing performs a important function in stopping the unfold of infectious diseases. Diseases much like COVID19. spread of the coronavirus is to maintain social distancing. By minimizing close physical contactbetween people, we reduce the chance of contracting the virus and spreading it throughout the community. Observing the norms of social distancing between people has become an important measure to prevent thespread of COVID19 [2].

II. PROBLEM STATEMENTS

- 1. Due to increase of covid-19 cases the need of monitoring the Social Distancing is very difficult.
- 2. Banks, Public Offices, Malls, Schools, Theatres etc usually see long queues for hours every day.
- 3. To ensure social distancing in queues we hereby design a social distancing monitoring System.

III. HARDWARE

Wifi Module: The ESP8266 WiFi

Module is a self contained SOC with integrated TCP/IP protocol stackthat can give any microcontroller access your WiFi network. The ESP8266 is capable of either hosting an application or offloading all WiFi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much WiFi-ability as a WiFi Shield offers (and that's just out of the box)! The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community.



Figure 1.Wifi Module

Camera Module: Pi Camera module is a camera which can be used to take pictures and high definition video.

Raspberry Pi Board has CSI (Camera Serial Interface) interface to which we can attach PiCamera module directly.

This Pi Camera module can attach to the Raspberry Pi's CSI port using 15-pin ribbon cable.



Figure 2.Camera Module

Buzzer: A buzzer may be a valid sign instrument, which is probably mechanical, mechanical tool orpiezoelectric. Typical makes use of for buzzers are alarms, timers, and affirmation of person input, collectively with mouse clicks or keystrokes. Figure 3 shows the buzzer.



Figure 3.Buzzer

Wires and Connectors: Figure 10 shows the wires image. There are two main purposes for connecting robots: the first is to provide power to the robot's equipment, and the second is to provide a communication network for the many devices that make up the robot control system.



Figure 4.Jumper Wires

IV. SOFTWARE

Raspberry Pi: The Raspberry Pi board is a small computer (approximately the scale of a credit scorecard) that may without difficulty hook up with the Internet and engage with many hardware components. Raspberry Pi is more and more utilized in robotics projects. Figure 5 shows the structure of Raspberry Pi..

Reasons to use Raspberry Pi:

Raspberry Pi is small and cheap Raspberry Pi is powerful Compatible with large communities Multiple I/O Multiple connected devices: monitors, cameras, etc.Easy to use



Figure 5.Jumper Wires

V. BLOCK DIAGRAM



VI. CODING

Setting up the variable values

initialize minimum probability to filter weak detections along with

the threshold when applying non-maxima suppression

 $MIN_CONF = 0.3$

 $NMS_THRESH = 0.3$

define the minimum safe distance (in pixels) that two people can be

from each other

 $MIN_DISTANCE = 50$

Creating the People Detection Function

import the necessary packages

import numpy as np

import cv2

def detect_people(frame, net, ln, personIdx=0):

grab the dimensions of the frame and initialize the list of

results

(H, W) =frame.shape[:2]

results = []

construct a blob from the input frame and then perform a forward

pass of the YOLO object detector, giving us our bounding boxes

and associated probabilities

blob = cv2.dnn.blobFromImage(frame, 1 / 255.0, (416, 416),

swapRB=True, crop=False)

net.setInput(blob)

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layerOutputs = net.forward(ln)# initialize our lists of detected bounding boxes, centroids, and # confidences, respectively boxes = []centroids = [] confidences = [] # loop over each of the layer outputs for output in layerOutputs: # loop over each of the detections for detection in output: # extract the class ID and confidence (i.e., probability) # of the current object detection scores = detection[5:] classID = np.argmax(scores) confidence = scores[classID] # filter detections by (1) ensuring that the object # detected was a person and (2) that the minimum # confidence is met if classID == personIdx and confidence > MIN_CONF: # scale the bounding box coordinates back relative to # the size of the image, keeping in mind that YOLO # actually returns the center (x, y)-coordinates of # the bounding box followed by the boxes' width and # height box = detection[0:4] * np.array([W, H, W, H]) (centerX, centerY, width, height) = box.astype("int") # use the center (x, y)-coordinates to derive the top # and and left corner of the bounding box x = int(centerX - (width / 2))y = int(centerY - (height / 2))# update our list of bounding box coordinates, # centroids, and confidences boxes.append([x, y, int(width), int(height)]) centroids.append((centerX, centerY)) confidences.append(float(confidence)) # apply non-maxima suppression to suppress weak, overlapping # bounding boxes idxs = cv2.dnn.NMSBoxes(boxes, confidences, MIN_CONF, NMS_THRESH) # ensure at least one detection exists

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if len(idxs) > 0: # loop over the indexes we are keeping for i in idxs.flatten(): # extract the bounding box coordinates (x, y) = (boxes[i][0], boxes[i][1])(w, h) = (boxes[i][2], boxes[i][3])# update our results list to consist of the person # prediction probability, bounding box coordinates, # and the centroid r = (confidences[i], (x, y, x + w, y + h), centroids[i])results.append(r) # return the list of results return results #*Grab frames from video and make prediction measuring distances of detected people* **# USAGE** # python social_distance_detector.py --input pedestrians.mp4 # python social_distance_detector.py --input pedestrians.mp4 --output output.avi # import the necessary packages from google.colab.patches import cv2_imshow from scipy.spatial import distance as dist import numpy as np import argparse import imutils import cv2 import os # construct the argument parse and parse the arguments ap = argparse.ArgumentParser() ap.add_argument("-i", "--input", type=str, default="", help="path to (optional) input video file") ap.add_argument("-o", "--output", type=str, default="", help="path to (optional) output video file") ap.add_argument("-d", "--display", type=int, default=1, help="whether or not output frame should be displayed") vars(ap.parse_args(["--input","/content/drive/My args Drive/social-distance-detector/pedestrians.mp4","--= output", "my_output.avi", "--display", "1"])) # load the COCO class labels our YOLO model was trained on labelsPath = os.path.sep.join(["/content/drive/My Drive/social-distance-detector/yolo-coco/coco.names"]) LABELS = open(labelsPath).read().strip().split("\n") # derive the paths to the YOLO weights and model configuration

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weightsPath = os.path.sep.join(["/content/drive/My Drive/social-distance-detector/yolo-coco/yolov3.weights"]) configPath = os.path.sep.join(["/content/drive/My Drive/social-distance-detector/yolo-coco/yolov3.cfg"]) # load our YOLO object detector trained on COCO dataset (80 classes) print("[INFO] loading YOLO from disk...") net = cv2.dnn.readNetFromDarknet(configPath, weightsPath) # determine only the output layer names that we need from YOLO ln = net.getLayerNames()ln = [ln[i[0] - 1]for i in net.getUnconnectedOutLayers()] # initialize the video stream and pointer to output video file print("[INFO] accessing video stream...") vs = cv2.VideoCapture(args["input"] if args["input"] else 0) writer = None # loop over the frames from the video stream while True: # read the next frame from the file (grabbed, frame) = vs.read() # if the frame was not grabbed, then we have reached the end # of the stream if not grabbed: break # resize the frame and then detect people (and only people) in it frame = imutils.resize(frame, width=700) results = detect_people(frame, net, ln, personIdx=LABELS.index("person")) # initialize the set of indexes that violate the minimum social # distance violate = set() # ensure there are at least two people detections (required in # order to compute our pairwise distance maps) if len(results) ≥ 2 : # extract all centroids from the results and compute the # Euclidean distances between all pairs of the centroids centroids = np.array([r[2] for r in results]) D = dist.cdist(centroids, centroids, metric="euclidean") # loop over the upper triangular of the distance matrix for i in range(0, D.shape[0]): for j in range(i + 1, D.shape[1]): # check to see if the distance between any two # centroid pairs is less than the configured number

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of pixels if D[i, j] < MIN_DISTANCE: # update our violation set with the indexes of # the centroid pairs violate.add(i) violate.add(j) # loop over the results for (i, (prob, bbox, centroid)) in enumerate(results): # extract the bounding box and centroid coordinates, then # initialize the color of the annotation (startX, startY, endX, endY) = bbox(cX, cY) = centroidcolor = (0, 255, 0)# if the index pair exists within the violation set, then # update the color if i in violate: color = (0, 0, 255)# draw (1) a bounding box around the person and (2) the # centroid coordinates of the person, cv2.rectangle(frame, (startX, startY), (endX, endY), color, 2) cv2.circle(frame, (cX, cY), 5, color, 1) # draw the total number of social distancing violations on the # output frame text = "Social Distancing Violations: { }".format(len(violate)) cv2.putText(frame, text, (10, frame.shape[0] - 25), cv2.FONT_HERSHEY_SIMPLEX, 0.85, (0, 0, 255), 3) # check to see if the output frame should be displayed to our # screen if args["display"] > 0: # show the output frame cv2 imshow(frame) key = cv2.waitKey(1) & 0xFF# if the `q` key was pressed, break from the loop if key == ord("q"): break # if an output video file path has been supplied and the video # writer has not been initialized, do so now if args["output"] != "" and writer is None: # initialize our video writer

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fourcc = cv2.VideoWriter_fourcc(*"MJPG")

writer = cv2.VideoWriter(args["output"], fource, 25,

(frame.shape[1], frame.shape[0]), True)

if the video writer is not None, write the frame to the output

```
# video file
```

if writer is not None:

writer.write(frame)



VII. ADVANTAGES ANDDISADVANTAGES Advantages

- 1. Fully automatic monitoring.
- 2. 24/7 operation.
- 3. Automatic detect the person.
- 4. No human error.
- 5. Non-contact operation.

Disadvantages

- 1. Need to charge the battery.
- 2. Internet connection required.

VIII. CONCLUSION

We conclude and make recommendations in this section based on our results. We re-iterate the following as noted from our discussions of the results in the above section

- In demonstration of the project, the SYSTEM was successfull to identifying the right distance between humans and update them on server
- Microcontroller was very efficient in its task performance, thus computation of counts and controlling I/O devices
- Hence the whole purpose of the social distancing for monitoring queue was successfully achieved and is applicable in the wider scope. Finally, we conclude that the proposed system will help in managing the distance betweenpeople hence keeping them safe.

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REAL TIME FLOOD MANAGEMENT AND CONTROL WITHEARLY WARNING SYSTEM

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ABSTRACT

Floods are the natural disasters occurring all around the world. In recent times climate change has been the major reason for such kind of disaster. Heavy rainfall, melting of the snow, cyclones are all the major reasons for the occurrence of the floods. Floods often cause damage and destruction to the homes and businesses if they come under the flood plain area. Floods are the most common natural disaster seen all over the world. In the floods scenario there is temporary overflow of water which comes onto the dry land and is generally uncontrollable. Floods can be controlled or have to be controlled by using different techniques and procedures like harvesting rainwater, redirecting excess water to properly built canals and water system and also taking help of IOT Applications along with the hardware and software prototype and even real time flood management system.

Keywords — Ultrasonic Sensor, Solenoid Valve, Rain Gauge, indicator, Rain Flow Sensor, NodeMcu, Web Hosting, PHP, MYSql.

I. INTRODUCTION

Flood is a weather-related hazard that is widespread all around the globe. Floods produce damage through the immense power of moving water and through the deposition of dirt and debris when flood waters finally reduce. floods deal with the fast movement of the water upstream and also the carrying and deposition of the dirt and debris along with it which spoils the entire space and also creates problem to the entire mankind. The effect of the water itself can be devastating on the objects like books, furniture, photographs, electronic equipment, and so on can be damaged even if they are not directly damaged by the water movement. Floodwaters typically contain toxic microorganisms and dissolve chemicals. This usually results in compromising drinking water supplies, resulting in short-term shortages of potable water and also restarting the normal water supply to the affected areas. Recent research and developments in the field of IOT along with different technologies and sensors are playing a major role in understanding the reasons of flood occurrence and also provide a helping hand to manage and control the natural disasters like floods. Presently IOT is one of the technologies used at a wide scale to improve the management of the floods and also detect the happening of the floods before the actual devastating scene comes into the picture.

II. LITERATURE SURVEY

Prof.Vinod Bharat, Shingare Shubham, Dafade Jagdish, Patil Anmol, Khatke Renuka, Proposed the method which implemented the use of solenoid valve rather than manual valve. They also gave a brief introduction on the use of mobileapp and SMS beforehand to actually minimize the wastage of water[1].

Jayashree S, Sarika S, Solai A L, Soma Pratibha, The paper discusses about the use of flood alert system used to give the intimation of flood beforehand so that losses can be taken care of by moving the people to safe places and also help to protect their valuable assets. This paper also discusses about flood warning systems and issues associated with each of them[3].

Dola Sheeba Rani,Dr. Jayalakshmi G N, Dr. VishwanathP Baligar, Environment problems are increasing day to day because of pollution done by the human. Flood is usually caused either by change in the state of water body or due to the overflow of rivers, dams, etc which is also one of the maineffects of environmental disbalance. This paper includes the effective and flexible method for the detection of flood and alerting system. The most advanced technologies like machinelearning (ML) in the field of technology is also being used. The objective of this work is to survey on flood issues[5].

Anton Prafanto, Edy Budiman, In this study designed a use of water level detection sensor-based wireless network is being used which has the tendency to automatically read the height of the water using ultrasonic sensor and then the relevant data is sent to a website so that the public can monitor the height of the river in real time. using two main components HC-SR04 and NodeMCU. HC-SR04 periodically transmit data of water level in real time, then NodeMCU upload this to the monitoring platform. The invention has followed advantages: small power consumption, simple structure, low cost, convenient installation[8].

K.Vinothini, Dr.S.Jayanthy, Use of three sensors to detect temperature, humidity and water levels is being used at every stage. The detected sensor values are processed using PIC Microcontroller and it is transmitted to IOT

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through Wi-Fi module. The broadcasting of the values will be done through cloud. The decision tree algorithm is used in the classification process. The experimental results for Correctly Classified Instances and Minimum Absolute Error indicates that the proposed Decision Tree Algorithm gives 99.6% classification accuracy with Minimum Mean Square Error than Hyper Pipes Algorithm[9].

III. SYSTEM DESIGN

Good Flood Management system is made up of different smaller systems operating together and performing properwater distribution and storage too.

Front side : use of HTML, Bootstrap, PHP, CSS and Javascript.

Back Side : Use of MYSql for data information, PHP, JavaScript and NODEMCU.

Main Goal and Objectives of the system are:

International Conference on Emerging Trends in Technology, Science and Education (ICETTSE-2022) ©2022 IEEE and helps to implement the proposed methodology in a more convenient way.



Fig. 1. System Design

The river as the water body is being taken into consideration for this proposed system and also the diagrammatic representation deals with the same. Whenever there is heavy rainfall every water body shows the presence of maximum water in it. The natural limit to accept the water above its owncapacity is really difficult by any water body. If the water crosses the natural limit the chances of overflowing of the water rises and this in turn is the main cause of a particular type of natural disaster called as Floods. The problem of floods has to be taken care of and lot of preventive measures can be carried out by using different system designs and the the proposed system shows the presence of different devices working together on the same mechanism. In this mechanism there is a presence of solenoid valve which works as inlet and also gives direction to the water to pass through water flow sensor into the tanks. This system also deals with the presence of tank, which are being arranged appropriately under the water body. presence of an alarm signal system is also being used in this system for the whenever the capacity of the tank of water filling reaches to its peak level and also lots of water in the water body can also be stopped by getting overflowed and can be used again as and when required. The alarm system will help the mankind to alert themselves with the danger of floods and water overflowing prior to the disaster. If the water is stored properly as the system predicts and works on the stored water can be reused as and when needed because it also shows the presence of motor pump at a precise location which also has the capacity to lift the water out of the tanks wherever and whenever needed through outlet. The main highlighted working mechanism of the proposed system is about the working of the automatic closing of the solenoid valve along with its inlet when the water capacity comes to its original limit so that the actual capacity of the water storage is maintained at a proper value and at proper time.

IV. WORKING DIAGRAM

The above Fig2 block diagram consists of microcontroller which works in coordination with different sensor systems

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Fig. 2. Working Diagram

Fig.2 represents the system methodology which works in sync with different sensors and also the data which will get collected and also published through the communication devices. The sensors play a major role of sending the data andthen the collection of data by the microcontroller. Also, one of the main technologies that is internet is used in the form of the WIFI module and this module also works continuously for the storage of data in a proper database and this real timedata with such an exceptional technology being used can be reflected and seen through the concerned webpage created and also can be viewed at any particular time or any particular place wherever required.

This webpage works as a building bridge between the microcontroller and the internet services which will help to put the data on the server and from this server it will be put up on different devices like computers or mobile devices or desktops etc as all these devices where it can be monitored, read and understood at a proper pace and also delivered ahead wherever and whenever required.

V. EXPERIMENTAL RESULT

The experimental result is being depicted by three figures. Each figure will give the idea of the expected result of the concerned experimental set up.



Fig.3.1Tank(Volume) Fig.3.2River Heig Fig.3.3 Rain Fall

Fig 3.1 is showing the actual water storage capacity of the tank. It also deals with the real time water storage capacity data of the tank and accordingly it also proves the implementation of the system model. As a result (Fig 3.1) is showing the real time water storage capacity of the tank and in the fig, it is seen about 350 m3 water in it. This estimates that the designated model system and the outcome of the result is considerably giving the proper result and implementation.

(Fig 3.2) successfully highlights the height of the river and also the level of the river water as it was predicted in the designed model of the system and also accurately helps to know the value in real time management.

(Fig 3.3) is showing the amount of rainfall recorded along with the help of the sensor. As the rainfall falls on the sensorthe information of the actual mm of the falling of the rain is being displayed and captured.

]	F-+		id.	location	rain_tall	tank.	water_level	reading_time
	SEdr Hi Copy	C Delate	1	office				2021-06-12 12:07:04
Q	JEdt Ba Copy	O Defete	2	office				2021-06-12 12:11:35
a	JEdt Hi Copy	O Delete	3	office				2021-06-12 12 16:56
0	2 Edit Bi Copy	Conte	14	office	120	300	20	2021-06-14 21:35 33
0	🥖 Edit Bi Copy	O Delete	5	office	140	320	25	2021-11-09 00 29:00
Ô	JEdit Be Copy	Delete	6	office	90	325	24	2021-11-09-00-29-00
0	SEdt Be Copy	O Delete	7	office	150	359	25	2021-11-09 00.36:47
	Copy	Delete	8	office	103	360	24	2021-11-09.00:36:47

Fig.3.4 MYSql Database

Fig (3.4) MySQL database helps to give the real time data which is been captured by the sensors and then used as and when required. Such type of the system design and implementation of the captured data, makes it possible to view these results anywhere in the world.

VI. CONCLUSION

The designed experimental set up, the interpretation of the data collected as a result helps us to understand not only the working of the real time management of the floods but also has the presence of alarming system which gets activated as soon as water reaches its higher level than the normal quantity and also helps in showing the actual capacity of the system when water crosses its actual limit.

Reusing of the rainwater is a very important factor if the storage of rainwater is done at a proper place and proper time. This system also helps to deal with both these conditions precisely and at place.

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MULTIMODAL BIOMETRICS BASED ON CONVOLUTIONAL NEURAL NETWORK

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ABSTRACT

Due to increase in the need for security of personal data a personnel authentication system is in demands. The multimodal biometrics system which overwhelms the shortcomings of unimodal systems and significantly improves and achieves the higher accuracy, has attracted a lot of interest in recent time. In the customary biometrics recognition system, which includes pre-processing, feature extraction and categorization are interacted to provide the desired results, but it is challenging to get an equilibrium in design system. To deal with this concern, convolutional neural networks (CNN) model which is an end-to-end trainable model is used for multimodal biometric recognition with face and palmprint as biometrics modality. In the proposed approach high-level feature are splendidly obtained using convolution operation. The extracted blended features are obtained by passing through convolutional and pooling layers which are enlightened representation of features. The presented approach is tested on FERET, FRGC, AR, ORL face datasets and PolyU palmprint dataset. The resulting accuracy obtained is 100% and is vigorous to degraded biometrics images and appropriate to human identity identification task.

Keywords—multimodal biometric recognition, face, palmprint, CNN, Alexnet.

I. INTRODUCTION

Multimodal biometric identification technologies are required to provide the desired accuracy and effective identification with enhanced implementation to meet the increasing security demands [1]. Biometrics systems are based on the biometrics cues such as face [2], palmprint [3], iris[4], fingerprints[5] etc. But unimodal biometric recognition systems have a few difficulties given as substantial intra-class variations, non-universality, etc. [1]. To overcome the limitations of unimodal biometric recognition, huge research has constitute proof of blending more than one biometric cues improves the identification accuracy of biometric identification systems. Multimodal biometric identification overcomes the limitations by using numerous sensors, or multiples biometrics cues, compound features or combining various biometric recognition technologies.

In the recent years, multimodal biometric recognition technologies attracts the researchers because of excellent performance in human authentication. Multimodal biometric recognition consists of multiple level of representation of unimodal data. This multiple level of information consists of multiple biometric cues, multiple feature extraction techniques, multiple classifiers, or multiple machine learning techniques for increasing the performing factors of biometric recognition system. Conventional machine learning methodologies had their specific constraints and mandatory to have careful management in choosing appropriate feature calculator and classification in handling natural data and

information acquired from unrestricted ecosystem. These techniques need limited data for training the system and comparatively less training time required and can introduce the new user on the fly with the limitation on accuracy with unconstrained environment. But to enhance the accuracy of approach with unconstrained environment deep learning has capability and efficient optimization techniques, which demonstrated highly effective for authentication.

This work is planned and presented as: section II, gives the literature survey. Details of methodology is given in section III. Experimental outcomes obtained are mentioned in section IV. At last conclusion is given.

II. LITERATURE SURVEY

Ahmad et. al. [6] presents palmprint-face multimodal biometrics approach established on feature level fusion using an alternating concatenation of DCT coefficients. DCT features are low frequency coefficients which are more discriminative features. A fuse feature vector is applied on principal component of the eigenvector which results in lower dimension feature vector. The presented algorithm chose an finest feature subset using PCA to improve the accuracy of palmprint-face recognition. Gayathri et. al. [7] presents feature level fusion system which combines the Gabor feature information of face and palmprint using wavelet-based fusion technique. For the classification of the fused feature vector, a KNN classifier is used. Farmanbar et. al. [8] presents a biometric recognition technique using face and palmprint modality based on score level fusion. LBP based feature are calculated from biometric modality. These features acts as a local feature representing effective texture

descriptor. Dominant features are selected using a BSA technique to form the best possible subset of extracted features of biometric modality. Two palmprints and face features are extracted, and matching scores are calculated based on selected features. A score level fusion is obtained using tanh normalization. Obtained fused score is again fused with two palm and face scores using the sum rule. Navdeep and Surinder[9] proposed palmprint and face based multimodal biometric recognition system using the combined NN and SVM to increase accuracy of recognition.

Researchers worked on multimodal biometrics primarily emphasis on a range of fusion approaches, such as score level fusion, decision level fusion, feature level fusion, or pixel level fusion. In these techniques statistical methods are employed to analyse the distribution of features in vector feature space, and to locate a best possible feature vector corresponding to distinct modality. Conventional biometric authentication techniques are unstable and not robust for identification with huge datasets. For this problem deep learning has emerged with good accuracy and robust generalization capacity and strength against the noisy

images. Hui Xu et.al.[10] proposes the Convolutional Neural Network for multiple biometrics identification based on palmprint, face and iris. Gowda et.al. [11] proposes deep biometric confirmation system built on multispectral palmprints using Deep Convolutional neural network. Sobhan Soleymani et.al.[12] proposes multimodal biometrics system using deep fusion algorithm which comprises of numerous streams of modality-specific CNN, which are mutually optimized at multiple feature abstraction levels. The proposed algorithm is implemented on iris, fingerprint and face modalities.

III. PROPOSED METHOD

The proposed system of biometric recognition using CNN is as illustrated below in Figure 1.



Fig. 1: Convolutional Neural network based multimodal biometric system.

The system accepts the face and palmprint image from the user. A combined image of face and palmprint is given as input. For the implementation of Convolutional Neural network, a AlexNet is used. AlexNet proposed by Alex Krizhevsky et.al.[13] is a deep learning convolutional neural network.

The CNN employed by multiple layers arranged in distinct ways to form specific network structural design. The conventional neural network is built using three different layers given as Convolution Layer, Subsampling Layer, and Fully Connected Layer.

- 1. Convolution Layers: Kernels or filters is used to execute convolution operations in two dimensional convolution layers, it also involving a non-compulsory bias designed for defined kernel. Strides are the steps to be performed to implement convolution operations by sliding the kernels on input image. Bigger size of stride results in kernels skipping more spaces between each convolution operation. This results in fewer convolutions and compact resulting size of output. A multiplication operation was made between kernel and input section considering bias to produce feature map. This resulted feature vectors are applied to activation function, whose output acts as input for the subsequent layer. Feature vector size is calculated as given in eq.1 Feature Map size = $[(\$ k\$ + 2 \times P)/\$t] + 1$ (1) where K kernel size; S stride; P- padding; I –input on every portion of image with overlapping, form left-to- right direction, sliding by one position for every operation. Resulting this a feature map of 3-channel (4×4).
- 2. Subsampling Layers: Subsampling layers is used to down-sample input features using nontrainable kernels or windows. The subsampling layer reduces the feature size drastically, also helps to eliminate network's position dependency. Average Pooling and Max Pooling are two subsampling methods which calculate average or maximum values available in every single kernel is incorporated in subsequent feature vector. The feature vector resulted from convolution layer defines a size of subsampling layers. A 3- channel (6×6) image subsampled by a 3-channel (2×2) kernel. The subsampling function was executed with a zero padding and stride of two. This implied that the kernel shifted in non-overlapping mode with shifting two places for every operation, over each (2×2) input section resulting a 3- channel (3×3) down-sampled feature vector. Fully Connected (FC) Layers: FC layers are the last a small number of layers of

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Convolutional Neural Networks, present next to numerous convolution and subsampling functions performed on input image. FC layers are separate neural networks that consist of few hidden layers that can be one or more than one. FC layers operations consist of multiplying applied inputs by weight vectors which are trainable, and a bias which is also trainable. The outcome of FC layer is given to activation functions, in the same way of convolution layers. The implemented CNN architecture is as shown in Figure

IV. EXPERIMENTAL RESULTS EXPERIMENTATION PERFORMED ON THE POLYU PALMPRINT

Database and ORL, FRGC, AR, FERET face databases.

FERET: [14] FERET database comprises 14,126 facial images of 1199 subjects laterally 365 duplicate sets of images taken on a dissimilar daytime. The images acquired for different categories including frontal images and pose angles. We select the -150 to +150 - variations with variation in hair and dressing style. Also, some of the images are acquired after a few years so the variation in face over the time also included in database.

FRGC: [15] Images of a person's face are taken in a set of session for biometric subject data. The images are acquired as one three-dimensional face image, two uncontrolled face images and four controlled face images. A studio setup is used for controlled face images which are captured for full frontal face images, with two different facial expressions (smiling and neutral) and with two different lighting conditions. Uncontrolled images were captured in changing lighting situations. Uncontrolled face images also consist of two smiling and neutral expressions.

AR: [16] 126 persons faces which consist of 70 men and

56 women in AR face database. Face images consist of frontal facial view of distinct expressions. Facial images with image size.

Also the facial images with varying lighting (illumination)

channel (6×6) image and 3-channel (3×3) kernel with (1×1) bias used for convolution operation with zero padding and a stride of one. This results in movement of (3×3) kernel conditions. The database is acquired under firmly restricted conditions. But no restrictions on hair style, makeup, etc. were applied to participants. Data was collected in two separate meetings with the gap of two weeks' time. All frontal facial views are collected with neutral expression, shout, light on right side of face, smile, light on left side of face, anger, light equally distributed on face, face with sunglasses, face with scarf, face with sun glasses and light from right side, face with wearing scarf and light from left side, face with sun glasses and light from left side, face with wearing scarf and light from left side. Facial images collected in second session with the same conditions as mentioned in first session.

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32 R	Name	Туре	Activation	Learnable	Total Learnable
1	data 227X227X3 image with zerocenter normalisation	Input image	227X227X3		
2	conv1 96 11X11X3 convolutions with stride [4 4] and padding[0 0 0 0]	Convolution	55X55X96	Weights 11X11X3X96 Bias 1X1x96	34944
3	relu1	ReLu	55X55X96		
4	norm1 cross channel normalization with 5 channel per element	cross channel normalization	55X55X96		
5	pool1 3X3 max pooling with stride [2 2] and padding [0 0 0 0]	Max pooling	27X27X96		
6	conv2 2 groups of 128 5X5X48 convolutions with stride [1 1] and padding [2 2 2 2]	Grouped convolution	27X27X256	Weights 5X5X48X128 Bias 1X1x128X2	307456
7	relu2	ReLu	27X27X256		
8	norm2 cross channel normalization with 5 channel per element	cross channel normalization	27X27X256		
9	pool2 3X3 max pooling with stride [2 2] and padding [0 0 0 0]	Max pooling	13X13X256		
10	conv3 384 3X3X256 convolutions with stride [1 1] and padding [1 1 1 1]	Convolution	13X13X384	Weights 3X3X256X384 Bias 1X1x384	885120
11	relu3	ReLu	13X13X384		
12	conv4 2 groups of 192 3X3X192 convolutions with stride [1 1] and padding [1 1 1 1]	Grouped convolution	13X13X384	Weights 3X3X192X192 Bias 1X1x192X2	663936
13	relu4	ReLu	13X13X384		
14	conv5 2 groups of 128 3X3X192 convolutions with stride [1 1] and padding [1 1 1 1]	Grouped convolution	13X13X256	Weights 3X3X192X128X2 Bias 1X1x128X2	442624
15	relu5	ReLu	13X13X256		
16	pool5 3X3 max pooling with stride [2 2] and padding [0 0 0 0]	Max pooling	6X6X256		
17	fc6 4096 fully connected layer	Fully connected	1X1X4096	Weights 4096X9216 Bias 4096X1	37752832
18	reluó	ReLu	1X1X4096		
19	drop6 50% dropout	Dropout	1X1X4096		
20	fc7 4096 fully connected layer	Fully connected	1X1X4096	Weights 4096X4096 Bias 4096X1	16781312
21	relu7	ReLu	1X1X4096		
22	drop7 50% dropout	Dropout	1X1X4096		
23	fc8 1000 fully connected layer	Fully connected	1X1X1000	Weights 100X4096 Bias 1000X1	4097000
24	prob SoftMax	SoftMax	1X1X1000		
25	output crossentropyex with 'tench' and 999 other classes	Classification output	1X1X1000		

Fig. 2: Convolutional Neural network architecture.

ORL: [17] The ORL Database of consist of 400 facial images from 40 different humans. The facial images are collected at numerous sessions. All face images are collected with different lighting conditions, changing facial expressions such as smiling or neutral, faces with open eyes or closed eyes and faces with wearing glasses or face with no glasses. The face images are acquired with dark uniform background and subjects are in an upright and frontal position. Subjects are captured with variation of some side movement.

PolyU: [18] The PolyU database acquired two sessions at Hong Kong University comprise Right Palmprint and Left Palmprint of 386 Subjects having 10 images of each palmprint resulting total of 7752 images in BMP image format. Duration between first and second session is two months.

For experimentation randomly samples are selected form the face and palmprint database and applied to Convolutional neural network. All the data samples are arranged in the three groups as training samples, verification samples and testing samples. The 70 % of dataset is used for training, 20 % dataset is used for validation and 10 % dataset is used for testing purpose. Experimentation is performed on the defined four datasets combination

Results obtained on the FERET and PolyU database is as shown in Figure 3 for six epochs.

2 Therefore and the second sec

(a) Training Progress

Tomining on simple CPU.

6.0	eral i	wine'	Persona	1000	20	- 24	-	10.
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	poch	1	Dispetion	Time Elapsed (hArmstram)	Rind-beech Accurery	1	Telodetice Accuracy	1	Mini-betch Losp	1	Validention Loss	l.	Base Learning Rate
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	- 2	i.	55.1	00:00:11 /	25.004	į.	43.258	ï	3.6.49	î.	3.3908	ř.	1.0000e-05
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а.	16	ſ	255	00:12:84	33.758	ì	100.008	i.	0.2558	ï	0,0341	i.	1.0000+-05
6	6	ï	224	00:04:54-1	35,64	i	100.008	ï	6,3766	î	0.0145	Ē.	1.0000e-05

The accuracy of the test set is 100.000000 k . The accuracy of the validation set is 100.000000 k

(b) Recognition/Verification Results Fig. 3: Results obtained on the FERET and PolyU database with six epochs.

Results obtained on the FRGC and PolyU database is as shown in Figure 4 for six epochs.



(a) Training Progress

Texining on single CFU. Initializing inege normalization.

3	poch	Iteration	Time Elapsed (bb:mm:so)	Accuracy	Validation (Accuracy (Enti-betch Loss	Validation (Loss (Base Learning Base
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	2.1	50	00:03:19	31.254 1	62.054 1	3.4656	3.1958 (1.00098-65
	3.1	202	80:06:28	15.004 (99.50N	1.5654	0.3540 (1.0000e+05
	. 4.1	150	10:19:50	10,191 1	99,754 (0.5626	0.1505	1.0000e-05
	5	195.	00:12:40	11.441	100.004 (0.5418 (0.0176-1	1.0000e-05

The accuracy of the test set is 100.00000 Å The accuracy of the twildetion set is 100.00000 Å

(b) Recognition/Verification Results

Fig. 4: Results obtained on the FRGC and PolyU database with six epochs.

Results obtained on the AR and PolyU database is as shown in Figure 5 for six epochs.



(a) Training Progress

Iporti (Theration 1	Time Ellipsed ((hhomesed))	Mini-bebch Accupacy	Validation Accusecy	Mara-baoch Long	Talisation (Base Coursiag Bate
11	11	00:00:00 (2.128	2.214 (5,3102 (4.7227-1	1.0000-00
11	\$0.1	(01:03:02.)	7,101	43.328 (3,8655.1	5,5334 (1.0000#-05
21	310.1	00:06:42 (31.501	37.734-1	2,3748	2.0488 (1.0005e-05
21	- 150 1	00:10:00	72,815.1	10,428.1	2.1210 5	0.5565	1.00008-03
11	200 (00:11:14	10.19h I	39,009 (3,036.1	0.12241-1	2.00008-0
- 21	250 (00:14:25)	96.00h (200.009 1	1.2104 (0.0277 1	1.0000#-0
- 31	300	00119062	52-315	205,009 (0.1262 (0.0078 (2.0000e-0
11	190-1	00:22:39	210.004 (200,004 1	1.035.0	0.0021 1	1.0000#-2
1.5.1	400 (00:26:18	280,004 1	300,009 (11.0004.1	0.0000 [1.00008-0
51	450 1	(01:29:26)	305.004 (100,008.0	0.0078.3	0.0008 (1.0000#-0
51	442.1	00:30:20	100.004	1. #00.002	0.0218 (0.0005 (1.0001e-0

The abstracy of the next set is 200.000000 % The accutacy of the maindention set is 100.000000 %

(b) Recognition/Verification Results

Fig. 5: Results obtained on the AR and PolyU database with six epochs.

Results obtained on the ORL and PolyU database is as shown in Figure 6 for six epochs.



(a) Training Progress

Test	Value		- 64	(ala)	14	100
140		1993	- 24	66	w.	14 0 %

R	Sports 	Iteration 	tine Elignet thomase	Mini-betch (Accusecy (Validation Accuracy	Kini-betch Lots	1 Velidetion Loss	1	Base Learning Bate
Ĩ	11	11	00:00:00 (0.004 (10.424	1.366	1.3662	1	1.0008-05
	2.1	52	60:03:039	19.066	100.00A	0.603	0.3547	9	1.0000e-05
	4.1	350 1	01:06:18	16.881	100.004	4.1042	0.0083	ξį,	1.000e-95
	51	130	00:05:14	100.004	100.004	0.0343	1 0.003	1	1.000e-05

The accuracy of the test set is 100,000000 k The accuracy of the validation set is 100,000000 k

(b) Recognition/Verification Results

Fig. 6: Results obtained on the ORL and PolyU database with six epochs

V. CONCLUSION

A CNN based multimodal biometric authentication algorithm using face, and palmprint as biometric cues is presented. The experimentation conducted on number of standard databases. Experimental results show that the CNN algorithm provides the 100% accuracy of the biometric recognition. But the CNN needs enormous volume of training data to unscramble deviations and stifle inappropriate differences which guides in processing huge intraclass changes and degraded noisy biometric data. CNN has the ability of surpassing previous conventional algorithms with better generalization.

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RECONFIGURABLE WIDEBAND ANTENNA FOR WIRELESS APPLICATION

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ABSTRACT

Different multiband frequency reconfigurable patch antennas are presented in this paper for wireless applications. Two different reconfigurable antennas are presented in this paper. The On-Off combinations of PIN diodes and capacitors are used to achieved reconfigurability. Three stages are studied for these reconfigurable antennas. When all PIN diodes/Capacitors are off, two of them are on ON stage and when all the PIN diodes/Capacitors are in ON stages, multiple antenna parameters are studied. Proper optimization has been followed to get better Front to Back ration and efficiency with changes in patch's dimensions. By changing the feedline and port dimensions, enhanced impedance matching has been gained. VSWR for all three cases is less than 2. Radiation efficiency for all three cases are above than 90%. Radiation pattern for all three cases are omnidirectional. Ansoft HFSS v13.0 software is used for simulation of antenna. The dimension of antenna is 36*32.5mm².

Keywords- PIN Diode, Patch antenna; Frequency reconfigurability; VSWR; Radiation pattern; HFSS

INTRODUCTION

With the advancement in new wireless communication systems, the demand for more bandwidth is increasing drastically. In order to reuse full frequency spectrum, the model of reconfigurable antenna is proposed. These antennas are capable of changing their key operating parameters such as frequency, polarization, ration pattern or bandwidth. Reconfigurable antennas are getting such attention due to their major feature of using spectrum effectively. PIN diodes, varactor diodes or RF MEMS switches can be used as switching element to achieve this reconfigurability.

Among various ways to achieve frequency reconfigurability, one is to select and deselect some operating parts of antenna structure. In [1] frequency reconfigurability is obtain by having different nine frequency bands for which PIN diodes are places between slots of ground plane. In [2], four varactor diodes are connected with microstrip reconfigurable patch antenna to generate circular polarization at different resonates frequency bandwidths. On the other hand, in [3] a slotted patch is used with inserted lamped capacitor and the operating frequency bands can be changed accordingly. In [4], four PIN diodes and parasitic elements are used to attain pattern reconfigurability. In [5] frequency band and radiation pattern reconfigurability is carried out by incorporating a novel planer parasitic array antenna.

Simultaneous reconfiguration of frequency and pattern has been studied many times. In [6], author presents pattern frequency reconfigurable patch antenna using different switches. A half annular ring slot reconfigurable antenna for four frequency bands has been proposed in [7]. Whereas in [8] reconfigurable filters are used to obtain reconfigurability. This filter consists of PIN diodes as switch.

In this paper a new design for reconfigurable antenna is presented. The proposed antenna is well suited for cognitive radio applications. The antenna parameters are optimized to get multi band frequency range. The simulated results show that the suggested antenna is able to change its frequency ranges by changing the On-Off of different PIN Diodes and capacitors.

RECONFIGURABLE MICROSTRIP PATCH ANTEENA

Antenna Design

For basic design, three different patches are placed and 50 Ω microstrip feed line is connected in the middle point of patch1. The antenna is working on single frequency band and all antenna parameters are analysed. The substrate having $\epsilon r \ll 2.5$ is preferred. For proposed antenna RT/duroid5870(tm) is used with $\epsilon r \approx 2.33$. The dimensions for used substrate, its ground plane and for patches are mentioned as below:

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W₃ W_2 ۲ 5 W₁ 5 - F_{S}

Ws

Fig 1. Top view of basic antenna

Working of PIN Diode

The on and off states of PIN diode is used to switch between different frequency bands. As shown in fig 2, the ON state of a diode is a combination of an inductor (0.45H) and a resistance (1 Ω). Two rectangles are placed and corresponding values are assigned to them to work them as a PIN diode. On the other hand, for Off states it is a combination of inductor (0.45H) and resistor (3.5 K Ω) which is connected with a capacitor (0.08 pf) in parallel. Off states is shown in fig 3.





Fig 3. Equivalent circuit diagram of PIN diode in OFF condition

Capacitor loaded and PIN Reconfigurable Antenna:

Figure 4 shows the upper and lower view of designed reconfigurable antenna. As we are using FR4 so the height of dielectric substrate is known to us which is 1.59mm. And the dielectric constant value of the substrate is 4.3. Thus, the value of all the parameter required calculating the width and the length of the patch is known.





RESULTS AND DISCUSSION

In this section simulated results for return loss, VSWR, radiation pattern and surface current distribution is discussed. In below table the different antenna parameters are present for all three types of antennas.

Parameters	Basic	When cap	pacitor is as	s a switch	When d	iode is as a	switch
	Design						
		When all	When	When all	When all	When	When
		are off	two are	are on	are off	two are	all are
			on			on	on
Operating	8.1GHz	9.6GHz	7.1GHz	4.8GHz	4.8GHz	2.01GHz	9.8GHz
Frequency							
Return	-13.5	-17.8	-32.3	-13.3	-34.0	-13.5	-22.01
Loss							
Peak Gain	1.1	4.8	3.2	2.01	1.5	1.7	1.2
VSWR	1.7	1.2	1.01	1.5	1.01	1.09	1.6
Radiation	32%	47%	60%	64%	50%	61%	65%
Efficiency							

Tabular presentation for antenna parameters for all three designs

Figure 6 shows the VSWR and simulated S11 parameters for PIN reconfigurable antenna.



Fig 6. Simulated S11 value and VSWR for PIN RA (all three cases)

CONCLUSION

A multi-wide band microstrip patch antenna with frequency reconfiguration is presented in this paper. It ranges between 5.7-5.9, 9.2-9.6 and 7.5-7.9 with three radiation patterns. Two PIN diodes/Capacitors are places between three patchs. The simulated result shows that the antenna is applicable for cognitive radio applications with a very compact size. The antenna efficiency lied between 91% to 99% which is very efficient. Further the PIN diode can be replaced with RF MEMS or varactor diode.

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STALK SHOP REVAMPING THE APPROACH FOR SMART SHOPPING SYSTEM

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ABSTRACT

Nowadays, due to the lifestyle and demands, majority of human beings are becoming increasingly occupied, need of the hour is to get all personal works done easily with minimum effort and time-consumption. Shopping at malls is a frequently carried out activity in. There can be a big rush at malls on holidays, weekends especially during special offers and discounts. Contrast to shopping in malls, people prefer online shopping to get required items through Amazon, Flipkart and Snapdeal etc., where they cannot have the look and feel of items unless they receive the delivery. The purpose of the article is to analyze several technologies which can be implemented for indoor shopping and for improving customers experience and even help those who are experimenting on new dishes with the recipe and ingredients. Therefore, we aim to explore several methods which can help reduce the time that customers spend to pay for the products, in search of the product and their recipe and to customize their shopping experience by analyzing their feelings towards shops and products .So to solve the problem we have proposed an smartphone application named as stalk shop with shopping cart at the malls having Rfid tags on product and Rfid sensors in the cart using which the billing will be easy ,and one can overcome the complications of online and offline shopping by ensuring a better shopping experience.

Keywords— Shopping; Smartphone App; Sensors; Rfid; Billing.

INTRODUCTION

Smartphone industry have been growing rapidly now a days, the supply and use of the smartphone increases steadily.by developing new software application, we are enhancing online shopping. So, the main objective of our application is to give the recipes ingredients, control the cart and add the entire billing amount of this will reduced the queue for billing ease in adding the amount, use of latest technology. To know this in detail let us take an example If the person is searching for recipes related to paneer, then they will get recommendation regarding all the recipes related with paneer like kadhai paneer, khoya paneer, shahi paneer, paneer tikka masala etc. in accordance with the need you will in ingredients involved to make it and the link to make that variety of recipes. After this process it will be added to the cart you can also go to other domain for more shopping and add that item in your cart. This application will also give you a map of your nearby store where the entire commodities are available, so location can never be a barrier. The cart in the store will have scanning system so that u can generate your bill easily.

RELATED WORK

Not everyone can memorize well the recipes they want. Their material is also an obstacle in cooking. Limited ingredients also become one of the causes of limited cooking creations, especially for someone who does not have passion in cooking. In this app, the user is asked to load the materials owned, then the application will look for recipes that have the material most like the material owned by the user [1]. This paper suggests a method that when you pick a product and drop it into the trolley, the RFID scanner scans the product's unique code and its price, it is just as a bar code or magnetic stick must be scanned to get the information, the RFID device must be scanned to recover the identifying information. And it gets displayed on the LCD screen [5]. THE primary task of association mining is to detect frequently co-occurring groups of items in transactional databases. The intention is to use this knowledge for prediction purposes: if bread, butter, and milk often appear in the same transactions, then the presence of butter and milk in a shopping cart suggests that the customer may also buy bread [3]. Shopping in the present day usually involves waiting in line to get your items scanned for checkout. This can result in a great deal of wasted time for customers. Currently available method in shopping malls is barcode method. In this method there are barcode labels on each product which can be read through specially designed barcode readers. A barcode reader (or barcode scanner) is an electronic device for reading printed barcodes. Like a flatbed scanner, it consists of a light source, a lens and a light sensor translating optical impulses into electrical ones [4]. During the phase of literature review we realized that majority of the individuals select to walk out of the mall tired of standing in big queues to purchase a small number of items. Addition to this, customers find it tough to find the item to buy, after picking item they should wait in the long queue for making payment. For solve this problem, there are several technological solutions implemented in hypermarket help [2].

Proposed system

A web service is a collection of open protocols and standards used for exchanging data between applications or systems. Software applications written in various programming languages and running on various platforms can use web services to exchange data over computer networks like the Internet in a manner like inter-process communication on a single computer. This interoperability (e.g., between Java and Python, or Windows and Linux applications) is due to the use of open standards.

Web services based on REST Architecture are known as RESTful web services. These webservices uses HTTP methods to implement the concept of REST architecture. A RESTful web service usually defines a URI, Uniform Resource Identifier a service, provides resource representation such as JSON and set of HTTP Methods.

Hardware

- NodeMCU v1. 0 The ESP8266 NodeMCU V1.0 ESP-12E Wi-Fi module is the latest version of this popular module and can be used as a Wi-Fi enabled replacement for an Arduino in many applications.
- EM 18 Module EM-18 is used like any other sensor module. First, we choose the mode of communication between MODULE and CONTROLLER. Next, we will program the controller to receive data from module to display.
- Push Button A push-button or simply button is a simple switch mechanism to control some aspect of a machine or a process. Buttons are typically made from hard material, usually plastic or metal.
- Led Red/Green LED is short for Light Emitting Diode. An LED emits light because of electric luminescence.
- Buzzer A buzzer is a small yet efficient component to add sound features to our project/system. It is very small and compact 2-pin structure hence can be easily used on breadboard, Perf Board and even on PCBs which makes this a widely used component in most electronic applications.
- Display Screen LCD modules are very commonly used in most embedded projects, the reason being its cheap price, availability, and programmer friendly.
- Rfid Tag RFID tags are a type of tracking system that uses smart barcodes to identify items. RFID is short for "radio frequency identification," and as such, RFID tags utilize radio frequency technology.

Software

- Android Studio Android Studio is the official integrated development environment (IDE) for Google's Android operating system, built on JetBrains' IntelliJ IDEA software and designed specifically for Android development. It is available for download on Windows, macOS and Linux based operating systems or as a subscription-based service in 2020. It is a replacement for the Eclipse Android Development Tools (E-ADT) as the primary IDE for native Android application development. Android Studio was announced on May 16, 2013 at the Google I/O conference. It was in early access preview stage starting from version 0.1 in May 2013, then entered beta stage starting from version 0.8 which was released in June 2014. The first stable build was released in December 2014, starting from version 1.0. On May 7, 2019, Kotlin replaced Java as Google's preferred language for Android app development. Java is still supported, as is C++. A specific feature of the Android Studio is an absence of the possibility to switch autosave feature off.
- SDK Framework: Flutter Flutter is an open-source UI software development kit created by Google. It is used to develop cross platform applications for Android, iOS, Linux, Mac, Windows, Google Fuchsia, and the web from a single codebase. The first version of Flutter was known as codename "Sky" and ran on the Android operating system. It was unveiled at the 2015 Dart developer summit, with the stated intent of being able to render consistently at 120 frames per second. During the keynote of Google Developer Days in Shanghai, Google announced Flutter Release Preview 2, which is the last big release before Flutter 1.0. On December 4, 2018, Flutter 1.0 was released at the Flutter Live event, denoting the first "stable" version of the Framework. On December 11, 2019, Flutter 1.12 was released at the Flutter Interactive event. On May 6, 2020, the Dart SDK in version 2.8 and the Flutter in version 1.17.0 were released, where support was added to the Metal API, improving performance on iOS devices (approximately 50%), new Material widgets, and new network tracking.
- Language Used: Dart Flutter apps are written in the Dart language and make use of many of the language's more advanced features. On Windows, macOS, and Linux Flutter runs in the Dart virtual machine, which

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features a just-in-time execution engine. While writing and debugging an app, Flutter uses Just in Time compilation, allowing for "hot reload", with which modifications to source files can be injected into a running application. Flutter extends this with support for stateful hot reload, where in most cases changes to source code are reflected immediately in the running app without requiring a restart or any loss of state. Release versions of Flutter apps are compiled with ahead-of-time (AOT) compilation on both Android and iOS, making Flutter's high performance on mobile devices possible.

- Database: Firebase The Firebase Realtime Database is a cloud-hosted database. Data is stored as JSON and synchronized in real-time to every connected client. When you build cross-platform apps with our iOS, Android, and JavaScript SDKs, all your clients share one Realtime Database instance and automatically receive updates with the newest data. The Firebase Realtime Database lets you build rich, collaborative applications by allowing secure access to the database directly from client-side code. Data is persisted locally, and even while offline, real-time events continue to fire, giving the end user a responsive experience. When the device regains connection, the Realtime Database synchronizes the local data changes with the remote updates that occurred while the client was offline, merging any conflicts automatically. The Realtime Database is a NoSQL database and as such has different optimizations and functionality compared to a relational database. The Realtime Database API is designed to only allow operations that can be executed quickly.
- Packages Used
- Material.Dart MaterialApp is a predefined class in a flutter. It is likely the main or core component of flutter. We can access all the other components and widgets provided by Flutter SDK.
- Flutter_test.dart The flutter test package provides the following tools for testing widgets: The WidgetTester allows building and interacting with widgets in a test environment. The testWidgets() function automatically creates a new WidgetTester for each test case, and is used in place of the normal test() function.
- Main.dart Dart programs has an entry point called main. When you run flutter or dart file it first runs main function. In this case the main function is calling flutter specific function called runApp.
- Cupertino.dart This library is designed for apps that run on iOS. For apps that may also run on other operating systems, we encourage use of other widgets, for example the Material Design set. A collection of commonly used autofill hint strings on different platforms.
- Cached_network_image.dart The Cached Network Image can be used directly or through the Image Provider. Both the Cached Network Images. Cached Network Image Provider have minimal support for web. It currently does not include caching.
- Cloud_firestore.dart Flutter plugin for Cloud Firestore, a cloud-hosted, NoSQL database with live synchronization and offline support on Android and iOS.
- Shared_preferences.dart SharedPreferences is used for storing data key-value pair in the Android and iOS.
 SharedPreferences in flutter uses NSUserDefaultson iOS and SharedPreferences on Android, providing a persistent store for simple data.
- Firebase_auth.dart Firebase Authentication provides backend services, easy-to-use SDKs, and ready-made UI libraries to authenticate users to your app. It supports authentication using passwords, phone numbers, popular federated identity providers like Google, Facebook, and Twitter, and more.
- Widgets.dart In flutter, Widget is a way to declare and construct UI. ... A widget might display Something, it might help define design, it might help with layout, it may handle user interaction, etc.
- Url_launcher.dart A Flutter plugin for launching a URL. Supports iOS, Android, web, Windows, macOS, and Linux.

Configuratioin



Fig 1. Block Diagram



Fig 2. Circuit Diagram



Fig 3. PCB Board



Fig 4. PCB Connection

In this project v r using an Arduino uno r3, em-18 RF Id module, 4 RF Id tags, 1 switch button, 16* 2 lcd display and one ZigBee module so ZigBee basically is a low-cost, low-power, wireless mesh network standard targeted at battery-powered devices in wireless control and monitoring applications. Zigbee delivers low-latency communication. Zigbee chips are typically integrated with radios and with microcontrollers. So here we must select the items i.e., the Rfid tags and press the switch, so that all the items get displayed on the screen. After that coming to the receiver unit in that we are again using a ZigBee module, USB to URAT module and pc flash magic software.

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Then coming to next circuit this is our connection of pins and proper arrangement of circuit. Now we are going to connect our receiver unit i.e., ZigBee module and USB to URAT module to pc, we will open the flash magic app on pc then connect the 3 pins of adapter to ZigBee, em-18 Rfid mod and Arduino r3 and restart then. And let us get started. Press the switch. As we are initially not adding any item , on pc screen the final bill will be displayed which will be 0. Now we will start adding items and check the led screen and whenever we want the final bill just to click on the switch and total bill will be displayed.

Experimental Results



Fig 5. Login, Categories Screens

A/10 P	ů.	1. TAXABLE IN CA	800.956		A DESIGN OF ME THE	
÷	Recipes					
	Search Recipes			My Profile		
	Red Velvet		Ħ	My Cart		5
			Ψ	Favourites	1	
			±	Recipies		
1	Strawberry I	Milkshake				
A.	Paneer Tikk	a				:15
	Whole Whea	it Banana Cake				
1774		4		_		

Fig 6. Recipes, Profile Screens



Fig 7. Add to Cart, Billing Screens


Fig 8. Green Led Blinks when Item gets Added



Fig 9. Red Light Blinks when Item gets Removed.

CONCLUSION

Development of shopping list and navigation system to search the products in mall can be implemented. A lowcost RFID scanner can be manufactured and used which can scan multiple tags (products) simultaneously for faster processing and lesser resources. There can be maps which can show the availability of the products in a particular mall Using a GSM module, we can transfer the bill to the mobile instead of printing it . This saves paper.

The inspiration and idea of this paper was drawn from the long queue at the shopping mall and the inconvenience that it causes to the costumers. Working on this product it was noted that RFID technology has a vast application soon. This shopping system can completely change the lifestyle and ease. Moreover, this smart trolley will be helpful to reduce the rush at billing counters.

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METHODS USED FOR HUMAN BEHAVIOUR RECOGNITION: A REVIEW

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ABSTRACT

The behavior of human play a very important role as the human reaction depends on their behavior. Behavior recognition can be done using any form of response from a person such as his text, speech, facial expression, or gesture. Using image processing and computer vision techniques, it is possible to analyze human behavior automatically. This survey paper provides study of various methodologies used for recognition human behavior. This paper provides analysis of various existing techniques used for data capturing, preprocessing, feature extraction and classification with precise and arranged representation. Also the study of the merits and demerits of existing methods.

Keywords— Electrooculography, Support Vector Machine, Freeman Chain Code, zoning, Histogram of Gradients, Discrete Wavelet Transform

I. INTRODUCTION

In the computer vision field, behavior detection and recognition of images is a significant task. In a real time application, all the data we collect are in large amounts. To understand this data, we need a process that data. Manually, it is not possible to process. That is why the concept of image processing needs to understand. In Image Processing, some operations are performed on an image, the image converts into digital form and useful information is extracted from that image. In a human behavior recognition system, it is necessary to capture the required image, enhance the image so that certain features are extracted from the parameters to obtain accurate results.

A recognition system is divided into different steps: data acquisition, preprocessing, segmentation, feature extraction, and classification. There are two methods used for data acquisition in recognition system: intrusive and non-intrusive [1].

In the intrusive method, sensors are required to be attached to a person. The sensors like accelerometer, microprocessor, and wireless transceiver are used in this method. Some wearable sensors are attached to the different body parts. Whereas in the non-intrusive method, the sensor does not require to attach to a person. Sensors like color cameras, thermal infrared sensors are used in this method.

The output from the sensor contains noise we need to remove noise for further processing. So next step is to remove noise from the image is called preprocessing. According to the application, different filters are used for noise cancellation.

Segmentation of the image is done after noise cancellation where the region of interest is separate from the main image. Feature extraction is the next step after segmentation, where certain features are extracted from the original image. Feature extraction increases the accuracy of the output that comes from the classification step.

The last step in the recognition system is classification. Different types of classifiers are used, such as K-nearest neighbor (k-NN), support vector machine (SVM), artificial neural network (ANN), decision tree, and so on.

The rest of the paper is divided into different sections. Different human behavior recognition systems and different methods used for classification, preprocessing, and feature extraction are mentioned in section II. Comparative studies of different techniques are mentioned in section III. The conclusion is mentioned in section IV.

II. PREVIOUS WORKS ON BEHAVIOR RECOGNITION SYSTEM

A. Based on Eye Movement

In this work, a behavior recognition system based on eye movement using Electrooculography (EOG) has been introduced [2]. From the EOG signal, behavior of human such as happiness, sadness, anger, fear is recognized. For behavior recognition, an EOG signal is used. To obtain the EOG signal, the two sets of skin electrodes place on the opposite side of the eyes, and reference electrodes place somewhere on the forehead area. The EOG signal is obtained from corneo-retinal standing potential. In this system, the human eye considers an electric dipole, in which the corneo is positive and the retina is a negative pole. They assume that there is a stable potential change between the carneo and the retina. When the eye passes from the center position towards the periphery, the

retina approaches one side and the corneo on the other side which causes a transformation of electric potential field and gives an EOG signal.

EOG signal contains noise due to many reasons such as a loose end-to-end connection, housing power line. This noise is removed by using a low pass filter and median filter. The Median Filter is a non-linear digital filtering technique, it is used to remove noise from an image. Median filtering is widely used because it preserves edges while removing noise.

This noiseless signal is sent for feature extraction. From noise-free EOG signal some features like mean, variance, standard deviation, skewness, autocorrelation, kurtosis are calculated. Independent Component Analysis (ICA) is used for feature extraction.

Support vector machine classification technique is used for classification. By using this technique, the valence-Arousal model is obtained. Support vector machine kernel classifier is used to order the emotions based on the positive and negative value of arousal and valence features. It uses a hyperplane that splits up the datasets into suitable classes. These two groups are positive and negative classes. From these classes, the behavior of human can be identified. The positive classes indicate emotions like happiness and pleasant and negative classes indicate emotions like sadness, anger, and fear.

B. Based on Hand written cursives

In this paper, a human behavior recognition system based on a hand-written image that contains the cursive letter O has been introduced[3]. The work classified in two phases: testing and training phase. In the testing phase preprocessing of the image is done where the image is resized and color conversion is applied. After preprocessing segmentation is done. Freeman Chain Code (FCC) and zoning techniques are used to extract the feature. These trained samples of the image are then stored in the database. In the training phase, when someone writes something which contains the cursive letter O, the system identifies the letter. The feature of the image is matched with the database image and using the SVM classifier, the behavior of a person is identified.

In preprocessing step the image is resized and color conversion is applied to the image. The color conversion process converts the RGB color image into a grayscale image.

Drop fall algorithm (DFA) is used for segmentation. The basic idea of segmentation is based on the dripping process of water-drop from top to bottom. Due to Gravity, it drops only from an outline of the letter from top to bottom and scrolling in a horizontal manner. The water drop penetrates the stroke of the character [6].

Freeman chain code (FCC) and zoning techniques are used for feature extraction. In FCC, the number from zero to seven is given for eight directions and according to an outline of the letter, the code is generated which contains the number from 0 to 7. This is produced by the randomized-based algorithm that has the shortest computation time.

Zoning is another feature extraction technique that is used for the identification of the behavior of a person [7]. In this technique, the image of size 40*40 pixels is divided into 16 equal blocks. Each block is of size 10*10 pixels and each block represents with binary number 0 or 1. If the part of the character contains in a particular block, that block is labeled as 0 whereas other blocks are labeled as 1. This will create 128-bit binary strings.

This binary string is given to the SVM classifier which identifies whether that person is self-confident, closedminded, secretive, or sincere.

This paper considers the data of 500 samples of male and female of age 17-77 years. The resolution of the scanned image is 300 dpi. There are different methods for segmentation, feature extraction, and classification. By using FCC and zoning technique for feature extraction gives an accuracy of 86.66% [2].

C. Based on finger print

This paper defines the learning style of a person from their fingerprint. The system identifies the learning style of students and assigns teachers, which taught them according to their learning style, provides assignments to them, and keeps a record of the performance of students [8].

The ridges on the skin of the hand and toes developed during the 24th week in the womb of the mother. When this pattern is fully developed, the pattern remains unchanged for the whole life. Different patterns of the fingerprint are whorl, loop, arch, and accidental. This pattern is correlated with brain development from this pattern learning style of a person can be detected. The three types of learning styles are visual, auditory, and kinesthetic. The system takes the fingerprint of a person by using the biometric system. The image enhancement is done in preprocessing step. The Gabor type filter is used to remove noise from the image. After filtering the

grayscale to binary thresholding is performed. The ridgeline thinning is done for feature extraction. For the ridgeline thinning skeletonization method is used. The ridgeline endings and bifurcation are two features extracted from the fingerprint image.

The fingerprint is captured using biometric, then contrast stretching is done for image enhancement. The image is mapped into the grayscale level. In the Captured image of the fingerprint, noise is present in between ridgelines. This noise is removed by using a Gabor-type filter and a low pass filter. The result of the gray-type filter is given to grayscale to binary thresholding procedure. Bifurcation and ridgeline endings are important features for feature extraction. For feature extraction, the ridgelines should be thin. For thinning of ridgelines, different methods are used such as Gao's method and skeletonization method. But in Gao's method of thinning contains some discontinuities which affect the output, so the skeletonization method is used for thinning which gives clear output as compared to Gao's thinning [3]. After thinning the feature extraction is done and the output of this step is given to the CNN classifier to determine the learning style of the person [5].

This paper considers the fingerprint of 20 students and their learning abilities are defined. After analysis, it is observed that the majority of students are having an auditory learning style. If a teacher teaches them according to their learning style the performance of students increases from 5 to 42% [8].

D. Based on facial expresssion

The behavior of human is recognized using facial expressions. The image of a person is taken from the camera. The data pass through the filters, preprocessed, and classified using SVM, and defines the behavior of a person such as sadness, happiness, anger [9].

The first step is to capture the face of the person. Eye and lips are the features used for the identification of the behavior of human. These features are then passed through the filters. The output of the filter is sent to the classifier to get classified according to the trained data.

The face detection is done by using the viola jones algorithm, as this is an easy detection method and gives high accuracy. It uses haar based feature filter. The filter takes each sub-window and haar features are calculated for each sub-window and the difference is compared with the threshold values which separate object and non-object. As haar feature is the week, a large number of haar classifiers are arranged in a cascade manner to get a strong classifier. Each classifier checks the sub-window whether the face detects in sub-window or not. If a face detects in the sub-window, the signal pass to the next classifier else the whole process is repeated till the face is detected.

Similar classifiers are used to detect eye and mouth. The various techniques were used for feature extraction and classification and different combinations are used for best results.

The Fischerface classifier uses Principal Component Analysis (PCA), which reduces dimensionality, such that variables in the dataset are reduced to a minimum. This gives a precision output of 0.74, which is fairly good. Gabor filter recognizes the texture of the image and creates frequency and orientation components. This can be easily differentiated by mouth and eyes from the rest of the skin. SVM works best with this filter, which gives a precision of 0.81. The most precise classification of 0.85 is achieved by using a combination of Histogram of Gradients (HOG) filter followed by classification by SVM. Discrete Wavelet Transform (DWT) creates subsignals in the horizontal, vertical, and diagonal directions, which are analyzed to gain a general form of the image. This method gives a precision of

0.72. The images are through a DWT filter followed by a HOG filter and then classified by SVM which gives the precision of 0.70 [9].

III. COMPARATIVE STUDY

Table I provides the comparative study of the techniques used in behavior detection system.

TABLE I

Methods	Eye	Handwriting [3,6]	Finger	Facial
	Movement [2]		Print [8,3,5]	Expression[9]
Data Acquisitio n	Intrusive (By EOG	Non-Intrusive (input	Intrusive	Non- Intrusive
	Signal)	image containing a word	(Biometr ic	(Camera)
		with cursive O)	Machine)	
Preproc- essing	Median filter	Color	Gabor-	Viola Jones Algorithm
		Conversion process	Type filters	

COMPARATIVE STUDY

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Feature Extraction	Independent	FCC and zoning	-	Histogram of
	Component Analysis			Gradients (HOG) filter
Classifi- cation	Multi class SVM	SVM	CNN	SVM
Accuracy	87.99	86.66	67	85
(in %)				
Behavior	Happy or sad	Self-Deceit, Secretive,	Personal ity,	Sad, happy, disgust,
		Sincere	Learning Style	surprise, fear and
				angry
Applicatio n	Personal Assistance	Recruitment	Enhance learning	Recruitment
	system			

IV. CONCLUSION

The objective of this paper is to discuss various human behavior recognition systems. The paper first introduces the basic recognition system and different steps used in the recognition system, then provides the summary from a survey of 4 papers. This paper also discusses various techniques used for preprocessing, feature extraction, and classification. Based on this study, the SVM classifier gives high accuracy.

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RFID BASED VOTING SYSTEM WITH IRIS SCANNER

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ABSTRACT

Fundamental right to vote or simply voting in elections forms the basis of democracy. The conduct of periodic, competitive, participatory, credible and non-violent elections is one of the main yardsticks used to determine the democratic condition of a state. In India, elections have been conducted using the EVM's(Electronics voting machine) system of voting, but these elections using the EVM's means have been marred with a lot of electoral malpractices and hitches. Anybody can vote without proper authentication and authenticity of the voting system can be degraded due to human error. This problem can be solved by using a Two-step authentication process, where no human is needed to authenticate the voter or operate the voting machine. This is achieved by using RFID readers and RFID tags for voting and authentication and IRIS scanner for two step verification. Such a system with all these capabilities will go a long way in ameliorating the aforementioned problems of the existing EVM's used for Voting.

I. INTRODUCTION

The democracy of any nation lies in VOTE the people cast to elect their leaders. But this system despite high security is still suffering from various issues mainly during the verification process and the manpower requirement during that process is large. There are chances of intervention of political parties and human errors in this process but yet there are no best solutions to overcome this problem. If this problem is not overcome then it might lead the nation into the wrong hands. The security and manpower requirement during the verification process can be overcome by the method used in this paper.

• EXISTING SYSTEM

There are several methods available to carry out the verification process. Out of several processes biometric verification is the most secured process. But in the existing systems only either of the biometrics are used. The security cannot be ensured in these processes. Also these methods have not been implemented successfully.

• **PROPOSED SYSTEM**

The proposed system is based on the verification process on the Election Day. The system has a database which is pre-recorded and contains the details about the individuals who are above 18 years. These details include the biometric and personal details. The voter ID card is replaced with a RFID card which serves as an access to the individual on the day of voting. During the day of voting the voter undergoes a two step verification process. The first step is one in which the voter has to show his RFID card and it is read by a RFID reader module. The reader module senses the card and displays the details of the individual on the LCD screen.

Once after the details are displayed a voter is asked to place his/her iris on the iris scanner. In this system is to check the capture of the voter iris image by using an iris scanner.

Match the captured iris image database using hamming distance. If the iris image is not matched to the database, then it will stop the process. On the other hand, if the iris image is matched to the smart card database then allow the voter to give a vote and update the voting record of the voter. It is safer than the traditional ballot paper voting system. This system is very much time effective and fast.

II. METHODS

We will be using methods of voting at higher security level which are as follows:-

- As we know while applying for a vote there is a specific voter ID (identity document) for each individual, so on that basis we will be providing different RFID cards to our voters which will define their identity.
- In our proposed system we are using RFID card readers as different political parties.
- For authentication purposes we will be using Mantra iris scanner MIS100V2 at step 1, we will create a database of all voters, that is, a database of their iris for authentication purposes and before casting vote we have to make sure that specific voter's iris is matching with our database.
- Now if it is matched with our saved database then in our LCD display it will show authentication successful and now voters will be allowed for our second step i.e. casting vote.
- As we have discussed above that each RFID card reader will be acting as different political parties, now

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according to our voters choice he/she will tapping his/her RFID card on reader and now his/her vote has been casted to their chosen party and their data will be stored that he/she has been done with voting. All the above steps will be monitored by a person assisting with a laptop, except the part where he/she casts their vote.

III. CIRCUIT DIAGRAM



III. CONCLUSION

With the increasing population day by day, the improvement of the voting system is necessary. Undoubtedly the proposed voting system's techniques are especially good. We have used iris recognition and smart cards for improving this system. IRIS verification could also be an honest choice for e-voting systems, where you can provide users adequate explanation and training, where the system operates in a controlled environment. It is not stunning that the work-station access application area looks to be based almost exclusively on iris, as a result of the relatively low price, small size, and easy integration of iris authentication devices Capture the iris image and compare or match to the database. The amount of votes is counted by the E-Voting machine and therefore the data are sent to the Server through the online technology. The project is found to be very helpful in overcoming the difficulties faced during voting times. Also it efficiently uses both the Iris scanner and Rfid Tag as voter ID. This serves to be an efficient method to reduce manpower requirements and other illegal activities. Also it eliminates manual errors incurred during voting and displays the polling results at the end. The process can be extended to help the government during elections and reduce fraudulence to a great extent.

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PNEUMONIA DETECTION AND CLASSIFICATION USING CNNS

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ABSTRACT

Pneumonia is a life-threatening infectious disease affecting one or both lungs in humans commonly caused by bacteria called Streptococcus pneumonia. One in three deaths in India is caused due to pneumonia as reported by World Health Organization (WHO).

The purpose of this project is to create a Convolutional Neural Network (CNN) that can detect and classify pneumonia and its origin from chest X-Ray scans. X-Rays have been selected as the targeted medical imagery owing to its quick generation time and wider availability, even in rural areas.

Keywords—About four key words or phrases in alphabetical order, separated by commas.

I. INTRODUCTION

Pneumonia is a condition that results in the inflammation of lung alveoli (air sacs) and may cause them to be filled with fluid or pus. Pneumonia can range from mild to life-threatening and usually affects infants, young children, people older than 65 or in people suffering from a weakened immune system (due to HIV-AIDS, etc.). Symptoms usually include dry cough, chest pain, difficulty in breathing and fever. Pneumonia is usually caused by bacteria and viruses and less commonly by fungi and other microorganisms. Although more than 100 strains of infectious agents have been identified, only a few are responsible for the majority of the infections. Most of the cases are limited to developing countries. Pneumonia is usually diagnosed based upon symptoms and physical examination. Chest X-Rays, Computed Tomography (CT) Scans, blood tests and sputum cultures are usually employed in detecting pneumonia. However, since the majority of cases are present in developing/poor countries, the mean diagnosis time is quite high when compared to developed countries. Methods such as blood tests and culture testing take more than 5-6 hours to complete and up to 24 hours for the labs to send reports. Moreover, the availability of CT machines is limited to urban centers in such countries. Due to the wide availability of X-Ray machines in both rural and urban centers and fast result generation time (10-15 min), X-Rays are quite popular in diagnosing pneumonia as seen in Figure 1.1



Figure 1.1: Comparison of X-Rays of a 72-year-old woman with healthy lungs (left) and pneumonia (right) taken one year apart.

However, the only limitation in using X-Rays is that, while they can confirm the presence of pneumonia in the lungs, medical experts can't determine its cause just by examining the XRay image with just their eyes, even though very subtle differences exist for different causes. Hence, to find out which microorganism is responsible, blood tests or culture generations are required. In cases which are more severe and where time is of the essence, this proves as a disadvantage.

Deep Learning (DL) and Image Processing (IP) methods have already proven effective in detecting and determining various ailments from medical imaging methods, such as skin cancer, breast cancer, brain tumours and glaucoma while maintaining an accuracy on par or sometimes even greater than medical professionals' diagnoses. Hence, it is imperative to employ DL/ IP methods for early diagnosis and determination of the cause factor of a given case of pneumonia. Such computer-assisted methods provide invaluable input and aid to medical practitioners. Thus, in this paper we introduce a novel method for the detection and classification of pneumonia from X-Ray images using deep learned convolutional neural networks and transfer learning.

II. OBJECTIVE

The proposed model has the following objectives:

1. To implement a convolutional neural network model to classify Bacterial and Viral pneumonia from chest X-Rays scans.

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2. plot the accuracies and losses in training and validation that occur.

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- 3. Generate activation maps during the testing phase to help visualize where the CNN decides to extract features from.
- 4. For better accuracy comparison, medical practitioners are to be given random sample images to classify those images as either viral, bacterial or normal cases. Same images will be tested in the model and the accuracies of both the model and medical practitioners will be compared.

III. PROJECT IDENTIFICATION

- 1. To identify and classify instances of bacterial, viral and bacterial pneumonia from chest x-ray images obtained from online repositories Kaggle and Cohent.
- 2. To implement a CNN model to help classify the given chest x-rays obtained from the datasets.
- 3. To monitor accuracies and losses in training and validation and subject the model to fine tuning if necessary.
- 4. To implement activation maps for visualization of testing data that is fed to the CNN network.
- 5. To compare the accuracies of the trained model and medical practitioners in diagnosing a random set of images into bacterial, viral or normal cases.

IV. PROBLEM STATEMENT

- 1. Pneumonia is a major concern in developing countries. While many medical imaging methods exist to detect pneumonia in the lungs, quick diagnosis of its cause is generally unavailable.
- 2. Most diagnosis methods rely on blood tests, sputum cultures, CT scans, etc. These methods are generally time consuming and may not be available in rural areas and can prove to be disadvantageous in time-critical cases.
- 3. Also there are several counties which are economically backward and they don't even have medical facilities in their most developed region. Also deploying medical equipment is economically very burdensome.
- 4. Pneumonia is one of the most severe which leads to several casualties, thus detection and treatment of the same in the quickest time is very important. Thus for that portability of the detection machine becomes very helpful.

V. LITERATURE SURVEY

Present methods that have been designed for the automatic classification of pneumonia cases have been described in Table 1. These methods are designed based upon various deep learning approaches and use either X-Ray scans or CT images as their testing, training and validation data. Moreover, some of these methods focus only on detecting pneumonia originating from only a single cause, e.g., SARS-CoV-19. These methods employ various deep learning approaches such as deep transfer learning inorder to extract features from the input training images and classify objects of interest. Table 1 shows that researchers used comparative analysis of various deep learning networks such as VGG, MobileNet and Residual for detecting pneumonia. They also present resulting accuracies for their work.

Sr no	Title of paper	Author	Details of conference	Work done
1	COVIDGR Dataset and COVID-SDNet Methodology for Predicting COVID-19 Based on Chest X-Ray Images	S. Tabik et al	IEEE Journal of Biomedical and Health Informatics	This method utilizes classes differentially populated with data based on their severity scores.
2	Covid19: automatic detection from Xray images utilizing transfer learning with convolutional neural networks	Ioannis D. Apostolopoulos, Tzani Bessiana	Physical and Engineering Sciences in Medicine	Deep Transfer Learning utilizing VGG19 and MobileNet were employed

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3	Automated detection of COVID-19 cases using deep neural networks with X-ray images	Tulin Ozturk, <i>et al</i>	Computers in Biology and Medicine Volume 121, June 2020, 103792	Utilizes a custom CNN called "DarkCovidNet" for binary and multi- class classification of
				pneumonia.

 Table 5.1 – Literature survey

VI. METHODOLOGY

The proposed methodology for this paper is as shown below:

i. Pre-processing

Open license online image datasets from Kaggle and Cohen have already been annotated into viral, bacterial and normal pneumonia cases as shown in Figure 6.1.



Fig. 6.1 Sample images obtained from the datasets

All the images were resized to 224×224 pixels. RGB reordering was applied to resized images, thus giving a final input image of $224 \times 224 \times 3$, with 3 representing the number of RGB channels. The image size was chosen according to the requirements of the ImageNet database. ImageNet is a public dataset that consists of millions of classified images. A residual network pretrained on ImageNet database has been used in this work to further train the network which is used to classify pneumonia. The process of using a pretrained network to further train newer networks is termed as transfer learning. The main benefit of transfer learning is that the pre-trained network layers already have learnt to recognise image characteristics such as borders, shapes, colours, lines, etc. The reason for using a pre-trained network is to avoid having to train the initial layers of the network to recognise the above-mentioned image characteristics which would otherwise take a very long time to train.

The resized images are subsequently subjected to a pixel wise division of 255 to convert the image pixel values between 0-1 to simplify processing. Image Data Generator from keras. preprocessing was used to achieve this.

ii. Transfer Learning

Residual models ResNet50 and ResNet34 have been employed for classifying Normal and Bacterial cases and Normal and Viral pneumonia cases respectively. Residual networks have been used in this model due to their higher relative performance when compared with other pre-trained network architectures such as VGG, Inception, mobile, etc in terms of accuracy as well as computation requirements. Moreover, residual networks, on average, require less storage space when compared to other networks. A separate residual network with 34 layers has been used for the classification of viral cases owing to a higher number of subclasses present to classify different viruses present in the dataset, e.g., ARDS, MERS, etc. Using a single network can lead to misclassification since the visual differences between viral and bacterial cases in the dataset. The last layer of the residual networks is frozen in order to retain the pre-trained weights and to avoid retraining which may result in longer training times per epoch. New layers are added on top of the residual networks namely:(i)AveragePooling2D with a pool size of (4,4), (ii) Flatten layer, (iii) two dense layers with 1024 and 64

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units respectively with activation function ReLU, (iv) a Dropout layer and finally (v) the output layer with 2 units corresponding to the number of classes in each case.

• Learning rates and ReduceLROnPlateau

Learning rate is the most important hyper-parameter while training the network. The learning rate is responsible to updating the weights of the network after each epoch or iteration. The weights (Θ j) are updated according to the formula shown in Equation 1.

1

$$\theta_{j+1} = \theta_j - \alpha \left[\partial J(\theta) / \partial(\theta_j) \right]$$
 -Equation

where j is the number of epochs, $J(\Theta)$ is the loss function and $[\partial J(\Theta) l \partial (\Theta j)]$ is the gradient of the Θj , α is the learning rate, and $\Theta j+1$ is the value of the updated weight determining an optimal learning rate can be quite difficult as a higher value of learning rate can cause premature convergence of weights and lead to inaccurate results, while a smaller learning rate may lead to the gradient descent problem. Hence to rectify the problem of finding an optimal learning rate, the callback function ReduceLROnPlateau from tensorflow.keras.callbackswas used. The ReduceLROnPlateau function introduces a new and reduced learning rate whenever the training and validation losses reached a plateau, i.e., an indicator that the current learning rate is not working. The initial learning rate was set to a higher value of 5e-3 and patience was set to 4. The learning rate was reduced by 1e-2 whenever a plateau was encountered.

iii. Data Augmentation

Data augmentation the process of increasing the amount of data available for training significantly. Since, the online datasets available to the team have a significant difference between the number of images belonging to each class (i.e., bacterial, viral and normal cases), data augmentation is used to avoid creating a class imbalance; since a class imbalance can lead to overfitting on training and false positives leaning towards classes with more data. Thus, to increase the number of images available for training, augmentation methods that have been applied are shears, zooms, shifts in the X and Y axes, random flips along the X axis and random rotations in the range of -15 to +15 degrees. However, only non-augmented images were used for testing purposes to ensure that the model does not overfit to only augmented images used in the training data.

iv. Training, testing and validation

The total number of images available to the model is divided in the ratio of 60:40 according to the Pareto principle, where 60% of total images will be used for training and 40% will be used for testing and validation



6.2 Architecture of the proposed of model

v. Model Architecture

The proposed model to detect and classify pneumonia is divided into three stages, as seen in Figure 6.2 the first stage consists of image augmentation and image pre-processing; the second stage will separate normal and bacterial cases from the augmented pre-processed images.

ResNet50 has been employed for this purpose. Residual networks have been considered for these stages since they outperform other deep network architectures such as VGG, MobileNet and other dense networks in terms of computational time and accuracy. All the images that don't pass stage 2 will be passed on to stage 3. This stage is set up to detect and classify viral causes of pneumonia. An instance of ResNet34 architecture will be applied for classification in this stage. Activation maps will be implemented in X-Rays that have been successfully classified by the model.

VII Requirements

The hardware and software requirements for this project have been listed as follows:

i. Software Requirements

- Operating system: Windows 8.x,10/ Ubuntu 20.xx
- Language: Python 3.x
- Libraries: Tensorflow, Keras, matplotlib, numpy, glob [21]
- Tools: PyCharm CE 2020.xx/ Spyder/ Google Colab

ii. Hardware Requirements

- GPU: Nvidia RTX 20/30 series or AMD Radeon RX 6800 XT
- CPU: Intel i9-10850K or AMD Ryzen 7

VIII CONCLUSION

As per the paper, the team has procured the data consisting of the chest x-ray images of patients afflicted with COVID-19 with various degrees of severity according to along with SARS, MERS and bacterial pneumonia. The team will begin with the coding part of the project.

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PARKING MANAGEMENT SYSTEM

Dhrumil Mistry, Jas Parmar, Shivam Gupta and Prof. Menka Singh

ABSTRACT

Most parking spaces, including cinemas, shopping malls, government parking, MLCP buildings, are manually managed. This makes managing multi-tenant, multi-level car parking chaotic - a headache for parking lot owners and providers. In Mumbai there is a committee placed to resolve some issues in the parking ecosystem, which is taking some initiatives like finding private spaces that can be turned into parking spots. This paper proposes a hardware parking management system manages the parking spots effectively using sensor and controller.

Keywords— Parking Management System, Microcontroller, Sensors, Parking Sol

I. INTRODUCTION

Large metropolitan cities like Mumbai are facing a major parking crisis after the increase in sales and production of private vehicles in the last two decades, Due to which there is a need of a parking space management system which contributes and reduces parking management system issues for various organizations and government sectors.

Handling the parking area manually is not a good idea in 21st century, as it uses labor force and paper work to handle parking areas, which could cost an organization to allot their resources to the area. An embedded system can be designed with the systems to handle such tasks such as assigning the parking spot, updating the empty locations in the parking area regularly, etc.

In this paper we have designed an embedded system consisting of infrared sensors and a microcontroller (STM32) which can be used to automate various tasks of the parking area.

II. RELATED WORK

There are various projects and papers available using [1] IOT, RFID, [2] Raspberry Pi, [3] Arduino along with cameras, and various other technologies to solve the parking problems which tremendously increases the expense of the system.

[1] The Smart Parking System project consists of usage of RFID, IOT, and networking concepts involved which makes the system expensive and requires high maintenance. The basic idea of this project was to provide mini map and calculate the empty locations in the parking area with parking position to the user, using Arduino board, RFID and IOT as their key components. [2] The main motive of A Novel Parking Management System, for Smart Cities is to save time, money, and fuel. It uses Raspberry Pi 3 to compute complex computations on images and provide result using camera and ultrasonic sensor. The car driver will be navigated to the parking spot using raspberry pi installed at the parking track of the automobile and sense its presence. Which makes the system not only expensive but also energy consumer. [3] Another paper uses Arduino as controller, various sensors for detection, and IOT for detection of name plate number and store its value in the cloud. The user will enter the parking area, the Arduino interfaced camera will capture the image of the car, and send it to the cloud, open toll and start the timer. Simultaneously, the number is stored in the database and tolls closes after 5 secs. And a vacant spot is allocated to the user.

The mentioned ideas are expensive for an organization to implement and for its maintenance. IOT solutions needs cloud which are shared among various users but they aren't cheap. If cloud usage has been eliminated then resources can be saved for an organization. Also, parking system can be monitored by a single administrator on the local network from their cabin.

III. DESIGN

A. Block Diagram



Fig 1. Block Diagram

1) Power Supplies: Display, Sensor and STM32 will have different power supplies which will be used to drive their operations.

2) STM32 Microcontroller: STM32 microcontroller is used to interface sensors, LCD display, store the empty states of the parking slots and fetch them when an automobile enters the parking area.

3) LCD display: LCD will be used to display messages and empty slot locations to the automobile driver. 4) InfraRed Sensors: InfraRed Sensors are used to sense an automobile presence at the entry of parking area and at the parking slot.

IV. PROTOTYPE CIRCUIT DIAGRAM

The prototype circuit uses STM32 microcontroller, IR sensors, Power supplies along with LCD display which werementioned in the block diagram along with their usage.



Fig 2. Prototype Circuit Diagram

A. Components and their Connection with STM TABLE I: Component list

Component	Units
STM32F401CCU6	1
LCD 16x2	1
IR sensors	2
Power Supplies	3
Jumper Wires	20+
Breadboard	1

TABLE II:	Connection	with	STM32	controller
-----------	------------	------	-------	------------

STM32	Connected To	Used for
Pin		
PA0-PA7	D0-D7 (LCD	Data transferred to the LCD
	Display)	
PA8	RS (LCD	To select Register
	Display)	
PA9	E (LCD	To read and write data from the RAM
	Display)	
PB0-PB2	OUT (IR sensor)	To sense the presence of an automobile at parking spot
PB15	OUT (Ckt	To sense and trigger the STM32 to start
	Triggering IR	performing its operations
	Sensor)	

B. Working



Fig 3. System Process when an automobile is entering

The Circuit consists of STM32 used to handle computations and interfaced with the IR sensors which provides state of the parking slot to the microcontroller. The system is powered on. The Microcontroller will undergo initialization process. STM will also read and update the current parking slot states in the parking area.

When an automobile is entering the parking area the ckt triggering IR sensor placed at the entrance of the parking area triggers the STM32 microcontroller. STM32 then updates the states of the parking slots in the parking area using IR sensors installed at the parking locations. STM32 after updating the parking location states searches for the empty locations in the parking area.

If there any parking location is found, the parking slot will be printed on the screen with the message on the LCD display. If there are no parking locations available, STM will print appropriate message mentioning that there are no parking slots available on the display. The microcontroller will repeat this process until the system is powered off.

C. Output



Fig 4. Slot 1 Available

Assume an automobile enters the parking area, then the state of IR sensor at the entrance will be changed, triggering the microcontroller to update the parking spots states in the memory and search for empty location, since only slot 1 is available, STM will assign slot 1 to the automobile.



Fig 5. Slot 2 Available

Now, slot 1 is occupied and another automobile enters the area, The system will assign this automobile slot 2.



Fig 6. Slot 3 Available

Both slots 1 and 2 are occupied, so the next entering automobile will be allocated with slot 3. While the next entering automobile driver will be informed with the message "No Parking Available!!".



Fig 7. No Slots Available

D. Prototype Implementation

1) Implementation Steps

• Connect the circuit on the breadboard

STEP 1: Connect LCD and IR sensors on the breadboard.

STEP 2: Interface the LCD display and IR sensors with the STM32.

STEP 3: Connect Power Supply to the STM32, IR and LCD display.

• Flashing the program on the chip [6]

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STEP 1: Connect the board to the computer with Keil uVision 5 installed

STEP 2: Open Project

STEP 3: Select Targets files

STEP 4: Go to FLASH -> Download

STEP 5: The chip will be flashed with the selected targets.

• Test the system

STEP 1: After assembling the system and flashing program on the STM32 microcontroller. Test the system with different test cases

STEP 2: Verifying test cases using below table for single slot prototype.

Sr. No.	Ckt Triggering IR sensor	Slot 1 IR Sensor	Output (Park at slot)
1	Uncovered	Х	Х
2	Covered	Uncovered	1
3	Covered	Covered	Not Available

TABLE III: Test Cases

Where X: Don't Care

Fig 8. Prototype with single slot

V. CONCLUSION

Parking Management Systems are required to save energy specifically fuel, labor and time of the organizations and individuals. The system can help to reduce fuel usage as it eliminates the time required for an individual to search the empty slot in the parking area, also the system is inexpensive compared to most of the other systems currently available.

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INDIAN AEROSPACE AND DEFENCE SECTOR AND ITS LINKAGES WITH ACADEMIA, IN PARTICULARLY ELECTRONICS AND TELECOMMUNICATION ENGINEERING: A DISCUSSION

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ABSTRACT

India's need for defence equipments and procurement of it is growing every year. The Indian government has set the defence production target at USD 25.00 billion by 2025 (including USD 5 billion from exports by 2025). In order to achieve this, India needs public and private partnership model in defence equipment manufacturing. In Aerospace and defence manufacturing, Electronics and Telecommunication plays a vital role. There is an opportunity of Rs. 3,30,000 Cr. of total electronics and telecommunication emerge by taking into consideration the requirements of Aerospace and defence sector in next 10 to 15 years. In order to achieve Atma-Nirbhar Bharat Mission, India needs to invest and build capabilities in Aerospace and defence manufacturing. It can be done by creating soft and hard infrastructure. The hard infrastructure is represented by existing defence public sector undertakings and some of the private sector companies. Under the Make in India Initiative, the government of India is encouraging the private investments in the defence sector and it has set up seven new companies in year 2021 to attain the future defence needs. The soft infrastructure for the sector would comprise of intellectual capacity building, R & D and innovation. This discussion paper highlights the need of academia and defence sector linkages and proposes suggestions to link existing curriculum of related branches of Electronics and Telecommunication Engineering vis-à-vis with Indian Defence Sector.

INTRODUCTION

According to the World Bank¹, India has been on a remarkable development journey since 1947. Currently Indian Economy has attained lower middle-income status from initially low-income nation. The current economic size of India is around 3 trillion United States Dollar (USD) and home to 1.3 billion people. Indian Per Capita GDP (Gross Domestic Product) is USD 6,121 with Human Development Index of 0.49.

India has 15,106 kilometers of land borders and a coastline of about 7,516 kilometers. Only 5 out of 29 Indian states have no international border or coastal line. Those long borders are shared with seven countries China, Pakistan, Bhutan, Myanmar, Afghanistan, Nepal and Bangladesh. Such extensive and porous borders run through different kinds of terrain, including mountains, hills, plains, valleys, forest, desert and swamp, and are sometimes difficult to monitor, especially at a time when territorial disputes and security troubles still plague parts of the Indian borderline.²

India's coastline measures 7,517 kilometers in length; of this distance, 5,423 kilometers belong to peninsular India and 2,094 kilometers to the Andaman, Nicobar, and Lakshadweep island chains.³

This complex situation is aggravated further as India's maritime boundaries are shared with seven countries Pakistan, Maldives, Sri Lanka, Indonesia, Thailand, Myanmar and Bangladesh.

Since Independence, India is constantly facing trouble at the Western and North Western Sector front and perennial border dispute with China on North East side as well as on the high altitude Ladakh sector.

Adam Smith justified the defence expenses as a first duty of a government (Dutta and Sharma 2005)⁴ and Indian Government is no exception.

Though there are some negative effects on the Defence Sector spending such as effecting the growth of other sectors of economy and less funds allocation for other social-economic goals, the need for defence sector funding increased manifold during last few decades due to turbulent world geo-political scenarios.

India with its uncanny neighbors has fought three Major Wars (China 1962, Pakistan 1965 & 1971) and one Minor war (Pakistan Kargil- 1999) apart from many incidences happening at the border areas. In order to protect its boundaries, India spent heavy amount on the defense expenditure. In the financial year 2021-22, the Indian government has allocated a budget of Rs. 4,78,196 Cr. of defence expenditure which is 13.73 per cent of the total central government expenditure and 2.15 percent of GDP for the year 2021-22.

The capital budget meant for acquiring new military systems and weapons stands at 25 per cent of the total capital expenditure. In order to maintain the peace, such cost must be borne by the Economy. According to the

SIPRI (Stockholm International Peace Research Institute), the five largest arms exporters during 2016–20 were the United States, Russia, France, Germany and China while the five largest arms importers were Saudi Arabia, India, Egypt, Australia and China.

The top five importers together received 36 per cent of all imports of major arms. In order to modernize its armed forces and reduce dependency over external dependence for defence procurement, several initiatives have been taken by the Indian government to encourage 'Make in India' activities via policy support initiatives. Indian companies were awarded defence contracts worth USD 37 billion during 2016-19, India plans to bring down its defence equipment import bill by at least USD 2 billion by 2022 so to encourage the local manufacturers. To attract foreign investment into defence manufacturing, the Indian government has announced a slew of measures including raising the cap on foreign investment from 49% to 74%. Indian Government formulated the 'Defence Production and Export Promotion Policy 2020' to provide impetus to self-reliance in defence manufacturing under the '*AatmaNirbhar Bharat*' scheme. To encourage more participation from startups and micro, small & medium enterprises (MSMEs) in Defence Research & Development (R&D) in achieving the '*AatmaNirbhar Bharat*' goal, the Defence Minister Mr. Rajnath Singh released a new version of 'Defence Research and Development Organisation (DRDO) Procurement Manual 2020' on October 20, 2020.

India's defence manufacturing sector recorded increased production to USD 10.9 billion in FY21, from USD 10.7 billion in FY20. The Indian government has set the defence production target at USD 25.00 billion by 2025 (including USD 5 billion from exports by 2025).

There are plans to establish new infrastructure including a defence park in Kerala to manufacture defence equipment for the armed forces. In July 2021, the Karnataka government announced the signing of Memoranda of Understanding (MOUs) with 23 companies from various sectors, including electric vehicles, data centres, aerospace, and defence in order to attract investments worth over Rs. 28,000 Cr. (USD 3.77 billion) and create nearly 15,000 direct jobs.

This discussion paper exploratory in nature is based upon the secondary data to highlight the contribution of Electronic Industry in Indian Defence Manufacturing and explores the possibility of future linkages of Academia with Aerospace and Defence Electronics Sector through *Make in India* mission so to achieve *AatmaNirbhar Bharat* goal in the Aerospace & Defence sector manufacturing.

1. OVERVIEW OF DEFENCE AND AEROSPACE SECTOR

The Indian Defence Industry sector, which was previously reserved for the public sector, was opened up to 100% for Indian private sector participation in May, 2001. As on date, 333 Private companies have been issued a total of 539 Industrial Licenses. Out of these, 110 companies have reported commencement of production.⁵

In order to give a lift to development of innovative defence technology and support a growing Startup base in the country, Ministry of Defence has earmarked Rs.1000 Cr. during 2021 - 22 for the procurement from the Innovation in Defence Excellence - *iDEX* Startups. These efforts aim to benefit 300 new Startups for innovative design and development in defence sector. Aiming for self-reliance in defence production, the seven new government-owned defence companies carved out of the Ordnance Factory Board (OFB) have already been given orders worth Rs. 65,000 Cr. The seven new Defence companies are: Munitions India Limited (MIL), Armoured Vehicles Nigam Limited (AVANI), Advanced Weapons and Equipment India Limited (AWE India), Troop Comforts Limited (TCL) (Troop Comfort Items), Yantra India Limited (YIL), India Optel Limited (IOL) and Gliders India Limited (GIL). These companies will be involved in production of defence equipment and material including ammunition, gun systems, and armored vehicles.⁶India is the 7th largest Aerospace and Defence (A&D) market globally. The Total Defence Electronics market in India is USD 74 Billion in over next 10-14 years. The indigenous manufacturing base, historically built around DPSUs (Defence Public Sector Undertakings) and Ordnance Factories is only now evolving with private sector players focusing on setting up meaningfully sized and competent facilities.⁷ As the Aerospace and Defence industry evolves, the key impact is in terms of greater capability in platforms – a significant portion of this comes from electronics. Hence electronics in Indian Aerospace and Defence industrial plan is the critical center-piece that needs addressal. The challenge is compounded by the historically limited industrial base addressing electronics. In the world's top 100 defence equipment manufacturers, only two Indian companies namely Hindustan Aeronautics Limited and Bharat Electronics Limited make it to that list as against seven Chinese and fifty American companies.⁸

According to SIPRI, American defense firms are the indisputable leaders of the world's USD 398 billion arms sales industry in 2017. The ever rising geo-political tensions will increase this number further. India can not only become self-reliant but can be net exporter of Aerospace and defence equipment's in coming years looking at its capacity in this field.

Sr. Nos.	Country	Number of Companies from the Defence Manufacturing in TOP 100
1	USA	50
2	China	7
3	UK	7
4	France	5
5	Japan	3
6	Israel	3
7	Germany	2
8	Russia	2
9	India	2
10	Others	19
	Total	100

Table 1: Countries and Number of Companies from it in TOP 100 Defence Equipment Manufacturing

Source : http://people.defensenews.com/top-100/

As indicated earlier India's defence equipment spending as well aerospace spending is going up. This fact also highlights that the Hindustan Aeronautics Limited earn around 3.24 Billion USD as Revenue and 93% of it is from defence equipment's. The Bharat Electronics earn revenue of 1.91 Billion USD and 75 % of it from the sale of defence equipment's.

This potentially big market must be supported by the soft and hard infrastructure. Currently India is expanding the hard infrastructure as it has added seven new defence companies from the public sector to the existing nine Public Sector Undertakings (PSUs)

Sr.	Existing Defence Companies PSU's with year of	Newly Set-Up PSUs (2021)
Nos.	incorporation	
1	HINDUSTAN AERONAUTICS LIMITED (1950)	Munitions India Limited
2	BHARAT ELECTRONICS LIMITED (1954)	Armoured Vehicles Nigam Limited
3	BHARAT DYNAMICS LIMITED (1970)	Advanced Weapons and Equipment
		India Limited
4	BEML LIMITED (1964)	Troop Comforts Limited
5	MISHRA DHATU NIGAM LIMITED (1973)	Yantra India Limited
6	MAZAGON DOCK SHIPBUILDERS LIMITED (1934)	India Optel Limited
7	GARDEN REACH SHIPBULDERS AND ENGINEERS	Gliders India Limited
	LIMITED (1884)	
8	GOA SHIPYARD LIMITED (1957)	
9	HINDUSTAN SHIPYARD LIMITED (1941)	

Table 2 : Indian PSUs in the Defence Equipment Manufacturing

2. ROLE OF ELECTRONICS AND TELECOMMUNICATION IN DEFENCE SECTOR

Electronics and Electronic systems are integral part of the defence equipments. Electronics and Telecommunication provides the capabilities that are critical to the defence requirements in terms of precision, the effectiveness and lethality of the weapons system. The Scope for electronics in Indian Context originates across both standalone systems and sub- system levels for another system. The Defence Electronics, Platform Electronics and Data links are the most sought after sub –system levels. Electronics has always been an important element of the defence sector, enabling communications, intelligence gathering and navigation. Object detection system uses radio waves to determine range, angle or velocity of objects such as aircrafts, ships, missiles, and spacecraft. Radar is used for target detection, target location and finding friend or FOE. Jamming, Spoofing can be done electronically to mislead the enemy in target detection. SONAR is used for sound navigation and ranging. Electronic Attack (EA) is the strategic use of electromagnetic or directed energy weapons to attack enemy forces' electronic infrastructure with the intention of degrading or eliminating their combat capabilities.

Looking at the next 10-15 years horizon, an opportunity of Rs. 3,30,000 Cr. of total electronics emerge by taking into the consideration the requirements of three defence services.⁹

Sr.	Name of The Company	Net Sales	Net Profit in
Nos.		In Rs. Cr	Rs. Cr
1	Hindustan Aeronautics Ltd.	22,742	3,234
2	Bharat Electronics Ltd.	14,108	2069
3	Mazagon Dock Shipbuilders Ltd.	4,049	479
4	BEML Ltd.	3,556	68
5	Cochin Shipyard Ltd.	2,818	608
6	Bharat Dynamics Ltd.	1,913	257
7	Garden Reach Shipbuilders & Engineers Ltd.	1,140	153
8	Mishra Dhatu Nigam Ltd.	813	166
9	MTAR Technologies Ltd.	246	46
10	Paras Defence and Space Technologies Ltd.	132	15
11	TAAL Enterprises Ltd.	104	31
12	Zen Technologies Ltd.	54	02
13	Taneja Aerospace and Aviation Ltd.	34	6

Table 3: Selected Indian Listed Companies (Private and Public) in the Defence Equipment Manufacturing

Source : www.moneycontrol.com

Table 4 : The World's Leading Space Research Organizations

Sr. Nos.	Name of the Space Research	Country	Annual Budget in USD
	Organizations		millions (2018)
1	National Aeronautics and Space	U.S.A.	19,500
	Administration (NASA)		
2	China National Space	China	11,000
	Administration		
3	European Space Agency (ESA)	EU	6,300
4	Roscosmos State Corporation for	Russia	3,300
	Space Activities (Roscosmos)		
5	Japan Aerospace Exploration	Japan	2,000
	Agency (JAXA)		
6	Indian Space Research Organisation	India	1,500
	(ISRO)		

Source : https://www.statista.com/statistics/947300/leading-space-agencies-by- government-budgetworldwide/

Indian Space and Research Programme is led by ISRO with many successful missions under its name. Current budget of ISRO is USD 1,900 million as of 2021. Antrix Corporation Limited was incorporated as a private limited company owned by Government of India in September 1992 as a Marketing arm of ISRO for promotion and commercial exploitation of space products, technical consultancy services and transfer of technologies developed by ISRO. Another major objective is to facilitate development of space related industrial capabilities in India.¹⁰

It offers expertise under

- SATCOM Services
- Ground System Services
- Spacecraft Testing Facility
- Spacecraft and Subsystems
- Mission Support System, and
- Remote Sensing Data and Services.¹¹

ISRO has Recognized the need for a broader academic interface with institutions across the country with a series of capacity building initiatives taken up to further strengthen the involvement of academia for ISRO

programs. Such initiatives could be termed as soft infrastructure so to accelerate the growth and reach of Aerospace-Defence electronics sector.

The Electronics also plays a key role in the Artificial Intelligence *AI*. The smart and adequate use of AI in armed forces would enhance the capabilities and effectiveness of all forces.

UAVs, drones and loiter munitions technology can be used for surveillance and reconnaissance. The small drones can be used in tactical operations by forces. It would help to provide real-time intelligence for tactical decision making by commanders.¹² Robotics, autonomous systems, AI have military utility. However, it's commercial and industrial utility goes into hundreds of billions. Development of the defence industry in this sector will also spur the modern commercial industry underpinned by these technologies.¹³

3. PROPOSED ACADEMIA – AEROSPACE, DEFENCE SECTOR LINKAGES

The soft infrastructure essential for the development of this sector in Indian context would be in terms of capacity building, R & D and innovation. This could be further developed with leveraging India's young technical talent pool. India has the largest number of engineers as well as the largest number of engineering education institutes and infrastructure in the world. As of 2021, India annually produces one million engineering graduates from 3500 engineering colleges.

Of the million engineering graduates produced every year, less than 5% of the engineers are produced by the pan-India national level autonomous institutes created by the acts of parliament, such as the Indian Institutes of Technology (IITs), National Institutes of Technology (NITs) and Indian Institutes of Information Technology (IIITs). The remaining over 90% of the engineering graduates are produced by the private and non-autonomous state level engineering education institutes. According to the Statista Research Department, in year 2019 around 6,31,370 students enrolled through-out India in the field of Electronics Engineering.¹⁴

This is the third largest discipline enrollment next to Computer Science and Mechanical Engineering

Such high number of enrollment and existing Engineering institutions makes India a cradle of talent pool which could be inter-linked with the growing Defence Electronics Industry. One of the problems faced by India's budding Engineers is that they are not employable.¹⁵

Only three per cent of engineer graduates in India get high-quality tech jobs with salary packages of Rs. 8,00,000 to 10,00,000 and over 80 per cent of these graduates end up pursuing non-technical careers due to lack of available employment opportunities.¹⁶

This problem needs immediate attention through strategic intervention. Such intervention could be possible by linking the Aerospace and Defence Electronics Industry with the existing curriculum of Electronics Engineering discipline. The experiential learning by the way of summer and live projects along with innovation labs in these Defence Electronics Fields will develop the fertile minds of young engineers which will make them not only employable but also remunerate enough to accept more challenges in the field. This would suffice the growing need of defence electronics manufacturing with multi facet benefits such as

- Channeling the innovative minds in the Defence Electronics sector
- Partially Solving the problem of Employability
- Building R & D Capabilities
- Bolstering the Industry Academia linkages
- Self Sufficiency in Defence Equipment Manufacturing, a step closer to AatmaNirbhar Bharat

4. CONCLUSIONS

The concept Paper illustrated the importance of Aerospace Defence Electronic sector in Indian Context. There would be many opportunities available for Indian Industry to participate in this over expanding segment. The Academia represented in terms Electronics & Telecommunication Engineering would be a vital cog in the wheel to support the hard infrastructure for this Industry. The interaction between the Academia and Aerospace Defence Electronics sector proves to be mutually beneficial with far reaching effects. In this light, this paper proposes to re-calibrate the syllabus of related branches of Electronics and Telecommunication Engineering to incorporate the modern Technology and Tools which could be useful for the sustainability of Aerospace Defence Electronics sector in Indian Context.

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REVIEW ON WOMEN'S SECURITY SYSTEM

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ABSTRACT

The world is becoming unsafe for women in all aspects. The crimes against women are increasing at a higher rate. The employed women are feeling unsafe due to increasing crimes. This project proposes a quick responding mechanism that helps women during trouble. When someone is going to harass, she can press the button that is attached to the device and the location information is sent as an SMS alert to few pre defined emergency numbers in terms of latitude and longitude. The ESP32 used. It is interfaced with a push button, a GPS module, a GSM modem and a buzzer circuit. If the switch is pressed, it activates the buzzer circuit to capture the attention of the people nearby for help. Thus the girl can be safe and she can feel protected.

Keywords: Sensor, SMS alert, GPS, GSM.

I. INTRODUCTION

In the modern world, most of the women are in working in order to stand by their own. Unfortunately, due to security issues not only women even the girl children in the world are facing lot of problem in their day to day life. However, the safety and security of women and children in the country is the most priority for the Government and its a responsibility of each and every individual to provide a safer environment to the women. In the recent days, the educated women are supposed to work in a different environment and surrounding and also way from their native. So, being safer is becoming a vital problem for the working women. Now a day's women are committing with men in each and every domain to show their ability. As we all know that the mental ability of the women is comparatively very when compared to the men still, most of the women are having fear of going out due to the women harassment and it is going in increasing manner. The Government is also taking necessary action like Kavalan mobile application to reduce these cases but it is the responsibility of every citizen to ensure the safer environment to the women and every woman should have an awareness regarding these issues to save themselves during those situations.

In these days the technology developing sharply in day by day and many people are providing a solution to this problem in their own using the developed technology.

In this paper, the survey on those solutions are discussed in order to provide a better solution to eradicate this issue in our nation. It is time to provide a save world to the women. The women should carry a device with them while going out for work to track them when they are outside. The devices which already designed are like an accessory to carry with them. The provided solution is discussed to give a more effective and better solution for this issue.

II. NEED OF PROJECT

Now a days, women and children are facing various issues like sexual assaults. Such violence will definitely have huge impact on the lives of victim. It also affects their health and their psychological balance. These kinds of violence keep on increasing day by day. Even school children are kidnapped and sexually abused. We are living in a society where a nine months old girl child doesn't have security, the child was kidnapped, raped and then murdered. On witnessing those violations against women, its impulses us to do something for women and children safety. So, in this project we have planned to propose a device which will act as a tool to provide security and ensures the safety of the women and the children. ESP8266 Microcontroller, GSM and GPS module are used to send notifications and current location of women to various mobile numbers in their contact.

In addition, this project will also act as a safety measure which will stun the opposition for few seconds. This project will help us to rescue many women and children from those fiendish in the socie

III. WORKING PRINCIPLE

The main purpose of the work is to provide safety and security to the women in danger situation. The button is pressed by a women when she feels insecure. Once the button is ON, the ESP32 microcontroller gets the commands and the GPS will calculate the current latitude and longitude values of the victim. The calculated values are shown on LCD. GSM module will send SMS which contains latitude and longitude values to the numbers already stored in the ESP32 microcontroller. GSM will send SMS to the registered mobile numbers.

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IOT module will track the current location of the victim and it will update the location. The microcontroller will switch ON the buzzer in the device, so that nearby people may come to know that someone is in danger and they will come to rescue

IV. LITERATURE SURVEY

The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013 is a legislative act in India that seeks to protect women from sexual harassment at their place of work. Today women are playing an important role as a president, prime minister, speaker of the Lok Sabha and even in the field of aeronautics, military, IPS, IAS, etc. Even today women have achieved top positions in job and society, yet they are facing problems such as physical harassment and the sexual assault. The cases of harassment and rapes on women are increasing hence security issue for such woman is more important. So, it is essential to develop a system to provide security to women. In this he devised a system allows women to protect themselves from attackers. In recent days the attacks on women are increasing and sometimes they are not even able to take their mobile and dial-up to police, this system will help women in such situations to inform about attacks and also in giving their exact location to a nearby police station for necessary action. In this, the author designed a device, in that, by pressing the button of the device a message along with her location will be transmitted by the system to the police station and her few relatives, so that they will get aware of her current situation. He told that with that message she is also for their defensive purpose they can able to give a shock to the attacker it will be more helpful to women at that critical situation, this system is designed as the defense equipment, it will them to attack the attacker. So, she has some time to rescue herself from that attacker [1].

In this paper, the author proposed a device consists of LPC controller, GPS, ARM controller, GSM and shock circuit. Women under a dangerous situation can press the emergency button. So that, the location along with the helping message can be transferred to the emergency number. In addition, shock circuit is activated and the generated current shock can be imposed to the attacker. In this the Shock circuit can be operated by driving and isolator circuit. By these, any women can protect them from situations that can harm them.

The amount of violence against women has increased by many folds due to the greater exposure of women in every field of life. Women were previously restricted to the four walls of the houses and after globalization, they have got the chances and opportunities to stand equally in all sectors at compare with male. Women are now a day's cab drivers and they are also the CEO of top companies. It is a good sign that the patriarchal mindset of the society has changed to some extent but not to the extent it was supposed to. It is the same mindset that restricts women to go out and work making them as a tool for domestication. It is the same mindset that treats males as superior than female and always try to dominate the womenfolk. There are different kinds of tools that are being used by the male-dominated society to prove their domination over the female. Eve teasing, sexual harassment, rape, domestic violence against women are these weapons used by the male to display the male superiority. This is one of the prime reason violence is increasing in India and women safety is a concern in India. In this paper, the author supposed to tell a remedy to safeguard women from these situations by designing a gadget like a typical belt. This design consisting of GPS, GSM, Zapper, Buzzer circuit. When women feel unsecured, they can use the gadget which is having an emergency button. Controller in that activates the GPS, GSM in order to identify the location and to transfer the misery message to the trusted people and to the control room during the time of the attack with their exact location. Zapper circuit produce shock which has high voltage to give a nondeadly stun to the aggressor. Buzzer also gets activated which produces boisterous yelling sound to get nearby individuals for help. Hence, they are Escaped from the danger.

Safety of Women in India has become a major issue in India now. The crime rates against women in the country have only risen to a great extent. Women think twice before stepping out of their homes, especially at night. This is, unfortunately, the sad reality of our country that lives in constant fear. Women in India have been given equal rights as men; however, people do not follow this rule. They contribute to the growth and development of our country; still, they are living in fear. Women are now on respected positions in the country, but if we take a look behind the curtains, we see even then they are being exploited. Each day we read about horrific crimes being committed against women in our country. In our daily life, where you don't hear the news of a crime against women in India. In fact, there are at least five news articles that tell us about the horrific details of the various crimes. It is extremely painful to watch the status of women's safety in India, especially in a country where women are given the stature of goddesses. To avoid situations like this, in this the author designed a device with a sensor called Iota to protect women from danger In this paper, the author proposed an IOT (Internet of thing) based women safety device which connects devices to the internet using sensors and a suitable platform. This IOT sensor is placed on the health monitoring equipment's to monitor the patient's health condition. This

monitors the status of the patient and sent to the doctor if they are in need of treatment. By this way, it is useful

for the doctors and it avoids the risk in the patient's life [3].

Violence against women and girls does not discriminate by race, religion, culture, class or country. Worldwide, one in three women have experienced either physical and/or sexual violence, and more than 15 million girls aged 15-19 years have experienced rape. Conflict and displacement only heighten the problem. As girls and women lose their support systems and homes, are placed in insecure environments and in new roles, their risk of gender-based violence (GBV), including sexual violence, intimate partner violence and child abuse increases day by day. Areas like streets, public spaces, public transport, etc. have been the territory of women hunters. Every day and every minute some women of all walks of life (a mother, a sister, a wife, young girls, and girl baby children) are getting harassed, molested, assaulted, and violated at various places all over the country. In this paper, the author proposed a system consist of android application, main device, and portable camera. Android application uses Phone GPS or GPS of the main device to locate the victim in the critical situation they were pressing the emergency button. The camera will be added through the photo will be captured and it will be sent to the server with ensure the data security, Main device is also attached with manually operating in pepper spray[4]

Voitao

GSM

GPS

SWITCH

As shown in the fig we are using Esp32, it is interfaced with LCD Display, GSM Module, GPS, Buzzer and a switch. Bridge rectifier circuit is a common part of the electronic power supplies. Many electronic circuits require rectified DC power supply for powering the various electronic basic components from available AC mains supply. We can find this rectifier in a wide variety of electronic AC power devices like home appliances, motor controllers, modulation process, welding applications, etc. The main purpose of the work is to provide safety and security to the women in danger situation. The button is pressed by a women when she feels insecure. Once the button is ON, the ESP32 microcontroller gets the commands and the GPS will calculate the current latitude and longitude values of the victim. The calculated values are shown on LCD. GSM module will send SMS which contains latitude and longitude values to the numbers already stored in the ESP32 microcontroller. GSM will send SMS to the registered mobile numbers. 10T module will track the current location of the victim and it will update the location. The microcontroller will switch ON the buzzer in the device, so that nearby people may come to know that someone is in danger and they will come to rescue.

ESP32

BUZZER

VI CIRCUIT DIAGRAM



The workflow of the women safety and security is explained in this section. The flow chart of the proposed system is

V BLOCK DIAGRAM

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Step 1: Start.

Step 2: Switch ON the 12 Volt power supply. Step 3: Emergency button is pressed.

Step 4: If GPS receives signal, GPS will start calculating the current latitude and longitude values of the victim and send it as SMS to the registered mobile number using GSM module. Step 5: If any problem occurs and switch is pressed, get the last location from GPS and send to GSM module.

Step 6: 10T module tracks the last location of the victim and that location is updated in the to MCU.

VII CONCLUSION

The proposed design will deal with critical issues faced by women in the near past and will help to solve them with technically sound equipment's and ideas. This system can overcome the fear that scares every woman in the country about her safety and security.

When women feels like a danger she just has to press button. Her location will automatically send to her closest persons via GSM. To identify her location GPS is used here with ESP32.

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ANALYSIS OF BPSK DIGITAL MODULATION IN AWGN CHANNEL W.R.T BER AND SNR USING PYTHON

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ABSTRACT

This paper will explain the analysis of BPSK modulation based on the BER performance of the BPSK Modulation in Additive white Gaussian noise channel using python. In Binary PSK, the bits '1s' and '0s' are represented as '+1' and '-1' respectively. The received signal is given by R=TX+n where TX is the transmitted signal and n is the noise with mean '0' and variance '0.5*SNR and plot the graph SNR (dB) versus BER for both theoretical and simulated values of BER.

Keywords—BPSK, SNR, BER, AWGN

I. INTRODUCTION

A wireless LAN (WLAN) is a network that connects two or more devices using wireless communication to form a local area network (LAN) giving users the ability to move around within a limited area such as a home, school, laboratory, campus, or office. Wireless LANs based on the IEEE 802.11 standards are the most widely used computer networks commonly called Wi-Fi. The 802.11 wireless standards are basically an extension of the Ethernet protocol, which is why it interoperates well with wired Ethernet networks. It uses the frequencies of 2.4GHz for 802.11b and 802.11g and 5GHz for 802.11a to broadcast data signals.

The key contribution of the 802.11b addition to the wireless LAN standard was to standardize the physical layer support of two new speeds, 5.5 Mbps and 11 Mbps. To accomplish this, DSSS had to be selected as the sole physical layer technique for the standard since frequency hopping cannot support the higher speeds. The 802.11b systems will interoperate with 1 Mbps and 2 Mbps 802.11 DSSS systems, but will not work with 1 Mbps and 2 Mbps 802.11 FHSS systems.

An RF signal can be modulated by manipulating the frequency, phase, or amplitude. Amplitude modulation is not sufficient alone for wireless LAN technologies since the amplitude is often affected by interference. Frequency modulation is also used, though it is less common today. Hence newer wireless LAN technologies use different kinds of phase modulation to achieve communications. In addition, amplitude modulation may be combined with phase modulation to increase potential data rates, such as in Quadrature Amplitude Modulation (QAM). Wireless LANs use digital modulation to transmit digital signals.

Code Division Multiple Access (CDMA) is well known air interface technologies in modern mobile communication .The CDMA technology has increased the standards for wireless communication systems in terms of high data speed, mobility both for short range and long range communication. By Choosing a reliable modulation scheme and better filtration Technique the enhancement of the performance can be obtained in the transmitter and receiver of the CDMA system. To analyze and compare the performance of these systems simulation may be used by using additive white Gaussian noise channel (AWGN).

With the increasing use and applications of smartphones in recent times, it is required that cellular networks render high data rates, fast delivery of excessively high throughputs demanded by the Internet users of such devices giving access to streaming services anywhere 24 by 7. Till today modulation is only defined as the process of sending the message with the help of the carrier, but now the efficiency, data-rate of communication depend upon the choice of modulation scheme. So it is essential to know the advantages and disadvantages, performance of different modulation schemes in wireless communication systems so that one can adopt the efficient one to improve the communication system.

CDMA technique is based on the spread spectrum communication. The CDMA with existing modulation techniques has the disadvantage that the presence of a strong interferer can raise the noise significantly for other channels which can cause communication to halt under serious conditions and also it needs a huge amount of power which results in implementation of extra hardware to adjust the power requirement. For a spread spectrum signal the transmission bandwidth is much wider than the bandwidth of the original signal. CDMA is a channel access method used by various radio communication technologies where several transmitters can send information simultaneously over a single communication channel. This allows several users to share a band of frequencies. CDMA or DSSS is a spread spectrum multiple access technique. A spread spectrum technique spreads the bandwidth of the data uniformly for the same transmitted power.

DSSS WLAN systems employ binary phase-shift keying (BPSK) and quadrature phase-shift keying (QPSK) modulation techniques. Although these modulation schemes are sufficient in 1 and 2 Mb/s systems, they do not meet the demands of higher data rate transmission schemes.

The BPSK modulation is a very basic technique used in various wireless standards such as CDMA, WiMAX (16d, 16e), WLAN 11a, 11b, 11g, 11n, Satellite, DVB, Cable modem etc. It is considered to be more robust among all the modulation types due to the difference of 180 degree between two constellation points. Hence it can withstand severe amounts of channel conditions or channel fading. It is used in

OFDM and OFDMA to modulate the pilot subcarriers used for channel estimation and equalization. As we know different channels are used for specific data transmission in cellular systems. The channels used to transmit system related information which are very essential are modulated using BPSK modulation.

II. BPSK MODULATOR AND DEMODULATOR

BPSK can be considered as a form of **amplitude shift keying** where each non-return to zero (NRZ) data bit of value 0 is mapped into a

-1, and each NRZ 1 is mapped into a + 1. The resulting signal is then passed through a filter to limit its bandwidth and then multiplied by the carrier signal $\cos \omega t$

i) BPSK Modulator

The block diagram figure no.1 of Binary Phase Shift Keying consists of the balance modulator which has the carrier sine wave as one input and the binary sequence as the other input. Following is the diagrammatic representation.



Figure no-1 BPSK Modulator

The modulation of BPSK is done using a balance modulator, which multiplies the two signals applied at the input. For a zero binary input, the phase will be 0° and for a high input, the phase reversal is of 180°.

Following is the diagrammatic representation of BPSK Modulated output wave along with its given input.



BPSK Modulated output wave

Figure-2: BPSK output waveform

The output sine wave of the modulator will be the direct input carrier or the inverted 180° phase shift 180° phase shifted input carrier, which is a function of the data signal.

BPSK Demodulator

The block diagram of the BPSK demodulator consists of a mixer with a local oscillator circuit, a bandpass filter, and a two-input detector circuit. The diagram is as follows.

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Carrier riock Stage 1

III. BPSK EQUATIONS

Bit Error Rate (BER) for BPSK modulation

The theoretical equation for bit error rate (BER) with Binary Phase Shift Keying (BPSK) modulation scheme in Additive White Gaussian Noise (AWGN) channel can be derived as follows. With Binary Phase Shift Keying (BPSK), the binary digits 1 and 0 may be represented by the analog levels and respectively. The system model is as shown in the figure below.



Channel Model

The transmitted waveform gets corrupted by noise, typically referred to as Additive White Gaussian Noise (AWGN).

Additive: As the noise gets 'added' (and not multiplied) to the received signal

White: The spectrum of the noise is flat for all frequencies.

Gaussian: The values of the noise follows the Gaussian probability distribution function,

$$p(x) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{\frac{-(x-\mu)^2}{2\sigma^2}}$$
(1)
With and $\sigma^2 = \frac{N_0}{2}$ Computing the probability of error

 $\mu = 0$

Using the derivation provided in Section 5.2.1 of [COMM-PROAKIS] as reference: The received signal,

 $y = s_1 + n_{\text{When bit 1 is transmitted and }} y = s_0 + n_{\text{When bit 0 is transmitted.}}$ The conditional probability distribution function (PDF) of for the two cases are:

$$p(y|s_0) = \frac{1}{\sqrt{\pi N_0}} e^{\frac{-(y + \sqrt{B_b})^2}{N_0}}$$
(2)

$$p(y|s_1) = \frac{1}{\sqrt{\pi N_0}} e^{\frac{-(y - \sqrt{B_b})^2}{N_0}}$$
(3)



BPSK Demodulator





With this threshold, the probability of error given ${}^{S}1$ is transmitted is (the area in blue region) Probability of error given ${}^{S}0$ was transmitted

Similarly the probability of error given ${}^{S}0$ is transmitted is (the area in the green region).

.Total probability of bit error

$$P_b = p(s_1)p(e|s_1) + p(s_0)p(e|s_0)$$
(5)

Figure-5: Conditional probability density function with BPSK modulation

Assuming that
$$s_1$$
 and s_0 are equally probable i.e., $p(s_1) = p(s_0) = 1/2$ (4)
The threshold 0 forms the optimal decision boundary

The threshold 0 forms the optimal decision boundary.

If the received signal \mathcal{Y} is greater than 0, then the receiver assumes $^{S}1$ was transmitted. If the received signal \mathcal{Y} is less than or equal to 0, then the receiver assumes $^{S}0$ was transmitted. i.e.

$$y > 0 \Rightarrow s_1$$

 $y \leq 0 \Rightarrow s_0$

Probability of error given ^S1 wastransmitted

Given that we assumed that s_1 and s_0 are equally probable i.e., $p(s_1) = p(s_0) = 1/2$

the bit error probability is, $P_b = \frac{1}{2} erfc \left(\sqrt{\frac{E_b}{N_0}} \right)$

IV. ALGORITHM USED FOR BPSK ANALYSIS IN AWGN USING PYTHON:

1. Generate N random BPSK modulated bits

+1's and -1's.

2. Transmit the signal through an Additive White Gaussian Noise channel. (i.e) y=x+n.

(6)

- 3. Estimate the received signal
- i. If $(y \ge 0)$, then it is 1;
- ii. If (y < 0), then it is -1;
- 4. Count the number of errors.
- 5. Repeat the steps for different SNR (dB) and Monte Carlo runs.
- 6. Plot the graph SNR (dB) versus BER for both theoretical and simulated values of BER.

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V. RESULTS

Analysis of BPSK modulation simulated results will provide the tradeoff between BER and SNR as using python. The graphical representation shows that as SNR is increased probability of error decreases so the relation between SNR and BER is inversely proportional.

VI. CONCLUSION

Table no-1 showing the simulation values of SNR, no of errors and error probability for N=10000 As the SNR value goes on increasing probability error will decreased dramatically

SNR in dB	No of errors	Error probability
0	7900	0.079
1	5496	0.05496
2	3763	0.03763
3	2332	0.02332
4	1303	0.01303
5	614	0.00614
6	235	0.00235
7	85	0.00085
8	24	0.00024
9	1	1e-05

TABLE I. Results showing relationship between SNR and probability of errors.

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REVIEW ON EMERGING TRENDS ON CYBER SECURITY AND ITS CHALLENGES

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ABSTRACT

At present, most of the economic, commercial, cultural, social, and governmental activities and interactions of countries, at all levels, including individuals, non-governmental organizations, and government and governmental institutions, are carried out in cyberspace. Recently, many private companies and government organizations around the world are grappling with the issue of cyberattacks and the danger of wireless communication technologies. Cybersecurity plays a significant role in IT. Today's world is highly dependent on electronic technology, and protecting this data from cyberattacks is a challenging issue Whenever we think about the cyber security the first thing that comes to our mind is 'cyber crimes' which are increasing immensely day by day. Different governments and companies are taking many measures to prevent cybercrime. Apart from various cybersecurity measures is always a very important concern for many. This paper mainly focuses on challenges faced by cyber security on the latest technologies. It also focuses on the latest about the cyber security techniques, ethics and the trends changing the face of cyber security

Keywords: cyber security, cybercrime, cyber ethics, social media, cloud computing, android apps

I. INTRODUCTION

The process of digitization in all aspects of human life, like healthcare, education, business, etc., has progressively resulted in the retention of all kinds of information, including sensitive data. Security, is the process of protecting the digitized information from theft or from physical damage while maintaining the confidentiality and availability of information, but as technology is growing rapidly, the cybercrime rate also increases both in number and complexity. The reason behind this tremendous growth in cybercrime is the usage of inadequate software, expired security tools, design flaws, programming errors, easily available online hacking tools, lack of awareness in public, high rates of financial returns, etc. In order to investigate the vulnerabilities of the target and therefore attack the victim, more powerful attack tools are developed by the technical attackers. With this, new attacks in different variations are coming that are hard to spot. Increase in internet dependency in all walks of life, the digital nature of data in huge amounts getting accumulated through online transactions and decentralization of data repositories, has led to the development of effective security algorithms. The changing nature of cybercrime also causes difficulties in managing and avoiding emerging threats. The task of securing cyberspace is the most difficult and the most difficult, since advanced threats play a very active role. Therefore, there is a need to obtain information on the concepts of security, defense mechanisms, different techniques and trends in the field of information on the concepts of security.

II. CYBER CRIME

Cyber-criminality is a crime involving a computer and a network. The computer could have been used in a crime, or it could be the target. Cybercrime can affect a person's safety and financial health. The growing list of cybercrimes includes crimes that have been made possible by computers, such as network intrusions and the dissemination of computer viruses, as well as computer-based variety of existing crimes, such as identity theft, stalking, bullying and terrorism which have become as a major problem with people and nations. Usually in common man's language cybercrime may be defined as crime committed using a computer and the internet to steal a person's identity or sell contraband or stalk victims or disrupt operations with malevolent programs. As day-to-day technology plays an important role in an individual's life, cybercrime will also increase with technological advances.

III. CYBER SECURITY

Computer security, cybersecurity, or information technology security is the protection of computer systems and networks from information disclosure, theft of or damage to their hardware, software, or electronic data, as well as from the disruption or misdirection of the services they provide. Cybersecurity involves the application of technologies, processes and controls to protect systems, networks, programs, devices and data from cyber-attacks. It is designed to reduce the risk of cyberattacks and protect against unauthorized exploitation of systems, networks and technologies.

Confidentiality and data security will continue to be the primary security measures that every organization takes care of. Today, we live in a world where all information is stored in a digital or cybernetic format. Social networking sites offer an area where users feel safe when interacting with friends and family. For domestic Volume 8, Issue 4 (IX) October - December 2021

users, cybercriminals are reportedly still targeting social media sites to steal personal data. Not only social networks, but also during banking transactions, an individual has to take all the security measures required.



The above comparison of cyber security incidents reported in India between January 2013 and June 2013 and 2020 clearly highlights cybersecurity threats. The threats countered by cybersecurity are threefold:

1. Cybercrime refers to players or groups that target systems for profit or to cause disruption.

2. Cyberattacks often involve collecting information motivated by political considerations.

3. The goal of cyberterrorism is to undermine electronic systems to spread panic and fear.

So how are the malicious actors getting control over the computer systems? Common methods for cybersecurity threats include:

IV. CYBER SECURITY TECHNIQUES

Malware

Malware means malicious software. Often released with an unsolicited attachment or a seemingly legitimate download, malware can be used by cyber criminals to make money or in politically motivated cyberattacks. Often released with an unsolicited attachment or an apparently legitimate download, malware can be used by cybercriminals to make money or in politically motivated by cybercriminals to make money or in politically motivated by cybercriminals to make money or in politically motivated by cybercriminals to make money or in politically motivated by cybercriminals to make money or in politically motivated by cybercriminals to make money or in politically motivated by cybercriminals to make money or in politically motivated by cybercriminals to make money or in politically motivated by cybercriminals to make money or in politically motivated by cybercriminals to make money or in politically motivated by cybercriminals to make money or in politically motivated by cybercriminals to make money or in politically motivated by cybercriminals to make money or in politically motivated by cybercriminals to make money or in politically motivated cyberattacks.

There are a number of different types of malwares, including:

Virus: An auto-replicating program that attaches itself to the clean file and propagates through a computer system, infecting files with malicious code.

Trojans: A type of malware that is disguised as legitimate software. Cybercriminals entice users to download Trojan horses onto their computers where they cause damage or collect data.

Spyware: A program that secretly stores what a user is doing, so that cyber criminals can use that information. For example, spyware could capture credit card details.

Ransomware: Malware that blocks, files and data from a user, with the threat of erasure unless a ransom is paid.

Adware: Advertising software which can be used to spread malware.

Adware: Advertisement software that can be used to propagate malicious software.

SQL injection

An SQL (structured language query) injection is a type of cyber-attack used to take over and steal data from a database. Cyber criminals leverage data-based application vulnerabilities to insert malicious code into a database via a malicious SQL statement. That gives them access to sensitive information from the database.

Phishing

Phishing is when cybercriminals target victims through e-mails that appear to come from a legitimate business that asks for sensitive information. Phishing attacks often use to dupe people into handing over credit card data and other personal information.

Man-in-the-middle attack
A man-in-the-middle attack is a type of cyberthreat where a cybercriminal intercepts communication between two individuals in order to steal data. For instance, on an unsecured Wi-Fi network, an attacker could intercept data transmitted from the victim's device and network.

Denial-of-service attack

A denial-of-service attack is where cybercriminals block a computer system from responding to legitimate requests by crushing networks and servers with traffic. This renders the system unusable, preventing an organization from carrying out vital functions.

V. ROLE OF SOCIAL MEDIA IN CYBER SECURITY

The main purpose of social networking sites is to connect people and organizations. It has also created a wide range of business opportunities for businesses and businesses. Social media has made a significant difference in how people communicate. Social networking sites highlight a specific concern about user privacy and security. The security and privacy of these sites focus mostly on malware detection because it seems to come from a trusted contact, users are more likely to click on the link. Social networking sites have formed applications in many areas such as social e-commerce: Social networking sites may be used for promotions and ads for e-commerce portal owners. Corporate image: social media provides a better platform for businesses to attract customers for more business opportunities.

Since the growth of social networking sites has brought various advantages, it has also brought various security problems. It also provides a vulnerable platform to be exploited by the attackers. Some issues associated are as follows.

1) Identity theft: The perpetrator usurps the identity of any user, which leads to identity theft. Attackers attack through applications in which they seek authorization to access information provided in social networking sites.

When a user permits it, he or she will have access to all information and this information may be misused without his or her knowledge.



Figure 1: Percentages of how many participants are involved with social media activities.

2) The threats associated with the use of third-party applications: These applications request permission from the user to access the personal information of all games and applications. The user gives the application some level of permission regarding the user's information. And some of those apps that play prominently can download malicious software onto the user's computer or phone without the user's consent.

3) Trust the operators of social media websites: The content that the user downloads or is published on social media websites, the information is available to the network operators. The operators can save account data even after deletion.



4) Viruses, Phishing Attacks and Malware: Viruses and malware often find their way onto your computer because of these annoying ads. Once access to the network is obtained, the attacker can access or steal confidential data by spamming.

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5) Legal Matters: Posting content offensive to an individual, community or country. There are legal risks associated with the use of social networking sites such as leakage of confidential information from the sites or intrusion into an individual's privacy.

6) Tracking Users: It can cause physical security concerns for the user, as the third parties may access the roaming information of the user by collecting the real-time update on the user's location.

7) Data Privacy: Users share their information on social media sites and may cause privacy poaches unless proper security measures are applied. For example, everyone can see the information of a user if the user's default setting is 'public'

VI SPECIFIC CYBER SECURITY TECHNOLOGIES

5.1 Access Control and Identity Management

The username/password combination has been a fundamental of computer access control since the early 1960s.

5.2 Authentication

Documents need to be authenticated as having originated from a trusted source and that they have not been subsequently altered.

5.3 Malware scanners

Software that has been regularly scans files and messages for malicious code.

5.4 Firewalls

A firewall program will monitor traffic both into and out of a computer and alert the user to the apparent unauthorized usage.

5.5 Cryptography

It is used in two main ways in information security. The better known is to provide confidentiality by encrypting stored data and data in transit.



VII KEY CHALLENGES TO SOCIETY

1. Third Parties Can Unlawfully Misuse the Potential of 5G Network

The 5G network makes young people more inquisitive. For example, anyone can see a user's information if the default setting of the user is "public". For instance, everybody can see a user's information if the user's default setting is "public". Such attacks will be from the side of cyber assaults who will unlawfully enter the 5G wireless networks comprising complex architectures via various endpoints and misuse the data collected or stored in the smart plus speedy gadgets. Primarily, these attackers would be the third parties that smothered the neck of telecommunications services with their revolutionary marketing steps. 1. Third parties may illegally take advantage of the potential of the 5G network.

2. Artificial Intelligence: AI is Somewhere Controlling Cybersecurity Systems

Today, health industries and supply chain departments have adopted tools that support artificial intelligence. Also, those tools have some glimpses of Machine Learning and NLP with which they are helpful in controlling the datasets primarily involved with patients' info or orders in which retailers/distributors are interested. According to the McKinsey report, more than 25 per cent of health sector organizations is investing in AI tools in this era of COVID-19. Even the banking sector has an impact of more than 30 percent of the analyses produced by the AI/ML tools.

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3. The Growing Popularity of IoT Devices

The use of the Internet-of-Thing's devices is trending nowadays because of their robust response time and the low cost they invite in handling the merits of cloud technology. Moreover, the solutions that these devices, push through their communication channels are unbelievable and considered by organizations with a variable number of employees. However, with such growing popularity, cybercrimes are continually expanding. This is because cyber criminals can expose cost-effective assets whose data is accessed from certain industrial cloud networks. At 2021, the Internet of Things market reached the potential of US\$418 billion, and we can expect that it will reach about US\$1.567 trillion by 2025.

4. Growth of Hacktivism

Hacktivism is a combination of words Hack N Activism. Generally, this is done for the purpose of penetrating someone's computer and stealing that information that supports political or social programs in the wrong way. The target of activists is mainly to get their visibility on the websites of government organizations and disfigure their security protocols by promoting their policy-driven cause. According to the 2021 IBM X-Force report, there was 25 percent of data thefts and leak attacks (in 2020) in which activists have demonstrated their interest in seeking data of multi-national corporations and the government bodies connected with them. Regardless of the activist intentions, such criminal attacks are a slap in the face for government organizations that look after their clients' assets. With this, a kind of motivation to challenge governments or to force them to go against their manners is without knowing it promoted. There are numerous anonymous activist groups that fight (since 2008) against the disruption of internal processes of government or multinational organizations in the name of public well-being. They mingle with Tier C executives and continue to embarrass the government with an ideology for retaliating for their online campaigns supporting regular DDoS attacks. This is a newer version of breaking into cybersecurity systems of the government so that the protests of activists may spread throughout the world and launch a shuttle of the defacement of the reputation immorally.

VIII CONCLUSION

Cybercrime has become serious, pervasive, aggressive, growing and increasingly sophisticated, and has major implications for national and economic security. Many industries, institutions, public and private sector organizations (particularly those that are part of essential infrastructure) are exposed to significant risks. Cyber security in all its components will be essential to future growth, innovation and competitive advantage for businesses and governments alike. There is no single answer for success, but by working across public and private sector partnerships and by advancing security measures, particularly with regard to mission-critical systems, processes and applications that are connected into cyberspace, businesses will be able to work towards a future environment that is both open and secure and prosperous.

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REVIEW REPORT ON WSN NETWORK FOR DISASTER MANAGEMENT

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ABSTRACT

A tragedy is an unexpected event that severely affects the public presentation of a residential area or social club and effects on human life, material and economical or environmental loses that disturbs the community's or society's ability to cope using the available resources. Some steps are required to be submitted towards the action to overcome these conditions before they go up. Disaster management is required in ongoing human life as well as wildlife. WSNs offer various ways for detection of different disasters and alarming system. Here we are speaking about the various techniques employed in wireless communication for disaster management

Keywords—WSN, disaster management, Sensor.

I. INTRODUCTION

Climate on the earth surface is changing extremely with human causality as well as loss of wildlife and economic losses. Disaster management and emergency services used to protect human and wildlife because of disasters such as Tsunami, landslide monitoring, and fire protection, relief operation from all these natural calamities are disaster management where data accumulation and data sharing is the an very important activity. WSN can be an substitute for wired networks in case of infrastructures collapse like a landslide, fire or a Tsunami. WSNs typically have a number of sensor nodes distributed over a specific region. WSN consists of tiny sensor nodes synchronously working to monitor and acquire information about an environment. The parameters analyzed by sensors such as the atmospheric humidity and temperature which is required for detecting fires ,gases by explosion, flood level detection and prevention during water level increase, vibration level during an earthquake and so many things. Multimedia sensors can fetch movies and videos from the area and transport them in real time for the quick decision process. WSN can detect the disasters in advance, which will prepare humans to face the situation.

II. TYPES OF DISASTERS

Following are the number of disasters observed in a survey [3]

- i. heat waves;
- ii. floods;
- iii. landslides;
- iv. avalanche;
- v. Erosion of soil;
- vi. tropical cyclones,
- vii. drought
- viii. storms
- ix. earthquake
- x. forest fire

The change in global climate effects are felt by many in and around [1].

- Earthquake and Landslides

So many well-known regions are affected by landslides and earthquakes. Optical fiber sensors may provide expert solutions.

- Fire

More broadly, to anticipate fire risks, earth observation satellites in various phases can be used: fuels mapping, hazard assessment, detection, monitoring, mapping, and so on .The fire disaster system rely upon many aspects of fuel like condition, moisture, etc., Besides weather, like the wind velocity and its focal points, temperature, force per unit area, stress), etc.

- Floods

The effect of floods always leads to loss of the valuable and precious lives; it also demolishes huge amount of buildings, bridges, and tunnels annually as per information, in poor and developing nations. Now a day's optical flood sensors are preferred and recommended to predict floods. To alert regarding the water level in artificial lakes, ponds and rivers, artificial lakes optical sensors can be implemented

III. CLASSIFICATION OF SENSORS

Classification of sensors based on the physical property is tabulated as follows . [4]

Physical Property	Sensor	Output
Temperature	Thermocouple	Voltage
	silicon	Voltage Current
	Resistance temperature detector(RTD)	Resistance
	Thermistor	Resistance
Force/Pressure	Strain Gauge	Resistance
	Piezoelectric	Voltage
Acceleration	Accelerometer	Capacitance
Those	Transducer	Voltage
FIOW	Transmitter	Voltage
Position	Linear Variable Differential Transformer(LVDT)	AC Voltage
Light intensity	Photodiode	Current

Table. I. Classification of sensors

IV. DIFFERENT WSN ARCHITECTURE

4.1 Wireless sensor networks for earthquake detection

Earthquake is common, natural disaster which affects many lives. Human organisms, animals and economical loss are uncountable. The sudden shock on surface of the primer can be called by means of sensors and timely activity.





The damage caused by 26th January 2001earthquake had a great impact and a shock in minds of Indian population which affected not only India, but nearby countries as well [4].Each sensor is distributed in a separated statistical model of frequency spectrum for different units of signal energy received by sensors. These sensors make the information on voltage to the nearest sensors and compare the yield of the sensors to the predicted values If the values of comparing voltages or data are approximately same and more than the threshold values that has been saved in the sensors, then the information is sent to the closest base station that has been laid in the nearby area or areas. At base station these values are fed as input to a data processing center located there, and processor or a virtual home base-form like software that has already been installed at the data processing center fetches the data around the intensity of earthquakes, location of sensors etc. The local base stations can easily pass signal to one another directly using wireless communication. Thereby the base station sends the same information to the nearest base station that has been placed at the nearest kilometer to the sensitive zones or the zones where an earthquake has been detected and also commits the information to the earthquake research center and network service center supplier.

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4.2 Wireless flood monitoring sensor networks.

Flooding is the most impacting destruction type. It causes loss of so many lives. In September 2014, flooding was in Jammu and Kashmir, in 2011, Bihar and West Bengal there was major human loss/wild life and property loss. Each year so many rivers cross their boundary points. In 2019, so many cities of Maharashtra faced the problem of flooding, although all these losses cannot be eradicated but can be cut to bare level, if protective actions s can be selected in advance. The Bar can be taken which will be lots safer than the disaster itself. The sensors are spread in the water body such as a river, which will always monitor the grade and will compare it to the threshold level already set earlier. This info is the passed to the home place. It's the case, and then SMS is sent to every person in the country displaying the rising that the urine spot is above the danger level this information will be very important in all examples. Since some amount of time will be available for people to defend themselves and their belongings.



Figure 2 Data Collection in wireless sensor network for flood level.[2]

4.3 Wireless Sensor Network for Tsunami Detection

Tsunami occurred in 2004 destroyed the complete east coast of India. Due to the effective monitoring system, an alarm was triggered and an area along the coast was vacated. In Japan, Indonesia, Vietnam and Thailand Tsunami is a common sight compared to India, yet it is smarter to be alert rather than regretting later on the tragedy. As it appears, it is very brawny and the loss is unspeakable. We offer the use of waterproof sensors, simply like that used in earthquakes and place them deep in the oceans and seas. They detect vibrations of frequencies matching the seismic pattern and respond accordingly if the vibration is abnormal. If many of such sensors give similar data, we will know that tsunami is going to arrive at the shores pretty soon and then that we can grab hold of suitable steps to minimize its effects on lives and belongings.[3]



Figure 3 Tsunami detection and response system architecture [2]

4.4 Wireless Forest Fire Detection sensor networks

It is practically difficult to set off fires then the disaster can be turned away given the data about the site of the flame can be promptly sent to the closest control focus and sufficient measures be taken to control it, before it

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inundates everything. An extra Sensor Nodes are thickly sent in the boondocks. All Sensor Nodes are collected into groups, then, every node has a cluster header. Sensor Node can get humidity, the environmental temperature, and smoke. By presuming their location information by the equipment's such as Global Positioning System GPS, each Sensor Node gives measurement data, as the location information, to the corresponding cluster head. The cluster header can provide the climate record utilizing a neural system technique and sends the climate file to the manager node through the sump.



Figure 4 A WSN for real-time forest fire detection [2]

V. DESIGN ISSUE FOR WSN

There are various publications to be considered while designing disaster management using Wireless Sensor Network. The most important thing is the type of disaster to be utilized as per requirement. Different situations are activated for different system design.

5.1 Deployment

Deployment relates to network setting. WSN is utilized by methods viz pre deterministic or random. In pre deterministic deployment the location of the sensors is identified initially before one can deploy the sensor nodes. The degrees of coverage and node connectivity are guaranteed in this method. Random deployment is simpler than the pre deterministic deployment where the sensor nodes are randomly split up in the region of involvement. It allows the WSN to be deployed over hostile and unreachable environment.

5.2 Coverage

Sensing coverage is an essential charateristics of wireless sensor networks (WSNs) Determining what it is exactly that you are attempting to monitor is known as coverage. Discussion of three cases reported for barrier coverage blanket coverage, and sweep coverage. The region of interest obtained in blanket coverage has maximum detection rate. Unlike blanket coverage barrier coverage ensures that the border of the area of interest is tracked fully. For achieving blanket and barrier coverage detectors static arrangement is required. The objective of sweep coverage is reached by executing sensor nodes to sweep-off the area of interest in terms of sensing range of sensors. The other specifications of coverage are listed as in terms of area, barrier and point. Coverage percentage is the proportion of the country embraced by at least one sensing element to the total area of the region of interest. Coverage issues can be regarded also as a minimization problem.

5.3 Connectivity

The connection of sensors with their base station and amongst themselves is an important factor to be considered in the connectivity for WSN. Base station uses multihop communication to deliver information in WSN, the transfer of data between the clients is performed until data arrives at the family position. This data exchange approach requires a connection in the network with at least a spanning tree to link up in the lymph glands to home place. The trouble with this form of network is missing of information with the interruption of nexus. To maintain connectivity in some environment, obstacles such as dense rain forest will make it difficult hence moving base stations are offered which collects data by moving to monitor across the country.

5.4 Mobility

In any ad hoc network mobility is a primary aspect of all nodes, In WSN mobility is more application specific and is also related to part of network element. Mobility is classified as; uncontrolled and controlled mobility. The decision of actions taken by sensor nodes by themselves is controlled mobility. The movement either by environmental influences like idle words and moving ridge or the sensor is embedded to a mobile object is refereed as uncontrolled mobility

VI. CONCLUSION

This inspection report represents the use of WSN as part of their architecture. These networks are gathering information from the disaster region and transfer this information to a key database. We have given different disasters like earthquake, fire detection, flooding, Tsunami etc. These papers focus on effectiveness of wireless communication in case problems infrastructure collapse after the tragedy. WSNs not only save human life, but also precious nature which is significant for future life. On that point are some challenges in developing such networks. While routing emergency messages considering the delay factor is an important part. The essential aspect for such technology is to locate emergency responders and victims also considering energy consumption as an central problem. With the requirement of investment and manpower this field needs a lot of work to be done.

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CLEFIA: CRYPTOGRAPHIC ALGORITHM FOR LIGHT WEIGHT NETWORK

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ABSTRACT

Cryptography is that the practice and study of hiding information. It is the science of reworking message to form them secure and resistant to attack. In cryptography, the original message is converted into another message at encryption side and converted into an original message at the receiver side.

For constrained devices, normal cryptography algorithms can be too slow, too big or too energy-consuming. Light-weight cryptography is generally defined as cryptography for resource- constrained devices, for which RFID tags and WSN are typically mentioned as examples.

The important benefits of light weight algorithm are Smaller block sizes, Smaller key sizes, Simpler rounds, Simpler key schedules, Multifaceted key schedules increase the memory, time delay and the power requirement of implementations therefore, most of the lightweight block ciphers use simple key lists that can uses sub-keys. This paper focuses on implementation of CLEFIA cipher for key length of 128,192,256 bits.

Keywords-Cryptography, Light weight algorithm, CLEFIA, Key size, plaintext, cipher text, Encrypted data and Decrypted data.

I. INTRODUCTION

CLEFIA is a 128-bit block cipher with its key length being 128, 192 and 256 bits, which is compatible to AES.

CLEFIA consists of two sections: a data processing section and a key scheduling section. CLEFIA hires a generalized Feistel structure is a symmetric structure used in the construction of block ciphers, with four data lines, and the width of each data line is 32 bits. Also, there are key whitening parts at the beginning and the end of the cipher key. The term whitening is a technique intended to increase the security of an iterated block cipher. It consists of steps that combine the data with portions of the key. The number of rounds used in the algorithm is related to the key lengths. For a 128-bit plain text there has to be 18 rounds, for a 192-bit length of plain text the number of rounds is 22. And also, for the 256-bit length of the original message 26 rounds have to be performed.[24] CLEFIA operates on 128-bit block size with three different key sizes: 128-bit, 192-bit, 256-bits.

Features of CLEFIA

The CLEFIA 128 algorithm has less execution time, less number of rounds as well as it has good throughput as compared to other Light Weight algorithm. Also, CLEFIA has the immunity against the differential attack and the linear attack.

II. STEPS FOR CLEFIA IMPLEMENTATION

The CLEFIA is a block cipher which has a bit length of 128 bits. This consist of variable key lengths with respect to the bit lengths considered. CLEFIA supports 128-bit block size with three different key sizes: 128-bit, 192-bit, 256-bits.

There are various algorithms based on keys. The first type in which a single key is employed for the encryption and decryption process in the case of secret key cryptography.

The key scheduling part of CLEFIA provides whitening keys and round keys for the data processing part. Let K be the key and L be an intermediate key, and the key scheduling part consists of the following two steps.

1. Generating L from K.

2. Expanding K and L (Generating WKi and RKj).

To generate L from K, the key schedule for a 128-bit key uses a 128-bit permutation GFN4;12, while the key schedules for 192/256-bit keys use a 256-bit permutation GFN8;10.

III. CLEFIA 128

CLEFIA 128 uses GFN (4,12) and 60 data lines or branch of 32-bit constants.

This CLEFIA algorithm is having 128- bit plain Cipher text with Hexadecimal data and having Security key of 32 bit. The CLEFIA -128 has executed using 18 rounds.[24]

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Test Vectors

The test vectors for CLEFIA is given for each key length. The data are expressed in hexadecimal form.[24].

128-bit key: The CLEFIA 128 is executed on key size of 128-bit, plain text is of 128 bits, The Cipher text generated is of 128 bits.

Key-

ffeeddcc bbaa9988 77665544 33221100

Plaintext-

00010203 04050607 08090a0b 0c0d0e0f

Ciphertext-

de2bf2fd 9b74aacd f1298555 459494fd

A. Simulation Result for CLEFIA 128



Figure 1 Encrypted data and Decrypted data of CLEFIA 128 algorithm

The input Cipher text is -

de2bf2fd 9b74aacd f1298555 459494fd which is in hexadecimal form. The respective Encrypted data and Decrypted data for various data set is as shown in figure 1

IV. CLEFIA 192

CLEFIA 192 has key size of 192-bit, Plain text of 128 bit and Cipher text of 128 bits. The CLEFIA -192 has executed using 22 rounds.[24]

192-bit key:

Key-

ffeeddcc bbaa9988 77665544 33221100 f0e0d0c0 b0a09080

plaintext-

00010203 04050607 08090a0b 0c0d0e0f

ciphertext-

e2482f64 9f028dc4 80dda184 fde181ad

B. Simulation Result for CLEFIA 192

Microsoft Visual Studio Debug Console	1255
Test Jaintext: 0001020304055060708090a0b8c0d0e0f secretkey: ffeeddccbbaa99887766554433221100f0e0d0c0b0a09080 (LFFIA-192 iphertext: Encrypt e2482f649f028dc480dda184fde181ad Jaintext: Encrypt000102030405060708090a0b0c0d0e0f	
:\Users\SESA628063\source\repos\ConsoleApplication1\Debug\Clefia192.exe (process 19720) exite o automatically close the console when debugging stops, enable Tools->Options->Debugging->Aut e when debugging stops. *ress any key to close this window	d with code 0. omatically close

Figure 2 Encrypted data and Decrypted data of CLEFIA 192 algorithm

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The input Cipher text is

e2482f64 9f028dc4 80dda184 fde181ad which is in hexadecimal form.[24]

The respective Encrypted data and Decrypted data for various data set is as shown in figure 2.

V. CLEFIA 256-

CLEFIA 256 has key size of 256-bit, Plain text of 128 bit and Cipher text of 128 bits. For CLEFIA-256, 26 rounds were taken for execution.[24]

256-bit key:

Key-

ffeeddcc bbaa9988 77665544 33221100 f0e0d0c0 b0a09080 70605040 30201000

Plaintext-

00010203 04050607 08090a0b 0c0d0e0f

Ciphertext-

a1397814 289de80c 10da46d1 fa48b38a

C. Simulation Result for CLEFIA 256

Microsoft Visual Studio Debug Console
Test laintext: 000102030405060708090a0b0c0d0e0f ecretkey: ffeeddccbbaa99887766554433221100f0e0d0c0b0a090807060504030201000 CLEFIA-256
<pre>iphertext: a139/814289de8061003446d1+a48b38a laintext : 000102030405060708090a0b0c0d0e0f :\Users\SESA628063\source\repos\ConsoleApplication1\Debug\Clefia_256.exe (process 22980)</pre>
o automatically close the console when debugging stops, enable Tools->Options->Debugging- e when debugging stops. ress any key to close this window

Figure 3 Encrypted data and Decrypted data of CLEFIA 256 algorithm

The input Cipher text is

a1397814 289de80c 10da46d1 fa48b38a which is in hexadecimal form. The respective Encrypted data and Decrypted data for various data set is as shown in figure 3

Platform- The program for CLEFIA algorithm for various key size is written and executed on Microsoft visual studio 2019, 16.9.2 version.

The Platform is open source and executed with C environment.

System configuration

System model- Laptop

System type- x64 based PC

RAM - 4GB

OS- MS Window 10 pro

Version- 10.0.18363 build 18363

Processor- Intel (R) Core[™] i3-8145 CPU at 2.10 GHz

VI. CONCLUSION

From this implementation and execution on data size of 128-bit length, it is concluded that CLEFIA supports 128-bit block size with three different key sizes: 128-bit, 192-bit, 256-bits.[24] So, for a 128 bit key size, 128-bit plain text there is 18 rounds, for a 192-bit key size , 128 bit plain text the number of rounds taken are 22.

And also, for the 256- bit key size, 128-bit plain text the number of 26 rounds has to be performed.[24] CLEFIA is lightweight algorithm designed to achieve less execution time and low power constraints.

The algorithm was executed on Microsoft visual studio 2019, 16.9.2 version.

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DESIGN OF MICROSTRIP PATCH ANTENNA FOR WLAN APPLICATION

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ABSTRACT

Microstrip Patch Antenna are broadly utilized in different areas of WLAN applications since It is simple to manufacture and due to their conformability. In This Paper, Square Shaped Patch Antenna for WLAN Designed and Analysed. The substrate measurement is 29.44mm x 38.03mm. The proposed Microstrip Patch Antenna works at 2.4 GHz with return loss and voltage standing wave proportion of -24.0183 dB and 1.2189 Respectively. The designed Patch Antenna results in a Bandwidth of 55MHz. Using a second layer of FR-4 Substrate, which is coated with copper, it reduced the back lobe and enhanced the gain as well as increased the directivity. Line feeding technique is used in this Microstrip Patch design where the conducting strip is linked to the Microstrip Patch's edge directly. The Microstrip Patch Antenna which is proposed is designed at a height of 1.6 mmfrom the ground plane by utilizing High-Frequency Structure Simulator Software (HFSS).

Keywords— Wireless Local Area Network (WLAN); High- Frequency Structure Simulator Software (HFSS Software)

I. INTRODUCTION

In wireless communication, the antennas act as an essential element of the wireless devices. The antenna for wireless communication must be compact in size, flexible, and cost- efficient [1]. Microstrip Patch antennas are ordinarily used in Wireless communication since of their lightweight, conformability, and cost-efficiency. The patch antennas are mostly used in mobile, aircraft, spacecraft.

A wireless local area network has no wired connections which means it communicates using high-frequency radio waves [2]. It links more than one device within a certain limited area. The IEEE standard for WLAN is 802.11 [4]. The proposed patch antenna works at 2.4 GHz for Wireless Local Area Network (WLAN) application.

A radiating patch is placed on one upper plane above the dielectric substrate, and a ground plane is placed directly on the other side of the dielectric substrate in a Microstrip Patch Antenna[3]-[4]. The EM (Electromagnetic Waves) are fired into the substrate and radiated into the air after reflecting off the ground plane. The feeding technique used of a microstrip antenna can be decided according to the requirement it can be microstrip line, aperture coupling, coaxial, and proximity coupling.



Fig. 1 Line feeding technique

The Line Feeding Method Because it is simple to develop, evaluate, and build, this feeding method is frequently employed. Fig. 1 shows a Microstrip Patch Antenna with a microstrip feed line as the feeding method. Dimensions of the patch are also shown.

The Dielectric used is FR4 substrate with a dielectric constant of 4.4, substrate material is taken according to the dielectric constant value. Changing the Substrate Material Leads to Alter within The Dielectric Constant, Changing The Substrate Material Implies Changing The Dielectric Constant (ɛr). [5].

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Frequency	2.4 GHz		
Length of patch	29.44mm		
Width of patch (?)	38.03mm		
Height	1.6mm		
? _{???}	4.085		
Dielectric constant	4.4		
Width of line feed	3mm		

II. ANTENNA DESIGN

The antenna is simulated on an FR4 substrate with a dielectric constant of 4.4, the thickness of the substrate is 1.6 mm. \checkmark The length and width of the antenna can be determined by the transmission line method as given below Width of the antenna is given by:

Step 1: Calculation of widthcvalues of W and h, we get Length = 29.44 mm. In final, we obtain the length of the patch using this equation.

Hence, for this design, the ground plane dimensions would be given as:

Table 1- Antenna Dimensions

Width = $\varepsilon r + 12 f_0 \sqrt{-2} = 3 \times 10^{10} 94.4 + 1 - 2 \times 2.4 \times 10 \sqrt{2} = 3.80 cm$ (converting into millimeters)*Width* = 38mm

Step 2: Calculation offfective Dielectric Constant.

Hence after calculating all the parameters using the above formulae, the rectangular microstrip patch antenna was

designed. $\varepsilon_{eR+1} \varepsilon_{R-1[1]} = eff221+12(w) = -4.4+1+4.4-1[1]$

EXPERIMENTAL RESULTS AND DISCUSSIONSDesigned Microstrip Patch Antenna: $22\varepsilon_{eff} = 4.085615$

(Step 3: Calculation of length $\sqrt{1+12(1.6)}$)38

Fig. 2, shows the model of the microstrip patch antenna which is being simulated. The simulation of the proposed

Line feed rectangular patch antenna design has been carried out by using Ansoft High-Frequency Structure

Simulator (HFSS 13.0).w_____Length = $\ ^{c} 0.824h(2f0\sqrt{\epsilon}eff(\epsilon eff-0.258)(h+0.8))$ ______3×10¹⁰×100.824(1.6)×2×2.4× $\sqrt{4.08561}$ (4.0856+0.3)(³⁸+0.264)1.6_____

(4.0856–0.258)(³⁸1.6)+0.8)=30.9208-1.4776*Length* =29.4432*mm*Fig. 2 Designed Microstrip Patch Antenna

By substituting the value of operating frequency 2.4 GHz, c



= 3×10^8 m/s, ε_R = 4.4 and h = 1.6mm the width of the patch (*W*) becomes 38.08mm. Substituting = 4.085 and the Return Loss:



Voltage Standing Wave Ratio (VSWR) :



Fig 5, The VSWR of the proposed antenna is obtained 1.2189. The functional parameter of microstrip patch antennareflection coefficient, VSWR meeting the requirements for WLAN application. Hence it could be used for various wireless applications.

Fig. 3: Return loss

Fig.3 shows that the proposed antenna is designed and simulated using Ansoft High-Frequency Structure Simulator (HFSS) The antenna return loss has observed -24.0193bB and it resonates at 2.4GHz.

Gain:

Fig. 5 :Voltage Standing Wave Ratio

3-D Radiation Pattern:



Fig. 4(a) 3-D Radiation Pattern on Microstrip Patch

Fig.4 shows the 3-D radiation pattern on the microstrip patch. As it can be seen the maximum radiation is towards the Z-axis and also the major lobe is above the patch towards the Z-axis while the minor lobe is below the microstrip antenna.

Fig 6(a) shows 3-D Radiation of antenna For gain and maximum radiation towards Z-axis. The gain is obtained for the proposed microstrip patch antenna 2.9303 dB at 2.4 GHz.



Fig. 6(a) : 3-D Radiation For Gain



Fig 6(b): Gain of the Antenna

-180

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Electric Field:

The current distribution of the antenna is shown in Figure 7. The current distribution is mostly concentrated on the patch. These distributions are plotted so that the relationship between operating principle, impedance parameters, and resonant frequency can be known.



Fig 7: Electric Field

E & H Plane Radiation Pattern:

The radiation patterns of the H-Plane and E-Plane at the resonant frequency of 2.4GHz are presented in Fig.8(a) and Fig 8(b) respectively. For the proposed patch antenna H-plane is the principle of XZ-plane and E-plane is the principle of YZ-plane.





Fig 8(b): H-Plane Radiation Pattern



Bandwidth :

The bandwidth is Calculated by S-Parameter (Return Loss) at

-10 dB. The upper Cutoff Frequency is 2.425GHz and Lower Cutoff Frequency is 2.37GHz as seen in Fig.9. So The Bandwidth is obtained for the proposed Microstrip Patch Antenna 55 MHz At -10 dB. Bandwidth is meeting the requirements for the WLAN application. Hence it could be used for various wireless Applications

III. CONCLUSION

A simple and efficient method of the Microstrip Line feeding technique has been studied because it is simple to model and easy to match by controlling the inset position. The of the proposed antenna specifically Return loss, Gain, Bandwidth, and VSWR are analyzed. The operating frequency of the proposed antenna is 2.4 GHz. The return loss and VSWR are - 24.0193dB and 1.2189 respectively. The dimension of the microstrip patch antenna is compact and meets the requirements for WLAN applications. The Bandwidth and Gain are 55MHz and 2.9303 respectively. The Main objective of this paper is to design a microstrip patch antenna for WLAN application with Microstrip Line feeding techniques. This proposed rectangular patch antenna is a more conventional approach for the implementation of a WLAN application and Microstrip antennas are also used in the fields of RFID (radio frequency identification), mobile communication, and healthcare.

Parameters	Values
VSWR	1.2189
Return Loss	-24.0193 dB
Gain	2.9303 dB
Bandwidth	55 MHz

Fig 9 : Bandwidth Calculated By S-Parameter

 Table -2 Antenna Parameters

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MULTIFUNCTIONAL ROBOTIC CAR

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ABSTRACT

Line Following is one of the most important aspects of robotics. The Robot uses several sensors to identify the line thus assisting the robot to stay on track. The system computes colour, motion and shape cues combining them into a probabilistic manner to accurately achieve object detection and recognition taking some inspiration from vision science. The detection and tracking of objects around an autonomous vehicle are essential for operating safely. This paper presents an algorithm to detect, classify, and track objects. The daily routine problems that the common man face on roads while commuting are becoming a serious problem with each passing day. People get late and meet accidents. The model of multifunctional robotic cars presented in this report aims to solve these issues by taking humans off the wheels, so that they do not have to drive anymore and the risk of accidents, getting late and traffic congestions can be reduced to a minimum. This car can follow the track, overtake other cars, detect obstacles, take sharp bends and turns, follow traffic signals and turn on its lights under low light conditions. Since robotics has become a major part of our daily life and also in the engineering field, it plays a vital role in the development of new technology. This is a very simple and easy type of remote control car, where the ordinary micro-controller has been replaced by Arduino and IR sensors have been replaced by a Bluetooth module. The remote can be an android or IOS cell phone. This project can be made on a bigger scale for real-time vehicles. Circuit diagrams for performing all these functions have been presented and the mechanical model of the car has also been shown in the report, which can be practically implemented.

Keywords— sensors, congestions, arduino, autonomous

I. INTRODUCTION

MultiFunction Robot will work as Line Following and Object Detection Robot. It will Work as an Automatic Car such as Tesla, Audi, Google Cars, etc. It will also have Remote Control access to it. This will help in preventing accidents and economic tolls caused by property damage, injury, death. We will be using this feature in the medical field as the pandemic has struck the whole world has come under panic and pandemonium, thousands of mass deaths in the world the medical field has come under a lot of stress doctors, nurses & paramedics are working 24/7 and this is taking a toll on their mental health moreover it is also costing the government to pay for the staff and their training, this bot is also cost-effective and we can use it to deliver medicines, track the medicines & track vaccines. This bot will ensure that there will be minimal human interaction so the medical equipment and medicines are fully sanitised.

II. PROBLEM STATEMENT

To increase roadway safety, autonomous vehicles are under development and are the focus of many research projects. The scope of this project includes converting a golf cart into a remote control vehicle. The safety of the vehicle's passengers and bystanders is of the utmost concern. Therefore the vehicle is required to be low speed and contain the ability for passengers to take control. The main problem was how we will choose the perfect microcontroller so it can be compatible with our needs from our project. By observing and studying a lot about the project functions which we are working on we have come across the Arduino Mega, a 16-bit microcontroller. There was also one problem with the road intersection: if the car is in the following path and it meets any intersection it will remain in its path which we have defined. Moreover, we can also track the bot so, if it gets misguided the person nearby can rectify its path. Moreover, some roads and streets are simply unmarked, presenting quite an issue for driverless cars. In addition to a lane marking problems, the lack of uniformity in road signage and stop lights could also prove to be a hurdle for autonomous car technology.

III. LITERATURE SURVEY

This Line Following Robot, which is a part of AGV (Automated Guided Vehicle), the autonomous robot in a simple term, can detect black or white lines to follow them. But research has been done to make them capable of following any colour. Light sensors based on LED or LDR and RFID based verification systems have been used to upgrade the line follower robot to that level. How a Line Following robot runs is based on the sensor value it gets from the sensors. The correct sensor value leads to the correct result. That's why it's important to have an accurate idea of those sensor data and so on. That is what the researchers have done. They not only built their line follower robot prototype but also went through that data. Based on which the robot takes its decisions. Path planning is the most crucial part of the line follower robot. As it is autonomous, it has to make the decision

based on the path. Most robots can follow a straight or round-shaped path. However, the vital part is to let it take its decision when there is more than one path to go and they are of different shapes. A practical study has been done to implement this in the prototype model.

IV. Hardware And Software Requirement



A. Arduino Mega

Arduino is an open-source hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices. Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analogue input/output (I/O) pins that may be interfaced to various expansion boards ('shields') or breadboards (for prototyping) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs. The microcontrollers can be programmed using the C and C++ programming languages, using a standard API which is also known as the "Arduino language". In addition to using traditional compiler toolchains, the Arduino project provides an integrated development environment (IDE) and a command-line tool developed in Go. Although the hardware and software designs are freely available under copyleft licenses, the developers have requested the name *Arduino* to be exclusive to the official product and not be used for derived works without permission. The official policy document on the use of the Arduino name emphasizes that the project is open to incorporating work by others into the official product. Several Arduino-compatible products commercially released have avoided the project name by using various names ending in *-duino*.

The Arduino MEGA 2560 is designed for projects that require more I/O lines, more sketch memory and more RAM. With 54 digital I/O pins, 16 analogue inputs and a larger space for your sketch, it is the recommended board for 3D printers and robotics projects. Both Mega and Uno have a clock speed of 16MHz but the memory and storage space is different. Mega has a flash memory of 256kB while that of Uno is 32kB. If the code is large, it is better to go with Mega due to the memory. Static Random Access Memory is used in Arduino systems.

B. Ultrasonic Sensor



An ultrasonic sensor is an instrument that measures the distance to an object using ultrasonic sound waves. An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an object's proximity. High-frequency sound waves reflect from boundaries to produce distinct echo patterns. Ultrasonic sensors work by sending out a sound wave at a frequency above the range of human hearing. The transducer of the sensor acts as a microphone to receive and send the ultrasonic sound. Our ultrasonic sensors, like many others, use a single transducer to send a pulse and to receive the echo. The sensor determines the distance to a target by measuring time lapses between the sending and receiving of the ultrasonic pulse. The working principle of this module is simple. It sends an ultrasonic pulse out at 40kHz which travels through the air and if there is an obstacle or object, it will bounce back to the sensor. By calculating the travel time and the speed of sound, the distance can be calculated. Ultrasonic sensors are a great solution for the detection of clear objects. For liquid level measurement, applications that use infrared sensors, for instance, struggle with this

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particular use case because of target translucence. For presence detection, ultrasonic sensors detect objects regardless of the colour, surface, or material (unless the material is very soft like wool, as it would absorb sound.) To detect transparent and other items where optical technologies may fail, ultrasonic sensors are a reliable choice. Our ultrasonic distance, level, and proximity sensors are commonly used with microcontroller platforms like Raspberry Pi, ARM, PIC, Arduino, Beagle Board, and more. Ultrasonic sensors transmit sound waves toward a target and will determine its distance by measuring the time it took for the reflected waves to return to the receiver. This sensor is an electronic device that will measure the distance of a target by transmitting ultrasonic sound waves, and then will convert the reflected sound into an electrical signal. Our sensors are often used as proximity sensors. Ultrasonic sensors are also used in obstacle avoidance systems, as well as in manufacturing.

C. Servo Motor



A servo motor is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity and acceleration. It consists of a suitable motor coupled to a sensor for position feedback. It also requires a relatively sophisticated controller, often a dedicated module designed specifically for use with servomotors. Servo Motors are not a specific class of motor, although the term servomotor is often used to refer to a motor suitable for use in a closed-loop control system. Servo Motors are used in applications such as robotics, CNC machinery or automated manufacturing. A servomotor is a closed-loop servomechanism that uses position feedback to control its motion and final position. The input to its control is a signal (either analogue or digital) representing the position commanded for the output shaft. The motor is paired with some type of position encoder to provide position and speed feedback. In the simplest case, only the position is measured. The measured position of the output is compared to the command position, the external input to the controller. If the output position differs from that required, an error signal is generated which then causes the motor to rotate in either direction, as needed to bring the output shaft to the appropriate position. As the positions approach, the error signal reduces to zero and the motor stops. The very simplest servo motors use position-only sensing via a potentiometer and bang-bang control of their motor; the motor always rotates at full speed (or is stopped). This type of servomotor is not widely used in industrial motion control, but it forms the basis of the simple and cheap servos used for radio-controlled models. More sophisticated servo motors use optical rotary encoders to measure the speed of the output shaft and a variable-speed drive to control the motor speed. Both of these enhancements, usually in combination with a PID control algorithm, allow the servo motor to be brought to its commanded position more quickly and more precisely, with less overshooting.

D. L298 Motor Driver

The L298 is an integrated monolithic circuit in 15-lead Multiwatt and PowerSO20 packages. It is a high voltage, high current dual full-bridge driver designed to accept standard TTL logic levels and drive inductive loads such as relays, solenoids, DC and stepping motors. Two enable inputs are provided to enable or disable the device independently of the input signals. The emitters of the lower transistors of each bridge are connected and the corresponding external terminal can be used for the connection of an external sensing resistor. An additional supply input is provided so that the logic works at a lower voltage. Also, for a motor, we need a motor driver because It can control both the speed and spinning direction of two DC motors.

And as a bonus, it can even control a bipolar stepper motor like NEMA 17. One of the easiest and inexpensive ways to control stepper motors is to interface the L298N Motor Driver with the Arduino. The Arduino Motor Shield is based on the L298 (datasheet), which is a dual full-bridge driver designed to drive inductive loads such

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as relays, solenoids, DC and stepping motors. It lets you drive two DC motors with your Arduino board, controlling the speed and direction of each one independently.

E. IR Sensor



An infrared (IR) sensor is an electronic device that measures and detects infrared radiation in its surrounding environment. Infrared radiation was accidentally discovered by an astronomer named William Herchel in 1800. While measuring the temperature of each colour of the light (separated by a prism), he noticed that the temperature just beyond the red light was the highest. IR is invisible to the human eye, as its wavelength is longer than that of visible light (though it is still on the same electromagnetic spectrum). Anything that emits heat (everything that has a temperature above around five degrees Kelvin) gives off infrared radiation. There are two types of infrared sensors: active and passive. Active infrared sensors both emit and detect infrared radiation. Active IR sensors have two parts: a light-emitting diode (LED) and a receiver. When an object comes close to the sensor, the infrared light from the LED reflects off of the object and is detected by the receiver. Active IR sensors act as proximity sensors, and they are commonly used in obstacle detection systems (such as in robots). Infrared technology is found not just in the industry, but also in everyday life. Televisions, for example, use an infrared detector to interpret the signals sent from a remote control. Passive Infrared sensors are used for motion detection systems, and LDR sensors are used for outdoor lighting systems. The key benefits of infrared sensors include their low power requirements, their simple circuitry and their portable features. Infrared waves are not visible to the human eye. In the electromagnetic spectrum, infrared radiation can be found between the visible and microwave regions. The infrared waves typically have wavelengths between 0.75 and 1000µm. The infrared spectrum can be split into near IR, mid-IR and far IR.

The wavelength region from 0.75 to $3\mu m$ is known as the near-infrared region. The region between 3 and $6\mu m$ is known as the mid-infrared region, and infrared radiation which has a wavelength greater than $6\mu m$ is known as far-infrared.

F. Bluetooth Module



A BlueTooth module is usually a hardware component that provides. a wireless product to work with the computer; or in some cases, the. Bluetooth may be an accessory or peripheral, or a wireless headphone. or other products (such as cellphones can use.)HC-05 Bluetooth Module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for a transparent wireless serial connection setup. Its communication is via serial communication which makes an easy way to interface with a controller or PC. HC-05 Bluetooth module

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provides switching mode between master and slave mode which means it can use neither receiving nor transmitting data.Specification:

Model: HC-05

Input Voltage: DC 5V

Communication Method: Serial Communication Master and slave mode can be switched

G. Arduino IDE



The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino hardware to upload programs and communicate with them. Programs written using Arduino Software (IDE) are called sketches. These sketches are written in the text editor and are saved with the file extension .ino. The editor has features for cutting/pasting and for searching/replacing text. The message area gives feedback while saving and exporting and also displays errors. The console displays text output by the Arduino Software (IDE), including complete error messages and other information. The bottom right-hand corner of the window displays the configured board and serial port. The toolbar buttons allow you to verify and upload programs, create, open, and save sketches, and open the serial monitor. The Arduino Software (IDE) uses the concept of a sketchbook: a standard place to store your programs (or sketches). The first time you run the Arduino software, it will automatically create a directory for your sketchbook. You can view or change the location of the sketchbook from within the Preferences dialogue. The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing and other open-source software.

H. MIT App Inventor

MIT App Inventor is a web application integrated development environment originally provided by Google and now maintained by the Massachusetts Institute of Technology (MIT). It allows newcomers to computer programming to create application software(apps) for two operating systems (OS): Android, and iOS, which, as of 8 July 2019, is in final beta testing. It is free and open-source software released under dual licensing: a Creative Commons Attribution ShareAlike 3.0 Unported license, and an Apache License 2.0 for the source code.It uses a graphical user interface very similar to the programming languages Scratch (programming language) and the StarLogo, which allows users to drag and drop visual objects to create an application that can run on Android devices, while an App-Inventor Companion that works on iOS running devices are still under development. In creating App Inventor, Google drew upon significant prior research in educational computing, and work done within Google on online development environments.

CONCLUSION

With the following studies & observation we can conclude that this multifunctional robotic car is an automobile system that can recognize its path, move and change the robot's position toward the line in the best way to remain on track. This project report presents an infrared sensor-based line follower robot design of 200 gm weight which always directs along the black line on a white surface. The multifunctional robotic car also responds to the remote control access and works according to the commands which are given to the bot by the controller. The multifunctional robotic car project challenged the group to cooperate, communicate and expand

understanding of electronics, mechanical systems, and their integration with programming. The successful completion of every task demonstrated the potential of mechatronic systems and a positive group dynamic.

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PHASE LOCKED LOOP DESIGN WITH OSU 180-NM

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ABSTRACT

This paper is the review report on the Phase lock Loop design in OSU 180nm technology node. It presents the on-chip clock multiplier using PLL. On chip clock multiplier accepts the clock signal generated by external crystal oscillator which is 5 MHz to 12 MHz and multiplies it with factor of 8 and outputs a signal with frequency 40MHz to 100MHz. This PLL works on the supply voltage of 1.8V. Duty cycle of the output clock is in between 48% to 52% giving symmetrical output waveform. Voltage control oscillators input voltage i.e., control voltage is in the range of 0.557V to 0.62V.

Keywords—*Phase lock loop; Charge pump; Voltage control oscillator; frequency divider.*

INTRODUCTION

Phase-locked loop (PLL) circuit serves the task of clock generation in microprocessors, clock recovery, bit synchronization and frequency synthesizer used in cellphone and vector network analyzers (VNA) [1]. In the high-speed communication connection, the synchronization between the transmitter and the receiver is of great importance thanks to a clock signal. Here PLL plays an important role to lock the phase of input clock signal to the PLL (Recovered Clock at Receiver) with its output clock signal (Clock generated by local oscillator i.e., VCO).

The Phase Lock Loop Assembly (PLL) shown in Figure 1 operates on the feedback principle. It compares the phase of the input clock signal with the phase of the locally generated output clock signal and produces the proportional error signal which in turn controls the frequency of local oscillator (VCO) Here Output clock signal continuously keeps tracking the input clock signal until both are matched in terms of phase and frequency. In the high-speed communication connection, the synchronization between the transmitter and the receiver is very important by means of a clock signal.

The PLL flow path is designed using LTSPICE, an open-source EDA tool. After creating the schema, spice netlist has been extracted, then adding the 180 nm OSU model libraries, it is simulated using Ng spice to get the waveforms [2].

The diagram for the phase frequency detector and its operation is shown in Section II. Section III provides details on the load pump and low-pass filter sections. The voltage control oscillator circuit is discussed at length in Section IV. Section V relates to the implementation of the frequency splitter circuit. The complete results of the PLL block simulation are covered in Section VI. Lastly, Section VII concludes the design of the PLL circuit, followed by an acknowledgment of receipt in Section VIII.



Fig. 1 Block Diagram of PLL.

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Fig. 2 PLL Block diagram drawn in LTSPICE.

Phase Frequency Detector

As shown in Fig. The 2-phase frequency detector is a block with two inputs f_in and $f_vco/8$ and two outputs that are both Up and Down signals. The corresponding input and output plots are illustrated on the figure. 4

It compares two input signals at the rising clock edge when $f_clk_in leads the f_vco$, The UP-output signal of PFD goes high and when $f_vco leads f_clk_in signal$, the Down output signal of PFD goes high. This allows the detection of phase and frequency differences between two input signals. When the two input signals are in exactly the same phase and frequency, the UP and DOWN signals both produce a zero fault signal at the output. These climb and descent signals are then given as input to the following block which is a charge pump.



Fig. 3. Phase Frequency Detector Schematic



Fig. 4. Input and Output waveforms of PFD

Charge Pump and Low pass filter

The schematic of the charge pump is illustrated in Fig. 5. It consists mainly of two switched current sources which pump the charge into the loop filter depending on the status of the UP and Down signals. As shown in fig. 2 C1 is the motor condenser of a load pump assembly. When the UP signal is elevated, C1 is charged on VDD and when the DOWN signal is elevated, C1 is discharged on the floor [3]. This can be observed in fig 6a. which shows the charge pump output CP waveform in blue color with no regard to the low pass filter. The output of Charge Pump block is signal CP which is then passed to through the Low pass filter circuit formed by resistor R1=500 Ω and capacitor C2=500 pF to get the average value of the error signal proportional to the phase difference between input and output clock frequency. Fig. This output of the load pump is then indicated in input vin_vco for the following block VCO. This charge pump outlet is then indicated as input vin_vco for the following block VCO.



Fig. 5. Charge Pump Schematic





(b)

Fig.6. PFD with Charge Pump output waveforms (a) Without LPF (b) with LPF

Voltage Controlled Oscillator

The voltage-controlled oscillator is a circuit that accepts the command input voltage and generates the frequency at the output [4]. Fig. 7 shows the schematic of VCO. The corresponding input and output wave shapes of the VCO are indicated in the figure. 8. The control input voltage of VCO may change from 0.557 V to 0.62 V.



Fig.7. Voltage Controlled Oscillator Schematic



Fig.8. Voltage controlled Oscillator Waveform

Frequency Divider Circuit

Voltage Controlled oscillator's output is then passed through frequency Divider network as this is on chip clock multiplier by 8. The VCO outputs signal with 8 x f_in so in order to fed back this signal to PFD block output frequency is divided by 8 and then it is given to PFD for phase and frequency detection with f_clk_in. Fig. 9 shows schematic of Frequency divider circuit (N=8). Here N = 8 is the division factor. The circuit diagram for the frequency splitter (N=8) is illustrated. Fig 10a. Displays the input and output signals from the frequency divider by two blocks where the output frequency is half the input frequency. Output frequency is divided by 8 as shown in fig. 10b.



Fig.9. Frequency Divider by factor of 8 schematic



Fig.10. Frequency Divider Waveforms (a) N = 2 (B) N = 8

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Pll Block

Fig. 2 shows the complete PLL block level schematic with it's all waveforms together shown in Fig. 11. It can be seen that as the control input voltage of VCO i.e., vin_vco acquires the steady state value, the output frequency of VCO i.e., f_out gets locked with f_in both in terms of phase and frequency and this state is called Phase Locked state. Another observation is that the output frequency (f_out) is eight times the input frequency (f_in).

Parameter	Min	Туре	Max	Unit	Operating Condition
Supply Voltage (VDD)	-	1.8	-	V	T=-40 to 150C
Reference clock frequency	5	10	12.5	MHz	
(FCLKREF)					
Output clock frequency	39.7	80.9	99.8	MHz	PLL mode, T=27C, VDD=1.8
(FCLKOUT)					
Duty Cycle (DC)	48	-	52	%	T=-40 to 150C
Oscillatror control input voltage	.557	-	.62	V	$Vin_vco = 0V$ at $t = 0$ (.uic)
(VVCO)					
Settlng Time (TSET)	5.2	5	4.6	μs	start from EN_CP and report 2 values;
					one at FCLKOUT=40MHz and one at
					FCLKOUT=100MHz

TABLE I.PLL SPECIFICATIONS

Table I. shows PLL specifications such as Reference clock frequency, Output clock frequency, Duty cycle, control input voltage of oscillator and settling time which are targeted and achieved during the design process with their minimum, typical and maximum values as specific operating conditions.



Fig.11. All PLL Waveforms

CONCLUSION

On chip clock multiplier with Phase Locked Loop was designed and simulated using a 180 nm OSU treatment node. This PLL is based on charge pump technique which overcomes the most of the drawbacks and limitations of Simple PLL such as limited acquisition range, trade of between ζ , ω LPF and phase error which comes into picture in high performance integrated circuits. The pre-arranged circuit simulation was conducted using open-source tools LTSPICE and Ngspice. The design of the layout and the simulated layout will be the future work of this document. The designed PLL accepts the input frequency in the range of 5 MHz to 12 MHz and output the frequency in the range of 39.7 MHz to 99.8 MHz with typical settling time of 5µS and 50% duty cycle.

Acknowledgement

The authors would like to express their appreciation to Mr. Paras Gidd and Mr. Kunal Ghosh Co-Founder at VLSI System Design Corp. Pvt. Ltd. [5] for conducting the VSD Open 21 Tutorial on PLL design using OSU 180nm process node. This document is the synthesis report about the work done during the tutorial.

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TRANSPORTATION MANAGEMENT SYSTEM USING DOTNET

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ABSTRACT

The Transport Management System is developed to manage the transportation work easily keeping the transport agency up to date regarding the vehicles information. Transport agency has the work to transport goods from one city to another city. They have to keep track of each and every truck or other transport vehicles they have in their transportation company. They have to record each and every vendor of the vehicle's parts to manage the transportation business. Our transport management system also allows users to keep records of their employees. Transport management companies keep records of every repair that has been taken by any transport vehicle, and the transport agency also records expenses incurred for a repair on a day. Our transport management system automates this process by calculating the total amount of a transport vehicle and also keeps records of fuel information. Transport agencies can also generate reports by using the system to keep records or document the expenditure.

Keywords- C#, Dotnet (.net).

1. INTRODUCTION

In this review paper, the Transportation management system using dotnet proposes an automatic system for creation, updating and maintenance of records. The users need to access the system by entering their ID and password. Once they are successfully logged in, they can view, add, edit, delete the existing information. India being a developing country its main aim is to digital delivery of services, digital infrastructure creation, and digital literacy. The existing system requires manual work for the maintenance of records. Many problems are encountered by the existing system such as

- 1. The old transport firm management system is very time consuming.
- 2. The maintenance of the old transport system is also very low.
- 3. The old transport system is also less Secure and user has to do many extra-clerical works because this old transport system does not generate each and every record.
- 4. Human intervention in updating and maintenance of records in ledger is error prone.

2. TMS METHODOLOGY

The methodology of the system is explained in figure above which shows the flowchart of the Transportation management system using dotnet. Initially the user is asked to enter the ID and password which they had entered while registration. There are going to be 2 logins i.e. Admin and Manager. After successful login, the user will get options like vehicle information, Employee Information, Vendor's Information. However, if the authentication fails the system waits for valid authentication. In vehicle information further the user can view details and list of existing vehicles, he can add new vehicles by entering details like vehicle model, color, country of manufacturing etc. The user can edit the existing details by the edit option. The user can delete a vehicle details by entering vehicle ID which they had entered while adding the vehicle details to the system. In Employee information the user can view the existing list of employees, he can add new employees by entering details like name, address, phone no., license no., license expiration date etc. he can edit the existing details by the edit option. He can delete an employee details by entering employee id. Similar options are given in the vendor information. Operation and also all information are stored in a database.



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This review paper reports the experiences of both adopters and non-adopters of transportation management systems (TMS) technology. TMS adopters represent a diverse array of companies. with a surprisingly high percentage of adopters using outsourced services for decision support activities. Motives for adoption tend to align with the firm's strategic needs though functionality focuses on the shipper's day-to-day operational needs. While expectations of system performance and return on investment vary greatly, TMS users illustrate a generally high level of satisfaction. Non-adopters view decision support for transportation activities as a low priority. This article explores future prospects for TMS development and adoption. The Transport Management System is developed to manage the transportation work easily keeping the transport agency up to date regarding the vehicles information. Transport agency has the work to transport goods from one city to another city. They have to keep track of each and every truck or other transport vehicles they have in their transportation company. They have to record each and every vendor of the vehicle's parts to manage the transportation business. Our transport management system also allows users to keep records of their employees. Transport management companies keep records of every repair that has been taken by any transport vehicle, and the transport agency also records expenses incurred for a repair on a day. Our transport management system automates this process by calculating the total amount of a transport vehicle and also keeps records of fuel information. Transport agencies can also generate reports by using the system to keep records or document the expenditure.

3. APPLICATION

This research paper is the first of its kind which has collected the opinions of both customers as well as transport providers on the problems faced in the transport sector in India. The study shows that traffic congestion is the major problem faced by transport users in India. Traffic congestion is a global as well as local problem. This results in slower speeds and increased travel time. Other problems like parking, improper signals also lead to traffic congestion. Illegal parking of vehicles on the road sides decreases the capacity of the roads which in turn results in the traffic congestion. Followed by traffic congestion, the second major problem is movement of Non-Motorised traffic. Indian traffic is a heterogeneous traffic where the same roadway is shared by the motorised and non-motorised traffic. As the vehicles move with high speeds, movement to pedestrians and cyclists becomes difficult and sometimes leads to accidents also. The same way, major challenges faced by the transport providers are increase in fuel prices and inadequate trained drivers. In the current scenario, there is a scarcity of trained drivers and high fuel prices are likely to increase the transport cost. In the case of railways, cleanliness and security is the major issue faced by the transport users followed by the availability of quality food. In the majority of the trains, availability of water in the toilets and toilet cleanliness is not up to the mark particularly in case of second class travel. In most of the trains there are no proper security systems because of which theft cases are registered more, particularly, in general and second class compartments. In case of airways, high fares followed by interactive

The quality of staff are the major challenges faced by the passengers. Customers are expecting better service quality from the cabin crew followed by food and ambience is the least bothered thing.

The methodology of the system is explained in the figure above which shows the flowchart of the Transportation management system using dotnet. Initially the user is asked to enter the ID and password which they had entered while registration. There are going to be 2 logins i.e. Admin and Manager. After successful login, the user will get options like vehicle information, Employee Information, Vendor's Information. However, if the authentication fails the system waits for valid authentication. In vehicle information further the user can view details and list of existing vehicles, he can add new vehicles by entering details like vehicle model, color, country of manufacturing etc. The user can edit the existing details by the edit option. The user can delete a vehicle details by entering vehicle ID which they had entered while adding the vehicle details to the system. In Employee information the user can view the existing list of employees, he can add new employees by entering details like name, address, phone no., license no., license expiration date etc. he can edit the existing details by the edit option. He can delete an employee details by entering employee id. Similar options are given in the vendor information. Operation and also all information are stored in a database. So, this system will be really helpful to people . In our new system everything is computerized and transport management is totally transparent. Everything is automated in the new system now users need minimal Clerical work involved to manage transport work. New transport management system requires less manpower since all the paperwork is automated in the new system. new transport management system is user friendly with good look and feel and accurate

4. ANALYSIS

The Transport Management System' is developed in such a way that users can access every functionality easily. This system is user friendly. Users can easily view records, book transport trips and create expense reports. The

old transport firm management system is very time consuming. Users have to create manual work to manage the records. The maintenance of the old transport system is also very low. The old transport system is also less Secure and users have to do much extra-clerical work because this old transport system does not generate each and every record. To keep the records of the bills and expenditure, the Transport Company needs more manpower. As the user has to do a lot of work manually then it is very difficult to stop irregularities in maintaining the record. And companies need very intelligent and diligent employees to keep records of transport related expenses. So, solving all these problems we have developed this project on

The transport management system

Our new system makes transport maintenance easy and requires less manpower and less time for maintaining the records of the transportation firm.

5. CONCLUSION

This research paper . It is important for the transport providers to know what customers expect so as to give quality service. The success or failure of any service organisation from every part of the globe completely depends on how effectively frontline staff delivers the required services based on the customization. It is therefore important for management to keep an eye on the frontline staff and their abilities to meet the customers' requirements by clearly understand the expectations of the diverse customers. This research proffers invaluable information about the challenges faced by the customers based on which there will be an enormous possibility to review their strategies and plans. The limitations of the study is that the research is concentrated only in the states of India. It has been a great pleasure for me to work on this exciting and challenging project. This project proved good for me as it provided practical knowledge of not only programming in windows based applications, but also about all handling procedures related with Greyhound Fleet Manager. It also provides knowledge about the latest technology used in developing client server technology that will be in great demand in future. This will provide better opportunities and guidance in future in developing projects independently.

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INDIAN STOCK MARKET PREDICTION USING RNN AND LSTM

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ABSTRACT

Prediction of the Stock Market is a challenging task in predicting the stock prices in the future. Due to the fluctuating nature of the stock, the stock market is too difficult to predict. Stock prices are constantly changing every day. The latest prediction techniques adopted for the stock market such as Artificial Neural Network, Neuro-Fuzzy System, Long Short Term Memory (LSTM), Recurrent Neural Network (RNN).

Keywords-Artificial Neural Network, ISTM, RNN

I. INTRODUCTION

Data analysis has been used in all business for data-driven decision making. In share market, there are many factors that drive the share price, and the pattern of the change of price is not regular. This is why it is tough to take a robust decision on future price. Artificial Neural Network (ANN) has the capability to learn from the past data and make the decision over future.LSTMs are very powerful in sequence prediction problems because they're able to store past information.

This is important in our case because the previous price of a stock is crucial in predicting its future price.

II. PROBLEM STATEMENT

predicting stock prices is an uncertain task which is modelled using machine learning to predict the return on stocks. Over the years, various machine learning techniques have been used in stock marketprediction, but with the increased amount of data and expectation of more accurateprediction, the deep learning models are being used nowaday

III. LITERATURE SURVEY

The first focus of our literature review was to evaluate different algorithms and models to determine whether stock price predictions could be made on real

stock prices [2]. However, as we have not been able to detect a possible change in this stock price forecast, we decided to look at existing plans, analyse major issues, and improve ourselves. A brief search of common solutions to the above problem led us to LSTM. After deciding to use the LSTM neural network to make stock forecasts, time series data is collected from stock firm prices of the stock and related macroeconomic variables over a period of years.

IV. ALGORITHM

Basically the algorithm we used here depends upon the recurrent neural network where we consider long shortterm memory cell. Neural Network mimics the behavior of the brain and sometimes attains the superhuman capabilities. A neural network consists of 3 main parts i.e. the input layer, a hidden layer and output layer along with some activation functions. So let's discuss some basic algorithmic structure.

V. BASIC ALGORITHM STRUCTURE

Input layer consists of input features that are basically derived from the old output ofstock market prediction. The input layer consists of many old features of the stock market. The input layer will be connected to some hidden layers. The hidden layer will pass on to some more hidden layers and in the end the output layers. The output layer will basically predict the probability. The probability will be determined by sigmoid activation function or rather by a softmax activation function. So, the input tensor will be the shape of input and in between, there are many hidden layers. It is important to give the shape of input to the tensor otherwise it will not be able to predict the output. The input layer is basically judged by the recurrent neural network. The recurrent neural network consists of long short- term memory cell. The data is contained inside the CSV file which is old stock market predictions. Info layer comprises information includes that are fundamentally gotten from the old yield of securities exchange forecast. The info layercomprises of numerous old highlights of a securities exchange. The information layer will be associated with some concealed layers. The shrouded layer will pass on to some more concealed layers and at last the yield layers. The yield layer will fundamentally foresee the likelihood. The likelihood will be dictated by sigmoid initiation work or rather by softmax actuation work. In this way, the info tensor will be the state of information and in the middle of there are many concealed layers. It is essential to give the state of contribution to the tensor else it won't have the capacity to anticipate the yield. The information layer is fundamentally made a decision by the intermittent neural system. The

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intermittent neural system comprises a long transient memory cell. The information is contained inside the CSV document which is old securities exchange forecasts.

VI. HARDWARE & SOFTWARE REQUIREMENTS HARDWARE

Automated Trading systems may sound too complex but requires very few hardware costs, you just need a good computer with a good editor and you're ready to go, not much requirement of extra hardware specifications

SOFTWARE

Python Idle3.6.5 - It is a python supervisor wherein we will really execute the calculation to separate informational indexes, perform controls, and anticipate the normal outcomes with exactness

INTEGRATED DEVELOPEMENT ENVIRONMENT

Working with Python in Visual Studio Code, using the Microsoft Python extension, is simple, fun, and productive. The extension makes VS Code an excellent Python editor, and works on any operating system with a variety of Python interpreters. It leverages all of VS Code's power to provide auto complete and IntelliSense, linting, debugging, and unit testing, along with the ability to easily switch between Python environments, including virtual and conda environments.

PYTHON LIBRARIES

KERAS >Working with Python in Visual Studio Code, using the Microsoft Python extension, is simple, fun, and productive. The extension makes VS Code an excellent Python editor, and works on any operating system with a variety of Python interpreters. It leverages all of VS Code's power to provide auto complete and IntelliSense, linting, debugging, and unit testing, along with the ability to easily switch between

Python environments, including virtual and conda environments.

NUMPY>The Stock market check is an exceptionally fascinating errand which join high substances of how the budgetary exchange limits, and what unconventionalities can be prompted in a market in light of different conditions. While a few venders may battle that the market itself is functional, and that if there is new check or any assortment from the standard in a market it charms it by auditing itself, thusly making no space for conjectures, while several vendors may battle that on the off chance that the information is orchestrated well, by then machine can make a sort out of procedure that is persuading can affect high continue exchanging or HFT, which is just conceivable through Algorithmic Trading Systems or Automated Systems of Trade.

Money related authorities think about the expression, Buy low, Move high yet this does not give enough setting to settle on proper endeavor decisions. Before an investigator places assets into any stock, He should realize how money markets continues .Setting assets into a wonderful stock regardless at a horrible time can have awful results, while vitality for a common stock at the fortunate time can hold up under focal points. Cash related monetary pros of today are going toward this issue of trading as they don't for the most part understand concerning which stocks to buy or which stocks to offer with the authentic objective to get impeccable focal points. Envisioning whole game plan estimation of the stock is commonly clear than foreseeing on day-to-day premise as the stocks change rapidly reliably subject to world events.

PANDAS>Pandas is an open-source library that is made mainly for working with relational or labeled data both easily and intuitively. It provides various data structures and operations for manipulating numerical data and time series. This library is built on top of the NumPy library. Pandas is fast and it has high performance & productivity for users.vPandas is an open-source library that is made mainly for working with relational or labeled data both easily and intuitively. It provides various data structures and operations for manipulating numerical data and time series. This library is built on top of the NumPy library. Pandas is fast and it has high performance productivity for users.

Pandas-Data Reader >Use to remove information from large number of web sources.

MATPLOTLIB>Matplotlib is an amazing visualization library in Python for 2D plots of arrays. Matplotlib is a multi-platform data visualization library built on NumPy arrays and designed to work with the broader SciPy stack.VMatplotlib is an amazing visualization library in Python for 2D plots of arrays. Matplotlib is a multi-platform data visualization library built on NumPy arrays and designed to work with the broader SciPy stack.

MINMAXSCALER>Matplotlib is an amazing visualization library in Python for 2D plots of arrays. Matplotlib is a multi-platform data visualization library built on NumPy arrays and designed to work with the broader SciPy stack.stack
VII. ACKNOWLEDGMENTS

Special thanks to our Guide **Prof.** Sweta Padman for assisting us to partially complete our project on "INDIAN STOCK MARKET PREDICTION USING RNN AND LSTM"

His/Her expertise and talent in circuit designing and troubleshooting and logical regression helped us effectively to partially complete this project.

We would also like to thank our Head of Department **Mrs.** Aboli Moharil madam for providing us facility and labs, which helped us constantly in increasing our technical knowledge, and to write this report.

We are also thankful to our Principal **Dr. S. Ram Reddy** sir for his continuous encouragement throughout the process.

Now, last but not the least special thank to all the staff of **Electronics & Telecommunication Engineering Department** for their technical support and constant motivation, without which this work would not have become successful.

VIII. CONCLUSION

In present, there are several models to predict the stock market but they are less accurate. We proposed a model that uses RNN and LSTM to predict the trend in stock prices that would be more accurate. In this work by increasing the Epochs and batch size, the accuracy of prediction is more. The proposed method is capable of tracing and prediction of stock market and the prediction will produce higher and accurate results. In our above model we are getting accurate results which will be more useful to stock analysts, Business analysts, Stock Market Investors.

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SELF DRIVING CAR

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ABSTRACT

A self driving car or a driverless car or an automated car. Within the present day time, the vehicles are made computerized to grant human drivers loose driving. In this field of automobiles, distinctive sorts of perspectives have been considered that produce a vehicle computerized. Google has started working on self-driving cars since 2010 and is still making advanced changes to require computerized vehicles to the another level. In this paper, we proposed a self-driving car demonstration called an autonomous, mechanical or driver-less car that works and navigates utilizing its insights. The fundamental thought here is to create a RC car to depict a computerized car. The venture contains the taking after computer program and equipment components such as CNN (Convolutional neural network), Monocular vision algorithm, Haar cascade classifier, Raspberry Pi Board model B+, Pi camera, Arduino, and an Ultrasonic sensor.

Keywords-Internet of Things, Raspberry Pi, Arduino Uno, CNN, EV, AI, ML

I. INTRODUCTION

A self-driving car (moreover called an independent car or driverless car) could be a vehicle that employments a combination of sensors, cameras, radar etc. to travel between goals without the assistance of a human. This thought of self-driving cars or independent vehicles has been brought into activity through human creative energy since the 1930s and with the 2020 expressed as the deadline to put self-driving cars on the lanes of major cities within the US and other created nations, stakes and inspiration are verifiably tall. Within the final few a long time, free driving has ended up to some degree conceivable from how did anyone think this wasn't unavoidable? to be commercially open. In December 2018, a company named Waymo, rose from Google's selfdriving-car wander, and started its commercial self-driving-car advantage within the rustic ranges of Phoenix.; to begin with, the program was underwhelming because there were only a few hundred confirmed riders, and human security directors remained behind the wheel.. But from the past four years, Waymo has steadily carried out the program to people within the open and has begun to run robotaxis without the assistance of a driver. The company has since brought its act to San Francisco. Robot rides have been paid since at that point. It's sensible to start. Waymo expressed that it'll extend the service's capability and openness over a period of time. Inside the interim, its one time controlling establishment has vanished. Each basic automaker is looking for after the tech, eager to rebrand and adjust itself as a "mobility provider. Amazon bought a self-driving-vehicle design, Zoox. Independent trucking companies are raking in budgetary master cashTech mammoths like Apple, IBM, and Intel are looking to carve off their cut of the pie. Up and coming unused companies have begun to fill specialties in a laser sensors, compressing mapping data, setting up burgeoning environment, centering on advantage centers, etc. Too, the government of India is advancing EV and modern advancements because it will make our nation less subordinate on other nations for Oil moment subsequently sparing Billions of dollars went through each year on Oil. It is an opportunity to create our aptitude in this field, a sort of venture in incredible and evergreen development which would be profitable in a couple of or the other way.

II. DESIGN

A. Arduino Uno R3



Fig.1: Diagram of Arduino Uno R3

Microcontroller board based commonly on ATmega328P(datasheet) is known as Arduino Uno. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator (CSTCE16M0V53-R0), a USB association, a power jack, an ICSP header and a reset button. It has an operating voltage of 5 Volts, and can have an input voltage from 7 to 20 Volts.

B. TowerPro SG90 Mini Servo - 180 degree Rotation



Fig. 2: Diagram of SG90 Mini Servo

The TowerPro SG90 9g Mini Servo is a 180° rotation servo. It may be a Digital Servo Motor that gets and forms PWM signals quicker and superior. It prepares modern inside circuitry that gives great torque, holding power, and quicker overhauls in reaction to outside powers. The wires have the

color portrayal, Red – Positive, Brown – Negativem Orange – Signal. The features include High resolution, Accurate positioning, Fast control response, Constant torque throughout the servo travel range, Excellent holding power.

C. Motor Driver l298n



Fig 3: Diagram of Motor Driver L298N

This L298N Based Motor Driver Module may be a high power motor driver culminating for driving DC Motors and Stepper Motors. It employs the prevalent L298 motor driver IC and has the onboard 5V controller which it can supply to an outside circuit. It can control up to 4 DC motors, or 2 DC motors with directional and speed control. This motor driver is a culmination for mechanical technology and mechatronics ventures and idealized for controlling motors from microcontrollers, switches, relays, etc. Perfect for driving DC and Stepper motors for micro mouse, line-following robots, robot arms, etc.

D. 10000mah 18 watt Power Bank



Fig. 4: Diagram Ptron dynamo Pro 10000mah 18 watt power bank

pTron Dynamo Pro with Capacity : 10000mAh, Battery Type : Li-Polymer battery, Micro Input : DC 5V/2A,, Size :

139.8 X 69.20 X 16.5mm, Material : Texture Finish, Weight : 210.86gm, Type-C Input : DC 5V/2A, Output : DC 5V/2.4A(max) (USB1 + USB2P) is used as a power source.

E. HC-SR04 Ultrasonic range finder



Fig. 5: Diagram of HC-SR04 Ultrasonic range finder

The HC-SR04 ultrasonic sensor uses sonar to determine the distance to an object like bats or dolphins do. This Ultrasonic Sensor module could be a transmitter, a recipient and a control circuit in one single pack. It has very handy and compact construction, offers excellent range accuracy and stable readings in an easy-to-use package. Its operation isn't influenced by daylight or dark fabric like Sharp rangefinders are (in spite of the fact that acoustically delicate materials like cloth can be troublesome to distinguish). Ultrasonic Ranging Module HC-SR04 provides 2cm-400cm non-contact distance sensing capabilities, Ranging accuracy up to 3mm.

F. GL12 830 points solderless breadboard



Fig.6 : Diagram of GL12 830 points solderless breadboard

840 Tie points – 128 Groups of 5 connected terminals, 8 Bus of 25 connected terminals Reusable for fast build a prototype of an electronic circuit – will acknowledge transistors, diodes, LEDs, resistors, capacitors and for all intents and purposes all sorts of components – No soldering required – Can alter or reexamine the circuits effortlessly Fit for jumper wire of 0.8mm distance across – Standard 2.54mm hole spacing Adhesive sheet on the back side of the board – Multiple breadboards can be spliced together too.

G. 5MP Raspberry Pi 3/4 Model B Camera Module Rev 1.3 with Cable



Fig. 7: Diagram of 5MP Raspberry Pi Camera Module Rev 1.3

The 5MP Raspberry Pi 3/4 Model B Camera Module Rev

1.3 with Cable prepares adaptable cable for connecting with Raspberry Pi 3 Model B. The high-definition 5MP camera conveys extraordinary photographs but can too shoot video, perfect for drones or a CCTV extend. The lightweight camera board is useful in more practical roles,

such as a hidden camera, even a camera for a Pi-phone. This Raspberry Pi Camera Module could be a custom outlined add-on for Raspberry Pi. It connects to Raspberry Pi by way of one of the two little attachments on the board upper surface. This interface uses the dedicated CSI interface, therefore it is designed especially for interfacing to cameras. The CSI bus is capable of extremely high data rates, and it exclusively carries pixel data.

H. 8025 5v cooling fan.



Fig.8 : Diagram of 8025 5v cooling fan.

3010 5V Cooling Fan for Raspberry Pi with Mounting Bolt & Nut. Utilize this compact 5V fan to keep your ventures cool. It is exceptionally simple to introduce and uninstall with simple mounting and Connector to put through onboard. This fan can be directly connected to Raspberry Pi pins 4 and 6.

I. 4 WD Double Layer Smart Car Chassis Kit

4 WD Double Layer Smart Car Chassis Kit contains, Acrylic Transparent car floor, Plastic wheels with Rubber Grip, Dual shaft BO Gear Motor, Coded Disk, Acrylic Fasteners, Battery Holder, Connecting Cable(Red and Black, Length: 20 cm each), M3 Brass Stand-Off, M3 Cross-Head Bolt (Length: 8 mm), M3 Cross-Head Bolt (Length: 30 mm), M3 Nut

Wheels

Moto

Arduin

Raspberry P



Objects

Traffic sign

III. IMPLEMENTATION

This proposed model is built using Raspberry Pi and Arduino Uno at its core which will process the image input samples obtained by the Pi camera which is connected at camera input of Raspberry Pi. Now this Raspberry Pi is connected to the Arduino via a usb port for sending processed data. The Arduino takes input from the ultrasonic sensor and the Raspberry Pi and gives instructions to the Motors via L298N motor driver which will give instructions based on Arduino to the motors. Following vehicle when faced by an obstacle, takes the help of ultrasonic sensors attached to it to detect them and avoid it. The Pi cam will be in front of the car and will detect the lane and all the subtle elements of the street environment like traffic lights, creatures, strolling pedestrians and numerous more.

Fig. 9 : Diagram of 8025 5v cooling fan. APPLICATIONS

As we all know that travelling from one place to another for business, for buying goods and many more has become the most essential part of human life, but for that a person has to either go with the help of public transports like bus, train or taxis. But many times it is not possible to go by public transport due to crowds, increased risk of spread of infectious diseases and many more, so people nowadays prefer to go by their own private vehicle. Owning a private vehicle is not a big matter but driving it is a big matter as it is related to your life and the life of pedestrians walking on the road. Many times people go for parties or somewhere where they spend time and get tired due to which they feel unable to drive the vehicle back home but as there is no other option for the same they have to drive helplessly and sometimes lead to accidents. To avoid this we have come





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to a solution, not a unique one but better than the existing one and the latest of all. We have proposed a self driving car model which can detect lanes and obstacles and traffic lights, basically all the details of the road and with this it will help the driver with driving and the chances of accidents would be greatly reduced. Imagine a situation wherein you and your family had gone to attend a wedding ceremony in your native place in the morning, go there and enjoy the whole day and then set to go back to home which is very far from that place assuming it would take 3 hours of driving. Now there are two cases. First, if you have a normal car you start it and drive even if you are not in the state of driving and tired, due to this you are at a greater risk of an accident due to lack of attention and this would cost your as well as lives of people inside the car. Now let us discuss the second case in which you are having a self driving car where you will not have to put your whole focus on driving and can relax to some extent as compared to a normal car. Now which case you like the most, of course the second one as it is safe and convenient also. Hence the basic idea behind developing this model is to implement it in our lives after the successful trial of the model and make our lives more convenient. Each and every component used in the model is useful like starting from the ultrasonic sensor which will detect and vehicle nearby, the pi cam which will capture picture samples and process it using raspberry pi and perform image processing, the Arduino which will control the motor and take input from ultrasonic sensor and the raspberry pi.

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Gratitude might be a way to express one's thankfulness but in a view, it is still less in showing how invaluable the guidance and the help means. My obedient and sincere thanks to Dr. S. Ram Reddy, Principal, SLRTCE, Mira Road for providing the facilities and necessary assistance to our requirements which was crucial for the completion of work. I express my thanks to Prof. Aboli Moharil, HOD (EXTC), SLRTCE, Mira Road, for giving her support for the growth of the project work.

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All the thanks and my gratitude towards my teachers, family, friends, the efforts, the blessings, and the guidance which had made it possible to achieve the fulfillment of the assignment.

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ISOLATING VOCALS FROM STEREO MUSIC

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ABSTRACT

Isolating vocals stereo music also commonly known as audio source separation involves rebuilding individual audio signals that have been overlapped with each other. For achieving this, a detailed analysis of signals has to be done. Depending on the implementation of the techniques, a plethora of applications can be worked upon. Some of these include the removal of noise, disturbance, or any unwanted frequency from an audio track, which can be used to enhance the quality of the track, and remixing or unmixing parts or sequences as per desire. To achieve an effective solution, Neural networks, a part of Deep Learning in Artificial Intelligence, come to the rescue. The idea is to use convolutional neural networks as a transfer function and build a model that separates the needed vocal from the mix.

Keywords— Convolutional Neural Network(CNN), Artificial Intelligence(AI), Signal Processing, Transfer function, Audio Separation, Spleeter

I. INTRODUCTION

Music is a part of our everyday lives. Recording music from various sources can lead to different qualities and distortion. Music can be in any form it can be an audio track from a call recording, it can be the song, it can be the scores from movies or recordings via the FM radio. In the music industry, there is a lot of remixing, remastering, retouching of audio tracks to make the quality of a song better or more pleasant to the ear. In such applications, we think that artificial intelligence could play a vital role as one doesn't have to manually figure out or separate the vocals by applying different filters. By using artificial intelligence, automation can be done easily. Not only can we perform isolation but also customize the algorithms according to the desired output. This will save a lot of time, effort and will generate a much more pleasant output than what is reflected as a part of the manual process.

To utilize this we study the deep learning field of artificial intelligence where we deep dive into the neural network and we also look at signal processing. Essentially all the voices we hear daily are vibrations. By studying the signals in our vocal tone, we can determine and build an algorithm to separate the different stems. While the implementation is rather complex, we have explored the artificial intelligence tool called spleeter. This tool is very helpful in separating the different frequencies of a music track. You can select a 2 step model, 4 step model, or 5 stem model. The two-step model is basically the voice and the accompaniment separation. The four stem models have the vocals, the bass, the drums, and the other separations. The 5 stem model separate command. We have also displayed an audio visualization of the tracks given as input and obtained as output, received upon the implementation of the tool. We have covered the basic theory needed to understand the implementation, the steps required to replicate the process and get started on the hands-on by yourself. There are a plethora of applications that can be worked upon including voice-to-text typing as the computer or an AI has to identify the correct words from the human speech and disregard the disturbances and convert them into textual form. This and many more applications are also mentioned in the paper.

II. DISCUSSIONS

Artificial Intelligence is a way of training the machines to gain the desired output without actually telling them how to do it. Let's take a human for example. A human, as a baby, uses their senses to sense things around them. This can be envisioned as inputs to an AI algorithm. A baby watches all the adults around them and tries to replicate the steps needed to walk. They fall and learn from their mistakes. A similar concept is implemented in the Deep learning aspect of Artificial Intelligence. Neural networks, as derived from the neural system in the human body, are built to use mathematical functions as a tool to mimic this aspect of human behavior. The part where the baby falls and learns is basically where reinforcement learning takes place. Convolutional Neural networks are basically where we use convolutional layers to extract features from any form of input. Convolutional neural networks are basically used to take an image as input, assign different structures in the image a variable distinction and differentiate one aspect of an image from the other. It uses a combination of various layers of mathematical functions and epochs to conduct feature extraction and gain the smallest of details from the input obtained.

Machine learning is a branch of artificial intelligence that is used to develop applications or models that learn from sample data or training data to make decisions and predictions and it improves its performance and accuracy with time without being programmed to do so. Machine learning can be classified into 3 as supervised, unsupervised and semi-supervised or reinforcement learning. In the context of machine learning, Spleeter can be considered as unsupervised as the models were trained with the unlabelled dataset by clustering.

Machine Learning is the core part where we are building models by training our algorithms based on datasets. Keep in mind that the dataset needs to be unbiased. We basically use a set of images or audio files or text inputs as a data set depending on the requirements. The data set is split into two parts, the training data set and the testing data set. Split the data set into two parts so that we have a part to test a model and gain its accuracy.

III. METHODOLOGY

In this paper we are going to talk about two methods, the first one being the isolation of the vocals or any desired tone from an audio track and second its implementation as seen in Spleeter, an open-source AI tool by Deezer.

Let's understand the structure of human speech. There are basically three main elements that can be found, the first one being a fundamental frequency, the vibration that you hear which is the vibration of the vocal cords. If we analyze our voices we will also find harmonics that have a similar pattern as fundamental frequencies. Then there are the noises or other unwanted sounds like the sound of our human breathing or any other noises that come as an outlier and don't follow the same pattern as the fundamental and the harmonics of a human speech.

When we understand the different elements that are present in human speech it becomes easier to distinguish and separate the different vocals from an audio track. The basic algorithm would be to identify the fundamental tone using AI and capture it. Easier said than done there are often many challenges that we face during this process. What if there is an audio track where two or more singers are singing at the same time or if there are multiple beats of multiple effects that are mixed into one track. This makes it very difficult to implement it from scratch.

From one of our literature surveys, we found that we can use convolutional neural networks as a rescue to this problem. If we use the short-time Fourier transform we can represent an audio signal as a sort of an image. These aren't actual images but we can treat them as images and then use our algorithm to validate our hypothesis.

In one of our findings, we discovered an amazing artificial intelligence tool called Spleeter. Spleeter is based upon time-frequency masking. As the name suggests, time-frequency masking is performing separation in the time-frequency domain. It uses a mask to separate the target or desired single from the other noisy or interfering signals. After performing this masking we are left with separated stems of a provided audio track. Spleetert has pretrained state-of-the-art models that do this task for us. It uses the U-Net architecture which is basically a pair of convolutional encoders and decoders. We just implement it by installing the splitter package along with dependencies and selecting the audio file and applying the algorithm and gaining the different separated audios.

IV. IMPLEMENTATION



Fig 1: Audio visualization of the example track used as input



Fig 2: Audio visualization of the vocal file received as output



Fig 3: Audio visualization of the accompaniment track received as output

The implementation of audio separation is performed using the splitter package in Python. We have used Google colaboratory as the platform for a project. You can use Google colaboratory or Jupiter notebooks depending on your preference. The first step is to install the dependencies. We have to install, Fast Forward Motion Picture expert group(FFmpeg). This package is used for processing audio and video formats as we are working on audio and this is vital for our implementation. We install Spleeter using the PIP command, pip install spleeter.

You can insert an audio file of your own by copying and pasting the audio file in the same directory as your Python file and then importing it. For the sake of convenience, we have used the audio sample file which is available in the GitHub repository of splitter by Deezer. We use the separate command to separate the vocals from the background score. Depending on the stem that you have used you will get the desired output. If you use the two stem model, you will get two outputs one is the vocal of other singers singing and the other is the background score, which will be the combination of all the musical instruments and effects used in the order track. We used the librosa library to visualize the audio waveforms as seen in the figures. Thus, we have successfully implemented spleeter and witnessed audio separation in action

V. APPLICATIONS

The audio isolation technique finds implementation in many aspects of the music industry. We can use it for the basic track separation, use this implementation for recommending music to users of any platform. We can use it to classify music by various genres, artists, music instruments, transcriptions, and more. Furthermore, it can be used to remove the noise, enhance the audio quality, remix popular tracks, mix and unmix as per desire and reconstruct messages. The usage of artificial neural networks increases the accuracy of isolating vocals from audio tracks by folds.

VI. CONCLUSION

This paper focuses on Isolating voice vocals from stereo music using artificial intelligence. While building a machine learning model from scratch, from acquiring the correct data set to train a model and actually building a pipeline into production might be a very big part of the deal, we hope that the implementation of spleeter conveys the desired output we are trying to achieve. This is just the beginning of the wondrous applications that this tool can have. Work on the different amounts of stems that you can separate and achieve the best of efficient reconstructed signals from the mix. In the production environment, there are a lot of strategies and optimization should be explored once the actual implementation produces the desired separation.

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DESIGNING A VENTILATOR USING ARDUINO

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ABSTRACT

The COVID-19 crisis has placed a huge strain on global healthcare due to the sudden and extra-cases burdens of various problems like chest pain etc but the major symptom is a breathing problem which also leads to insufficient access to the required supplies and equipment necessary to treat patients. Most notably, critical shortages of mechanical ventilators, which are essential for oxygenating patients who cannot breathe on their own, have forced doctors to make difficult decisions between who will and will not receive treatment, especially in resource-limited communities. The ventilator that we are designing is very cheap and affordable. When people suffer from breathing issues this can be used for emergency situations. Motor Mechanism is used to push the air bag.

Keywords-Arduino, Covid-19, Mechanism, Ventilator

I. INTRODUCTION

Respiratory damages comprise a noteworthy general medical issue in both developed and developing nations. The conditions like Asthma, respiratory infection and many more. These diseases are mostly caused by smoking, air pollution etc. Patients with lung weakness may create respiratory disappointment under an assortment of difficulties and can be bolstered by mechanical ventilation. Mechanical ventilator is used to achieve mechanical ventilation. Mechanical Ventilators are those machines that take over the working of breathing when a person is not able to breath enough on their own. The Mechanical Ventilator is also called a Ventilator, Respirator or breathing machine. Mechanical Ventilators are very costly machines. Ventilators are often fragile and vulnerable during continued use, requiring costly service contracts from the manufactures which leads to practices such as sharing of ventilators among hospitals and purchasing of less reliable refurbished units in developing countries.

Recently in covid-19 Pandemic the requirement of ventilator goes increasing in every country in major country they are capable of producing enough ventilators to the citizens but still they cannot cope up with demands and in major developing countries there is large scarcity of ventilator like situation arise. So the main contribution of the paper is to design a simple portable like ventilator which can be used during emergency situation

II. PROBLEM DEFINITION

When Covid-19 virus spread across the world, countries implemented the lockdown as a precautionary to limit the spread of the virus. After the first wave of covid-19 many surveys were conducted regarding virus and many medical equipment and on the basis of that surveys and various reports it is found that there is a need of a simple less bulky and affordable ventilator which can be useful again covid-19 so with the aim of simple and easy to displace ventilator with less cost this project is designed to fulfill the basic function of ventilator.

III. OBJECTIVES

- 1. To cope up or to meet the demand of ventilator because of Covid-19
- 2. To develop such a design which can easily be displaced from one place to another.
- 3. To develop a such a ventilator where a normal person which have very less knowledge regarding ventilator can easily operate
- 4. To provide a low cost ventilator which can be used in emergency situations like Covid-19

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In this paper[3] a ventilator is designed during the pandemic. A prototype is developed by placing the potentiometer and needle valve in place of flow analyzer. In this paper the device which is developed is in intilital design of

a portable ventilator. The main focus in this paper is to increase the efficiency of the initial design of portable ventilator as much as possible.

In this paper the author[2] also designed during Covid-19 Pandemics. Here the authors construct a ventilator aimed to mitigate the effects of the shortage of ventilator. This paper also shows a numerical method for monitoring the patients pulmonary condition.

In this paper[5] a ventilator is developed using a mixed integer model. Here the main objective of the author is to design a ventilator with greater efficiency.

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V. BLOCK DIAGRAM



Fig 1 Block diagram of Ventilator

From the literature survey our system will use Arduino as a brain for controlling every operation in our system. In our System Arduino will command a motor to perform a pushing mechanism on a Bag Valve Mask. In our system we can also adjust the inhale and exhale air flow. The Inhale and Exhale air flow will be determined by using different sensors. All the operations which are in process can be seen on a 16x2 LCD. There are switches which are used to increase or decrease the flow rate of air flow and also to start and stop the system. Hence our Provided System can be used during emergency situations.

VI. FLOW CHART

VII. CONCLUSION

Hence In this Paper a prototype device is designed which is used to assist the patients who have breathing difficulty. The devices in this project have very basic design. So our main focus while designing the prototype of ventilator is to minimize the components as much as possible but have basic function of ventilator that is pumping oxygen into Patients lungs

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IMPLEMENTATION OF LOCKER USING IOT

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ABSTRACT

Recently, the use of Internet of Things (IOT) technology in all aspects of life has increased, and the most important areas that have been affected by this development are locks, security systems, and remote-control technologies. In today's world, security becomes a very important issue. We are always concerned about the security of our valuables.

In this project, we propose Digital security Locker based on an IOT, which provides security, authenticity and user-friendly mechanism. Based on the cloude and bluetooth technique can be controlled remotely using a user friendly porable device. To design the interfaces that help to enhance security and convenience.

In addition to that, an alternative technique will be provided to open the lock by using thumb detection when the poratble device is not available. In order to use this locker First user needs to enter the username and the password while checking; the user directly connect to the lock through cloude. Then, the user chooses to lock and unlock the locker and after the selection, a notification will be sent to the user when opening or closing the locker.

Keywords: Hc05 Bluetooth, NodeMCU ESP8266, Firebase cloud, Relay, Latch lock.

I. INTRODUCTION :

There are many fields of using the Internet, including the educational, commercial, security, industrial and communications fields, as it has an effective role in accomplishing many tasks, hence a new revolution began in technical science, known as the Internet of Things (IOT) technologies, it is a new revolution of the internet so that all things in our life have the ability to communicate through the internet sending and receiving data to perform specific functions over the network. Over the decade, everyone is concerned about the safety of their valuables like jewelry, money, important documents etc. For ensuring the safety of these valuables bank can be an effective solution. However, due to the increasing rate of criminal approach it becomes difficult to ensure security of bank lockers should be taken into consideration. Therefore, in a paper we propose a Digital locker, which is mainly, an IOT based Digital security Locker. The research aims to replace traditional lockers lock with a Digital security Locker controlled by a mobile device application through Bluetooth solving traditional locking problems, by providing a degree of safety and ease of use. An alternative way to unlock the locker will be provided if the user forgets the phone or in case of a low Battery, by fingerprint technology Installed on the locker. The Digital lock doesn't only make your college Locker safe but also gives more control by allowing to lock and unlock the locker remotely.

II. BLOCK DIAGRAM:



Figure 3 : Block Diagram of system

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WORKING:

The proposed system specifies the improvement of the security that is integrated with the android mobile phone device, using Bluetooth as wireless connection protocol. The system controls the Digital locker remotely using the Internet of Things technology, through a smart phone application that will be designed to run on Android operating system, and the application is programmed using App Inventor, It will communicate with the lock using a Bluetooth chip that is connected to an electrical circuit lock (NodeMCU). The user begins to log into the application through the platform First the user enters the username and the password while checking, the user selects the appropriate Bluetooth network or firebase cloud to connect to the lock. Then, the user chooses to lock and unlock the locker and after the selection, a notification will be sent to the user will be able to use an alternative method to open the lock, which is a by scanning the thumb using Fingerprint sensor, it's placed on the locker and programmed using NodeMCU ESP8266. Fingerprint sensor is used to enter the secondary passcode to unlock the locker, if the user enters an invalid passcode through the mobile then both the buzzer and the red LED will turn on. The system allows the user to enter the password 3 times, if the password is invalid then the system will not respond to any entering through the mobile for next 10 minutes. The actual proposed system is divided into two parts software (platform design) and hardware.



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- > The automatic opening and locking system, activated through smartphones and Through biometric System.
- Increase Accessibility Without Compromising Security.
- Digital Locks Are Accessible Via Smartphones.
- Simplify Home Security.
- Remote Security Rocks.

IV. APPLICATION:

- Used in Industries
- College
- ➤ Home
- Buildings
- ➢ farm.
- Gardens



Figure 6: Flowchart of process

V. CONCLUSION:

In this paper a proposed locker security automation system based on IoT technologies along with the mobile communication techniques to authenticate the status of the conventional device. The lock system can be opened and managed via the Android application remotely. Fingerprint lock have gained tremendous benefits

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compared to conventional key door locks, combination door locks, keyless keypad lock or card reader door locks. Thus, thumbprint door locks surpass security protection, convenience, and speed. Fingerprint reader scanning is the most mature and tested type of biometric technology. Recent studies on biometrics have shown that compared to the hand method, fingerprint is more accurate and cost-effective. The duplication of biometric fingerprint technology is virtually impossible, only one in one billionth of a chance. Biometric security guarantees a positive method of user identification with something that cannot be lost, replicated or stolen. This system is very cost-effective and easy to install and is designed under different modes which makes it useful. The Digital security Locker has great potential. It will allow users to forget about their traditional key and to use only their mobile device to get access to the needed area. The system will be developed in the future to provide more extensions and to be as mobile as possible. Thus, this study has been approved for security and safety issues. The future work may include the accessing permission which is to be given by the property owner for more security measures.

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INDOOR AIR POLLUTANTS MONITORING SYSTEM WITH IOT

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ABSTRACT

Indoor air pollution is a matter of serious concern at present times. Indoor air pollution or indoor air quality degradation is becoming an issue of discussion among scientists and environmentalists in today's days. As human beings generally spend most of their time indoors, having good indoor air quality and its real time information is critical for maintaining human health and productivity. Air pollution that refers to the contamination of the air, irrespective of indoors or outside. A physical, biological or chemical alteration to the air in the atmosphere can be termed as pollution. It occurs when any harmful gases, dust, smoke enters into the atmosphere and makes it difficult for plants, animals, and humans to survive as the air becomes dirty. Nature has its own process for purifying outdoor air through rain, lightning, and ultraviolet sun rays, but what about insideair? In Proposed system we use Indoor Plants which clean Indoor Air by Natural Process.

Keywords— Air Quality Monitoring Systems (AQMS), PM (Particulate Matter), IOT (Internet of Things), AIR QUALITY SENSORS, Indoor plants, Raspberry-Pi.

I. INTRODUCTION

The main objective of IOT Indoor Air Quality Monitoring System is that the Air pollution is a growing issue these days. It is necessary to monitor air quality and keep it under control for a better future and healthy living for all.

Indoor Air Pollution Monitoring System in which we will monitor the Air quality over a webpage using(Node red) internet and will Indicate measured value & graph when the air quality decreases beyond a certain level, means when there are sufficient amount of hurtful gases are present in the air like CO2, Co,Methene and dust particles. It will show the air quality in PPM as well as in percentage on the OLAD Display and on webpage so that we can monitor it very easily. Also we can display graphical representation. We have used MQ135 sensor which is used for the best choice for monitoring Air Quality as it can detects most hurtful gases and can measure their amount accurately. We use pm2.5 sensors for the dust particles. In this IOT project, you can monitor the pollution level from anywhere using internet or by using mobile application. We can install this system anywhere and can startfan Automatic or manually when pollution goes beyond somelevel.

Worldwide every year two million deaths occur because of poor quality of indoor air. Out of these deaths, 44 % deaths are because of pneumonia and 54% deaths are due to chronic obstructive pulmonary disease (COPD). Near about 2% deaths occur because of Lung cancer. Polluted indoor air quality deteriorates health of women and children's because they spend maximum time at home. An easy and inexpensive way of reducing the concentration of pollutants indoors is keeping indoor plants. Plants can help in increasing the amount of oxygen and removing various toxins and pollutants. We have studied the effects of Sansevieria trifasciata and Chlorophytum comosum plants using a system of RaspberryPi and sensors. The level of pollution was monitored using anair quality sensor.

Sansevieria trifasciata and Chlorophytum comosum plants are easy to grow and propagate. Thus costs involved are lower compared to other methods such as using air purifiers. These plants are resilient and can survive days without water. They require little care and require very less fertilizers. The Sansevieria trifasciata plant requires very little water especially in cooler times. It needs to be fertilized just once in a few months. The Chlorophytum comosum plant also knownas spider plant requires moderate watering to prevent drying out and fertilizing every few weeks. Using these plants as a way of indoor air pollution control is an inexpensive and green way of having a healthier lifestyle.



Fig 1: Unsafe to breath Pollutants Air

II. HARDWARE AND SOFTWARE REQUIRMENTSNODEMCU:



Fig 2: Node MCU

NODEMCU is a Firmware on ESP8266. It's basically a SOC (System on Chip) A System on a Chip or System on Chip (SOC) is an integrated circuit that integrates all components of a computer or other electronic systems. The Esp8266 NODEMCU is one of the most popular inexpensive boards supporting wireless connectivity. Esp8266 NODEMCU is built by Espressif and it contains USB connector for providingpower supply. This device has a 32-bit processor, Tensilica LX 106. ESP8266 NODEMCU supports Lua scripting language and Arduino IDE. Esp8266 NODEMCU device is low cost and featuring extra low power consumption. The device cost is under \$3.

Raspberry Pi :





Raspberry Pi: The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. Raspberry Pi has the ability to interact with the outside world, and has been used in a wide array of digital maker projects based on internet of Things.

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SENSOR SECTION:

MQ135: This gas sensor are used in air quality control equipment's for buildings/offices, are suitable for detecting of NH3, NO2, alcohol, benzene, smoke, CO2 etc.



Fig 4: MQ 135 Gas Sensor

MQ2: This gas sensor has high sensitity to LPG, propane and hydrogen, also could be used to methane and other combustible steam.



Fig 5: MQ 2 Gas Sensor

MQ9: This gas sensor has high sensitity to carbon monoxide, methane and LPG. The sensor could be used to detect different gases contains CO and combustible gases.



Fig 6: MQ 9 Gas Sensor

GP2Y1010AU0F: GP2Y1010AU0F is a dust sensor by optical sensing system. An infrared emitting diode (IRED) and a phototransistor are diagonally arranged into this device. It detects the reflected light of dust in air. Especially, it is effective to detect very fine particle like the cigarette smoke. In addition, it can distinguish smoke from house dust by pulsepattern of output voltage



Fig 7: DUST SENSOR

DHT 11: This is a low-cost Digital Sensor for sensing temperature and humidity. This sensor can be easily interfaced with any micro-Controller such as Arduino, NODEMCU, and Raspberry Pi etc. To measure humidity and temperature instantaneously.



Fig 8: DHT11 (Temp. & Humidity Sensor)

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Relay: The 5v relay is an electromechanical switching device which can control the AC or DC devices through the 5v DC relay coil. Through which we can manage our Load like Fan, Light, etc.



Fig 9: 5v Relay

ADS1115: ADS1115 16-bit analog to digital converter: For microcontrollers without an analog-to-digital converter or when you want a higher-precision ADC, the ADS1115 provides 16-bit precision at 860 samples/second over I2C. The chip can be configured as 4 single-ended input channels, or two differential channels. As a nice bonus, it even includes a programmable gain amplifier, up to x16, to help boost up smaller single/differential signals to the full range. We like this ADC because it can run from 2V to 5V power/logic, can measure a large range of signals and its super easy to use. It is great general purpose 16 bit converter.



Fig 10: ADS1115

OLED DISPLAY: The OLED (Organic Light Emitting Diode) is a brighter, higher contrast display with faster response times, wider viewing angles, and consumes less power than conventional LCDs or VFDs. OLED displays are self-illuminating due to their organic material, so there's no need for a backlight to achieve maximum visibility in all environments. This also allows OLEDs to be significantly thinner than standard LCD or VFD modules. Our OLED displays come as complete, easy-to-use modules in both character and graphic display types.



Fig 11: OLAD DISPLAY

III. SOFTWARE ARCHITECTURE

It involves Node-Red, Integrated DevelopmentEnvironment, and MQTT Protocol & Database.

1) Node-RED

Node-RED is an easy to use, fundamental and an open source programming tool for IOT applications. It is highly used visual programming tool which help IOT developers to integrate Hardware devices, APIs and online services in a very interesting and creative manner. Built in Library of Node-Redconsist of thousands of flows and nodes that enable the user to connect all kind of devices and services. Flows can be run at the edge of network on the hardware like Raspberry pi or in the cloud since node-red runtime includes node.js. Node-Red provides a simple click mechanism to deploy the flows by the IOT developers to a light weight runtime environment.

2) Integrated Development Environment

Arduino programs can be written in any programming language that has a complier for a conversion of program code into the binary code. IDE is platform independent acting as the base for Arduino hardware. It is a very powerful for programmers, project development professionals and researchers to develop various Arduino projects employing different kind of sensors. Arduino IDE is an open source design/ software which have

originated from the integrated development environment for the languages processing and wiring projects. As IDE is platform independent, it can run onWindows, Linux based operating system as well as Mac OS [9]. Some of the key features of IDE include a text console, message area, toolbar for common functions. A program for Arduino using IDE platform is known as sketch, languages like C, C`++ are supported by Arduino IDE for programming.

3) MQTT Protocol

MQTT is extremely light weight connectivity Protocol for internet of things applications. It is designed for devices and high latency, low bandwidth, unreliable network. Its main principle is to minimize device resource requirement and network bandwidth. IANA reserved TCP/IP port 1883 for usewith MQTT over SSL. Unlike http Protocol it does not followrequest/response architecture instead it follows publish/subscribe architecture.

The message queue telemetry transport Protocol (MQTT), used in Internet of Things (IOT) for device to device communication. Basically, MQTT contains publisher, broker, and subscriber components. The MQTT Protocol works in Publish/Subscribe architecture. The first component in MQTT Protocol is the publisher, it contains sensors which are useful for measurement purpose and this measured data is sent to the broker for further processing. The second component of MQTT Protocol is the broker, which is used for providing communication between publisher and subscriber. The subscriber makes use of the data.



Fig. 12. MQTT Protocol

IV. DESIGN METHODOLOGY



Fig. 13.DESIGN METHODOLOGY

v. RESULTS

Block Diagram.



Fig14 : Block Diagram of IAQ Monitoring system using IOT

The proposed system provides low cost, low power, compact and highly accurate system for monitoring the environment with the dedicated sensors remotely from any place in this world. A perfect tradeoff between accuracy and cost is achieved by making use of single NodeMCU board andone minicomputer Raspberry pi and appropriate sensors leading to a well-grounded system. Each sensing node includes an integrated sensor array that can measure Ozone, Particulate Matter (PM10, PM2.5), Carbon Monoxide, Nitrogen Oxides, Sulfur Dioxide, Carbon Dioxide, temperature, and RH, Violate Organic Compounds affect IAQ. Temperature and humidity sensors support to calibrate the integrated sensor array's data.

In the middleware, all data from sensor cloud are calibrated with the characteristic tables of the cross sensitivities and the temperature/humidity dependence. Our experiments confirm that many factors (e.g., the existence of sources or materials that may cause bad air, room size, people density, air flow, location, wind etc.) may impact air quality and air quality are changing constantly; thus, real time monitoring on air quality is essential; sensor characteristics and environmental settings such as temperature and humidity may result in measuring errors; thus, pre-calibration and continual auto-calibration are needed; using gas sensors for air quality monitoring consumes a lot of power; thus, how to properly select sensor type and improve energy efficiency during design and implementation stages are critical; and identifying and removing the existence of sources or materials that may cause bad air and improving air flow are important to improve air quality.

VI. CONCLUSION

The experimental setup is used to analyse the quality of Air. This IOT based system used in this study can monitor and suggest required leaf index of plant under consideration and appropriate plants for purification of air. The suggested Solution for purification of air and maintaining air temperature in home, office is useful to earn carbon credits also.

There is a need to identify the long-term patterns of pollution, key relationship between certain pollutants etc. Society looks for a pollution-free globe for happy living. The global warming threat is waiting at the door. Government rules, governing pollution control in private sector industries are not implemented that effectively. This scenario stresses the need for an efficient monitoring system with the collaboration of users, domain experts, hardware designers and software developers. This study is an attempt in this direction.

The aims of this project are to study the performance of monitoring indoor air quality & design controlling System which consume pollution from air and purify them by natural process through indoor plant. In this experimental setup we observe the efficiency of plant to purify air quality in a closed chamber. The numbers of case studies of the experimentationare overall air quality index, Carbon Monoxide, Particulate Matter (PM 2.5), formaldehyde, trichloroethylene, xylene, and benzene, Temperature & Humidity.

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ITSM BASED SERVER MONITORING SYSTEM

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ABSTRACT

Resource availability is one of the most important requirements in the Business-Critical application. Techniques are required to increase the availability of the network to deal with new services and the consequent new traffic profiles and characteristics. This project proposes a more flexible scheme using ITSM lead to an efficient solution for Server Monitoring.

The IT Infrastructure Library (ITIL) provides guidelines for IT service providers how to design, manage and support IT services. ITIL is the most widely used IT service management (ITSM) framework. It consists of best practices that can be used in implementing, for example service support processes, such as incident management and problem management. Although ITIL includes a wide list of process metrics.

Considering servers being the core position in network, this Project introduces how to monitor servers through simple WMI. We expand WMI resources by defining WMI objects to monitor the resources of sever and use multi- threading technology to collect data and process them, which can improve the collection efficiency. The Project results prove that it is a successful way of integrated to ITSM and monitor, control for servers.

1. INTRODUCTION

Techniques for increasing the efficiency of Server Monitoring in Enterprises due multiple servers to deliver business critical services for their end users. Some of them include database servers, core app servers, caching servers, web servers, and more. Performance of each of these servers are critical because even if one of the servers fail, then it impacts the delivery of business-critical services. Therefore, it is imperative to know any performance issues proactively so that they are identified

at the early stage and fixed before they turn big and pose a threat to business. Server monitoring tools help in monitoring servers as well as the entire infrastructure. They also provide intensive reports on capacity planning to maintain the network without any hassle.

Server Monitoring is the process of monitoring a server's system resources like CPU Usage, Memory Consumption, I/O, Network, Disk Usage, Process etc. Server Monitoring also helps in capacity planning by understanding the server's system resource usage. A Server Monitor software helps in automating the process of server monitoring. Monitoring Server performance also helps in identifying other performance related issues like resource utilization, app downtime and response time.

Why is it important to Monitor Server performance?

- To monitor server availability and data loss.
- To monitor the responsiveness of the server.
- To know the server capacity, user load and speed of the server.
- To detect and prevent any issues that might affect the server proactively.

Information technology service management (ITSM) are the activities that are performed by an organization to design, plan, deliver, operate and control information technology (IT) services offered to customers. Differing from more technology-oriented IT management approaches like network management and IT systems management, IT service management is characterized by adopting a process

approach towards management, focusing on customer needs and IT services for customers rather than IT systems, and stressing continual improvement.

Why is it important to IT Service Magement?

- ITSM Provides a Clear Line of Sight Between Individual Contributions and Business Results.
- ITSM Creates Structure within the Business.
- ITSM Facilitates Consumer Self-Service and Self-Help.
- ITSM Provides the Basis for Automation of Routine Operational Activities.

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• ITSM Helps IT Identify and Implement Justifiable Improvements

Core part of IT Service Magement Service Desk

A Service Desk is a primary IT function within the discipline of IT service management (ITSM) as defined by ITIL. It is intended to provide a Single Point of Contact ("SPOC") to meet the communication needs of both users and IT staff, and also to satisfy both Customer and IT Provider objectives. "User" refers to the actual user of the service, while "Customer" refers to the entity that is paying for service.

The ITIL approach considers the service desk to be the central point of contact between service providers and users/customers on a day-to-day basis. It is also a focal point for reporting incidents (disruptions or potential disruptions in service availability or quality) and for users making service requests (routine requests for services).



2. INCIDENT MANAGEMENT PROCESS

The aim of the incident management process is quickly resolving incidents that affect the normal running of an organization's IT services. An incident is an intimation of some error or failure of some component in IT systems. Figure 1 shows the incident management workflow which can be used for resolving an incident. In a typical service desk, incident is either reported by the customer or automatically generated by system monitoring/event generation system. Customer report incidents by describing the system condition using natural language text whereas automatically generated incidents only have structured data specifying system and eventclass [17]. In this paper we are considering customer reported incidents only. For such incidents, Chat boot does a quick "keyword-based search" from a database of historic incidents. If any matching incident is found, its solution may be used to resolve the incoming incident. If the Chat boot cannot provide any resolution, an incident record is created. This incident record is classified for various purposes such as assigning priority based on urgency and impact, selecting the appropriate SME, etc. Then failing component is identified by manually associating hardware or software components (configuration items) responsible for the incident. Information about these configuration items (CIs) is maintained in a Configuration management database (CMDB) which is also used by other ITSM processes as an underlying data storage framework. L1 person uses keyword search along with human intelligence to guess the possibly responsible CIs. Then the incident ticket is forwarded to L2 support to diagnose the problem in the selected CI. For diagnosis the CI is monitored and various probes [14] may be used. If the identified CI is wrong ticket is bounced back and forth between L1 and L2 support. If any code change is required external support (L3) is contacted. After resolving the problem customer is informed and incident ticket is closed. In this paper we propose techniques to automate and improve various stages of the incident management workflow. Next, we describe our approach with the help of an example and outline our contributions



Figure 1: Incident Management Workflow

2.1 Contributions

We explain our contributions with the help of an example. Let us assume that on of customer critical server has failed and describes the problem as:

Example1: "I tried launching inventory application on server avalanche.server.net from 10.10.10.70. I get an error saying that database transaction failed."

First, we automatically identify relevant keywords which can be used to create incident and categories and identify possible failing. When customer describes the system problem, (s)he describes only her or his

perception of the problem. Thus, problem description may partially or not at all mention the possible failing component explicitly. We use the incident description data to get the context of the search and identify the failing component. For identifying the incident context, incident classification plays a key role.

The rest of the paper is organized as follows. In Section 3, we give details of data model of the server monitoring system. We use ITSM model and relationship between objects for performing server monitoring. Steps to automatically identify server status and crate incident automatically with description are presented in Section 4. Function design of system. in Section 5. Implementation details and performance results showing effectiveness of show that accuracy of problem resolution can be improved by more than 70% using our approach. By our proposed automations, we help the service desk by: describe towards the end of the paper. Using performance results over the actual customer data we

3. SERVER MONITORING

With the increasing expansion of the computer network and communication size, network has become essential to communicate for people's daily life. At the same time, the network monitoring has also developed rapidly. At present, the majorities of network management software are focused on the link and network equipment, but server should also be given adequate attention for being the carrier loading network services. In this paper, we introduce a server monitoring system, which not only monitors hardware and software of the system, but also monitors the security of the server's information.

At present, there are two types of network management protocol in computer network management field, which occupy the dominated position. One is common management information protocol and service (CMIP/CMIS), which is proposed by OSI organization. And the other is WMI. The two protocols are corresponding to two different management programs. WMI has become the most popular windows management protocol for its simplicity and scalability. Almost all of the windows server support WMI.

As soon as server fail system will automatically generate new incident By associating CI and intelligently selected keywords with historic incidents we improve recall of the "duplicate search" step.

By automatically associating responsible CIs, we help in reducing the number of incident tickets being forwarded (rightly or wrongly) to SMEs. As SMEs are costly to get and maintain, this will help in reducing operational costs.

We implemented a rule-based request router which uses various attributes of incident ticket, including associated CI, to automatically route the ticket to most appropriate SME.

Using the importance (or role) of the selected CIs, the service personnel can assign priority to the incident. For example, if the selected CI is a machine on which billing application is installed, and then higher priority can be given compared to the case where selected CI is the backup software



Figure 1. The SNMP-based management model

The management station serves as the interface for the human network manager into the network management system. The management station will have, at minimum: a set of management applications for data analysis, fault recovery, and so on; an interface by which the network manager may monitor and control the network; a protocol by which the management station and the managed entities exchange control and management information; a database of information extracted from the management databases of all the managed entities in the network. Only the last two elements are the subject of WMI standardization.

The management agent responds to requests for information from a management station, responds to requests for actions from the management station, and may asynchronously provide the management station with important but unsolicited information.

In order to manage the resources in a network, these resources are represented as objects. Each object is, essentially, a data variable that represents one aspect of the managed system. The collection of objects is referred to as Windows management instrumentation bases (WMI), which are written in a language called .net.

net is a data-oriented language .The WMI functions as a collection of access points at the agent for the management station; the agent software maintains the WMI. A management station performs the monitoring function by retrieving the value of WMI objects.

The management station and agents are linked by a network management protocol, which includes WMI messages: GetRequest, GetNextRequest, SetRequest, GetResponse and trap. All the first three messages enables the management station to retrieve or set the values of objects at the agent, are acknowledged by the agent in the form of GetResponse message. In addition, an agent may issue a heart bit message in response to an event that affects the WMI and the underlying managed resources.

3.1 Analysis of Monitoring Context

Server monitoring context includes the following four areas: static information (hardware description, software description, administrator, physical location, etc.), dynamic information (interface traffic, usage of CPU, memory and disk, etc.) network services (HTTP, FTP, DNS, SMTP, POP3, SQL Server database, etc.) and network performance.



Figure 2. Framework of the system

MIB and host resources WMI can monitor the state of hardware and software, and the running state of the system. We also want to achieve a comprehensive server performance monitoring, but the standard WMI can not meet the need. So we can expand the agent by adding WMI database files which are defined by ourselves according to the standard, in order to expand the WMI.

4. FUNCTION DESIGN OF SYSTEM

The monitoring system is based on WMI manager- agent model [3, 4]. We use layered structure method to design the system according to the different functions of the system. The system should include the following modules, which are shown in Fig. 2.

We design the system into three layers: data layer, service layer and function layer.

The data layer at the bottom is responsible for the communication between manager and agent, require and set the information in the WMI. Here we use two ways to collect data. One is real-time collection, which collets the real-time information that need to be displayed and sending them to the upper layer in time. Another way is timing polling, which collects information regularly during an interval and sends them to the upper layer.

The service layer in the middle layer is responsible for dealing with the collected information. If the collected information needs to display timely, it will be directly send to the upper layer to display, or it will be stored into the data- base for querying the history information.

The function layer in the upper layer is the interface for the administrator operating the system. It can show the monitored server's configuration information, performance information, and fault information in a visual and graphical interface.

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5. IMPLEMENTATION OF THE SYSTEM

The development environment is Windows 2000 server, which encapsulates the implementation of the WMI protocol, and provides a set of interfaces for developing network management programs based on WMI, called API. We use the SQL Server 2012 as our database and choose .net as the development tool.

A. Agent Expansion

We choose WMI agent to expand the WMI command output. We can define the WMI objects according to SMI standards and add them into WMI agent. The detail steps are as follows.

First of all, we design our own WMI files according to SMI standards. Secondly, we compile the files, and use mib2 tool to generate the procedure framework, and then improve the framework program. At last, we recompile the files, install the new agent and run it.

B. Data Collecting Module

The collecting program runs on a single manager station (a computer or workstation). The colleting process creates four threads. They are sending thread, receiving thread, preprocessing thread and storing thread. The four threads are controlled by a main controlling thread. Sending thread is responsible for sending WMI request message. Receiving thread is responsible for receiving WMI response message. Preprocessing thread is responsible for filtering and integrating the collected flow information. Storing thread is responsible for storing data into database, which are preprocessed by preprocessing thread of the Memory utilization at every acquiring moment and its changing rate.



Figure 3. memory utilization test figure

6. CONCLUSIONS

Considering the advantages of WMI, such as simple, flexible, small network load, and its strong expansion, we develop the system which can monitor and control servers under the condition of not affecting the server's load and its service performance. It also can make alarm and create incident to the administrator immediately when any abnormality occurs. The system runs well so far. It is very convenient for administrator to see the monitoring results because of the graphics display. So it is very meaningful to develop the server monitoring system.

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NETWORK OPTIMIZATION FOR RESOURCE ALLOCATION IN INTERNET OF THONGS (IOT) AGRICULTURE APPLICATIONS

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ABSTRACT

The Internet was initially used to transfer data packets between users and data sources with a specific IP address. Due to advancements, the Internet is being used to share data among different small, resource constrained devices connected in billions to constitute the Internet of Things (IoT). A large amount of data from these devices imposes overhead on the IoT network. Hence, it is required to provide solutions for various network related problems in IoT including resource allocation, routing, energy conservation, congestion, heterogeneity, scalability, reliability, quality of service (QoS) and security to optimally make use of the available network. In this paper, a comprehensive survey on the network optimization for resource allocation in IoT is presented. The paper draws an attention towards the background of IoT and its distinction with other technologies, discussion on network optimization in IoT and algorithms classification. Finally, state-of-the-art-techniques for IoT in particular to network parameter optimization are reviewed and different issues and challenges are observed

1. INTRODUCTION

With the advent of wireless communication, the Internet, and ubiquitous computing have given rise to a new paradigm called Internet of Things (IoT), by that a large number of physical devices in billions are being connected to the Internet. These devices are connected to the Internet through different technologies such as cellular technologies like 2G/3G/4G/5G, Machine to Machine (M2M) technologies with various radio options like Bluetooth (IEEE 802.15.1), Wi-Fi (IEEE 802.11), ZigBee (IEEE 802.15.4). These devices depend on various critical. Current trend of IoT is contemplated as Internet of future and contains billions of heterogeneously interconnected things or devices that leverage the contemporaneous technology by extending borders of the world with virtual and physical things [1]. Network lifetime can be enhanced by selecting the single optimum path among available multiple paths by selecting a linear programming model [6]. These above mentioned factors challenges the usage and management of spectrum resources effectively for IoT application since, IoT is considered as part of future Internet which covers all kind of domains and industrial applications. If these network challenges are not addressed then shortfall of spectrum resources will be the bottleneck for further IoT development. In this contrast, high priority should be given for optimizing network resource utilization by billions of new wireless devices being connected to Internet in future to facilitate efficient spectrum utilization. Hence Efficient network optimization techniques are required for the management and delivery of IoT data in the network which have been discussed in this review paper.

1.1 Motivation

To the best of my knowledge, this is the first survey work which delineates about network optimization Resource Allocation in IoT. The network optimization in IoT is gaining more attention due to the generation of massive amount of traffic in forthcoming years by IoT devices which are projected to be connected to global network in billions. Hence, IoT network needs to be optimized to reduce the effect of this traffic on other services which are using cellular and other net- work types. If the network challenges are not addressed then shortfall of spectrum resources will be an obstruction for further IoT development.

1.2. Contributions of this survey

Diverse survey works related to different aspects of the IoT are published so far. For example, Li et al. [1] cover various IoT definitions, fundamental technologies, architecture and different IoT applications. In [2], the authors address the main communication enabling technologies, wired and wireless and actuator networks and upgraded communication protocols. The authors in [7], provides IoT in cloud centric vision, technologies and application domains which drive future IoT research are discussed. Granjal et al. [8], examines existing protocols and methods to secure IoT communications along with research challenges for further research in this area. Summary of present IETF standard and various IoT challenges have been

discussed in [9]. Authors in [10], provide properties, survey, features, underlying technologies for the integration of IoT and Cloud.

The outline of the overall contributions of this paper relative to the recent literature in this field can be summarized as below.

- > This is the first paper of its kind which provides the need for network optimization in IoT.
- > Provides different algorithm types with an objective of network optimization in IoT.
- > Detailed strengths and limitations of recent papers published in the related network parameters.
- > Compared to other survey papers in the field of IoT, this survey provides a comprehensive review of most of the network parameters issues and challenges which is unique from most of the existing survey work.

1.3 Paper organization

The rest of this paper is organized as follows. In Section II, we provide the background of IoT. In this section, we briefly describe the history and evolution of the IoT. Then we explain the difference between M2M, IoT, and Internet of Everything (IoE). In Section III, we conduct our main discussion based on network optimization for resource allocation in IoT where we present the need for network optimization in IoT. followed by different algorithms types for network optimization in IoT. Section IV, discusses state-of-the-art solutions for IoT network optimization. Finally, Section V discusses open issues and challenges and the conclusion is presented in Section VI. For additional clarity, the organization of the paper is depicted in Fig. 1.

2. BACKGROUND OF IOT

2.1. IoT evolution

The term, IoT was first coined in 1999 by Kevin Ashton [12] to attract the management of P&G, where he was working on supply chain optimization using RFID. He wanted to make use of the Internet along with RFID to track and count the goods used in the corporate supply chain without the intervention of the humans. To achieve this, he convinced the P&G management and presented a new concept called IoT. After all, the IoT didn't get its attention worldwide until 2010. The Fig. 2 of Google search trends shows interest over time based entirely on the number of searches for the terms M2M, IoT and IoE.



2.2. Difference between M2M, IoT, and IoE

M2M has been in the application from the past decade and it is well known in the telecommunication field. Initially, M2M communication was used for linking one device to another, but now it's being used to transfer the data between multiple devices of the same kind, without the intervention of human whilst devices are communicating to each other through wired or wireless communication. M2M is a collection of distributed system of sensors and telemetry data. Some of the applications of M2M communication are telemetry, Wi-Fi thermostats, sensor network in oilrefinery, digital billboards, home and office security system, traffic control system, robotics and so on.

IoT is evolved form of M2M or M2M is a subset of IoT, i.e. if you consider M2M in a larger prospect you get IoT [13]. IoT connects different M2M technology together, leverages M2M to enable new applications and incorporates an existing legacy M2M system to solve various business problems. The IoT transport capability, that makes interconnected computing system and application to interact with the physical world, thus makes Web of Things (WoT) propounds networked things to coalesce into the web, making these resources available on the web through a standard procedure [11]. Thus IIoT, WoT and Internet itself constitutes a subset of IoE, is shown in the Fig.3 IoT devices can add into the network at any time in large number in an unpredicted manner, hence the network must be robust enough to provide scalability and additionally several individual applications

are hosted on the network at any time which imposes additional traffic overhead to the network. IoT devices induct peak traffic into the network indefinitely when IoT devices put data into the network whenever changes are observed and if that traffic is from large setup, in such cases network should not be congested and efficient data routing must happen to reduce delay and to conserve the nodes energy.



Fig.3. Internet of Everything and its subsets.

Hence, IoT network optimization offers a lot of benefits for improving traffic management, operating efficiency, energy conservation, reduction in latency, higher throughput and faster rate in scaling up or deploying IoT services and devices in the network.

3. NETWORK OPTIMIZATION

Generally, network optimization is defined as the technology used to improve the performance of the network for any environment.

This plays an important role in IT, as day by day large amount of data from various kinds of devices and applications are being populated into the network. Network optimization offers various benefits such as faster data rate, data recovery, eliminating redundant data and to increase the response time of application and network. In this section, we will discuss need for network optimization in IoT, different algorithm types proposed by the authors to provide network optimization in IoT and these algorithm types are then compared with different network parameters in order to clarify different network parameter supported by these algorithm types.

3.1. Network optimization of Resource Allocation in IoT

Network optimization in IoT is gaining increased attention due to the expectation of a high increase in traffic from IoT things and objects, as billions of IoT devices are expected to connect global network in the coming years. Due to this, it is obvious for researchers and operators to provide efficient solution to optimize IoT networks to reduce the IoT generated traffic impacting other services in the network and to utilize network resource efficiently. The traffic generated by IoT devices is different from the cellular network due to heterogeneity in applications and device types. Additionally, IoT traffic needs to be regulated to monitor the working of IoT devices and its services. IoT application generates fewer amount of data, however integration of devices to the application generates the higher volume of traffic because of control plane messages. Hence this non-application traffic puts a significant additional burden on the network. So to overcome from this burden, efficient mechanism is required to address and optimize the control plane messaging from IoT devices.

3.2. Algorithms classification

Generally the optimization problem is made up of input factors, outputs, constraints and different objective function. Network optimization problem in IoT comprises many parts which will be combined using different combination and methods which address a particular type of network problem. In common, we found out two important methods for optimization (1) Applying known optimization framework for addressing the problem. (2) Scheming novel work based on a heuristic method for the problem. Above mentioned approaches are not mutually exclusive; however they are combined sometimes when the problem is too complex or known approaches provide inappropriate results. Heuristic approach consists of (a) Algorithm which provides a faster approximation solution for more complex problem example, convex optimization (b) Greedy approach which provides optimal solution by making assumptions. Both these approaches provide optimal solution for complex problems and both achieve performance near to optimal. Hence there won't be a single algorithm which

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provides optimal solution to network optimization problem in IoT. Different algorithm types proposed by the authors to address different network optimization problems are explained in the below subsection.

3.2.1. Algorithms based on particle swarm optimization (PSO)

PSO is a computational method which optimizes given problem by improving candidate solution iteratively in regard to the given quality. PSO originated based on the swarm behavior of animals, birds etc and their schooling nature. Due to the unique structure exhibited by these provides the necessary information that the intelligence does not concentrate on individuals, rather it is distributed among many individuals of the group. PSO attained extensive popularity in recent years and many research articles related to different optimization methods have been published using this technique. For example in [1], the authors have proposed immune orthogonal learning PSO algorithm which provides fast route recovery from the path failure due to mobility of the sink node and also provides alternative path for efficient path repair by using orthogonal learning strategy. The result proofs that the algorithm reduces communication overhead and increases lifetime of the network. The authors in [17], used PSO to evaluate different level of transmission power required for each node without making disconnected areas in the sensor cluster. Final results show that by using PSO, the method has saved more sensors energy in comparison with common nodes deployment with sole transmission power. Energy efficiency is a critical issue in cluster based capillary networks, where selecting process of cluster heads (CHs) has a notable effect on network performance. So authors in [8], proposed novel QPSO scheme for CHs selection, which improves energy efficiency and protracts the lifetime of the network when compared to evolutionary algorithms. Wen et al. [1] proposed Improved PSO (IPSO) to improve the precision measurement via weight factors calculated through experimental simulations. Results obtained from the experiment shows that this algorithm combines the factors of weight, reliability of information source fusion, redundancy in information and hierarchical structure consolidation in undetermined fusion scenarios.

3.2.2. Genetic algorithms (GA)

GA attempts to assign the suitable value to the competing solution for the problem by using natural evolution activity and also by using the survival of the fittest principle. GA can be used for both constrained and unconstrained optimized problems. Amol et al. in [2], propounds optimal routing algorithm k-means clustering algorithm and GA. Using, k-means clustering algorithm best cluster head and cluster formation can be achieved, and by using GA, optimal path can be selected. GA is relying on the energy value of the cluster head and length of the path, hence resultant path obtained by GA will have more reliability, higher speed and lifetime. In [2], the authors have proposed GA based clustering optimization method for constrained networks of accounting IETF CoRE standards for data transmission and CoRE interfaces, by this battery level at the nodes, transmission energy and node processing capability can be improved. This method uses multi-objective criteria to select the best candidates and chooses sensors having maximum storage space and energy level.

3.2.3. Non dominated sorting genetic algorithm II NSGA-II is a non-dominated sorting-based multiobjective evolutionary algorithm for reducing computational complexity, non- elitism approach and need for specifying a sharing parameter [24]. Many researchers have chosen NSGA II to solve various multi-objective optimization formulation corresponds to various problems. To solve Energy optimization as a multi-objective problem instead of mono-objective evaluation authors in [7], proposed MOR4WSN based on NSGA-II choosing preeminent sensor distribution to maximize the network lifetime and also method to optimize results.

3.2.4. Heuristic algorithms

Heuristic algorithm is used to find solution out of many possibilities and provides relatively near solution to a complex problem in an easier and faster manner. There are many literatures available for network optimization based on heuristic algorithms. For example in [8], authors have proposed RPL routing protocol as a Robust Shortest Path Tree (RSPT), which improves resilience in network routing by considering uncertainty present in the link quality and to address cost of individual arc which is determined by feasible values instead of single value problem, they have extended a Scenario-Based heuristic (SBA) algorithm. Authors in [9], pro-posed Computational Intelligence (CI) to conserve energy and device resources by switching CI tasks from IoT devices to cloud and also to save energy optimized heuristic based on dominance sort is used. So overall the performance of whole IoT devices has improved using this method. Kaustubh et al. [3], proposed a heuristic and opportunistic link selection algorithm (HOLA), which minimizes overall energy consumption and also balances the energy across the entire network. HOLA attains this by shifting device data to smart devices calibrated to factory settings. Authors in [3], used LTE technology to provide coverage for various IoT devices and to make this technology resource restraint and to facilitate efficient communication they have proposed LTE Random Access Channel (RACH) mechanism. This mechanism enables devices to access channels and to reduce transfer power, the authors have proposed Delayed Power Ramping Algorithm (DPRA), which is a heuristic based approach.

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3.2.5. Bio-inspired heuristic algorithms

Approach Bio-inspired algorithms are the algorithms used widely for optimization and computational intelligence. Recently many research works for achieving network optimization in IoT have been published to address many issues. This method makes use of the bee's collaborative method of decision making and local information extraction algorithm to find and use critical resources around their surroundings to amplify intrusion detection in the network. To achieve this, authors proposed bio-inspired distributed model which uses voronoi based cooperation strategy and trust strategy to enhance the cooperation between Nano nodes.

3.2.6. Evolutionary algorithms (EA)

EA uses population based approach to meta-heuristic algorithm. EA provides approximate solution to almost all kind of problems since it doesn't make assumption while formulating the problem. This method outperforms in terms of throughput, energy and delay when compared to previous methods. Failure of the host devices due to lack of energy is addressed by the authors in [7]. They have proposed method, which balances the energy consumption of the outdoor deployed devices by using evolutionary game based approach for service selection. This method restricts the congregation of devices through global interaction for service selection in case of concurrent applications. Authors in [8], proposed method to address heterogeneity in IoT networks. This algorithm does sensitivity analysis to search optimal solution and helps neural network to restructure to overcome from tedious input issue.

3.2.7. Algorithms based on fuzzy logic

Fuzzy logic is used to determine partial truth whose true value lies between complexly true and false. It uses linguistic variables lead by membership functions and interference rules to achieve truth values. To detect anomaly in the IoT traffic authors in [4], proposed fuzzy logic interference applied to stationary Poisson or self-similar traffic of the IoT network. They suggested modified sliding window and modified stochastic approximation for detecting anomaly in the traffic. Authors in [4], proposed variable categorized clustering algorithm (VCCA) using fuzzy logic is applied to IoT local network to select CH based which has got the highest network capability.

4. STATE-OF-THE-ART SOLUTIONS FOR IOT NETWORK OPTIMIZATION

There are lots of network optimization schemes which have been proposed for the optimal operation of IoT networks. The Fig. 4 provides a classification of relevant works done against each aspect of network optimization technique related to IoT. Data storage, routing, packet retransmission, mobility of nodes, interoperability among heterogeneous nodes and to provide security for data becomes critical issues.

4.1. Network routing

Routing is a process of selecting the path for sending the data across a single or multiple networks. These data are generated by M2M or machine to object communication.

4.2. Energy conservation

In order to prolong network lifetime, different energy saving methods and sleeping technique plays an important role in IoT applications. Below are the some of the communication standards which accounts for achieving this objective.



fig.4. Network Optimization Objectives classification in IoT.

The authors in [5], proposed content centric routing (CCR), where content determines the routing. This method routes correlated data to achieve a high rate of data aggregation for reducing network traffic. Finally, this method is responsible for optimizing energy consumption, reducing network latency and to provide higher reliability to the network.

4.3. Congestion control

Energy According to the tecOhnical experts there could be around 25 billion Internet connected devices by 2020, as a result of the huge number of internet connected devices there could be a potential rise in the network congestion, hence efficient congestion control mechanism is required to address this issue. In the authors propose a CoCoA mechanism to remove the CoAP restrictions on messageO rate and to provide flexible congestion control mechanism with secure protocol guarantee. Congestion in IoT is the result of combination of a various type of devices and services, the data from these devices are in heterogeneous form. So to handle these data in the network, an optimized mechanism is required, which is discussed in this section. In this method, parsimonious covering theory is used to perform the data abstraction. Amadeo et al. [10] propose a high level Named Data Networking (NDN) for IoT data, resulting from the interconnection of billions of heterogeneous devices.

4.4 Scalability

Due to the use of embedded technologies in IoT, leads to large deployment of small sized and fewer memory devices like sensors and actuators in the real time applications. As these devices numbers grow, data produced and network required, also grows unboundedly. So handling these device data and to provide an efficient network to these devices is a big challenge task in IoT. In, the authors proposed a mechanism that optimizes the IEEE 802.15.4 networks by reducing 42% of packet transfer and 35% with respect to data transfer through header compaction which reduces and helps in achieving smaller header. This method is one of the best lightweight Extensible Authentication Protocol (EAP) and helps to deploy large scale devices in the network to facilitate scalability to the IoT network. To provide scalability authors in, proposed a storage management strategy to optimally use the limited storage space available in IoT devices.

4.5 Reliability

Network technology used in the IoT is unmanned in most of the applications and reliability is the most important quality parameter. In [11], the authors have proposed novel L2AM metrics to RPL to consider minimum cost path during routing. This method considers route on the basis of data reliability defined by ETX and residual energy present in the node. Due to this metric, it is possible to increase overall network lifetime with better network reliability. This enhances available reliability, security, and trustworthiness of the IoT. This framework uses privacy-by-design concept through that data are not be exposed to the third person and helps to maintain data privacy.

4.6 Quality of Service (QoS)

The IoT network's QoS parameters are considered from various views and dimensions such as bandwidth, delay, packet loss rate, avoid interference and jitter. Hence, QoS need to be defined differently for different technology. It is very difficult to achieve QoS efficiently in wireless networks, due to the gap in the segment that is a resultant of management and resource allocation of the shared wireless media [7]. This result provides a way for packet aggregation at the IoT gateway's mobile edge to optimize various QoS parameters like Latency, packet loss, jitter and bandwidth utilization required by a large number of small packets. In [15], the authors have proposed a QoS architecture that provides a mechanism for controlling transfer and translation from top to bottom layer.

4.7 Security

Security is the vital requirement for securing data transporting in the network, hence it is the optimal requirement to provide an efficient mechanism to secure data from different kind of breaches. In [13], the authors have proposed DTLS based two-way authentication architecture for it. This security architecture requires less energy, memory overhead, and latency, hence it is very well suited for IoT memory constrained energy efficient IoT devices. To secure IoT communication authors in [13], have proposed a secure multi-hop routing protocol (SMRP), uses security methods in its routing protocol which helps in faster cryptographic performance helps this to run on memory constraint hardware chips.

5. OPEN ISSUES AND CHALLENGES FOR NETWORK RESOURCE ALLOCATION OPTIMIZATION IN IOT

Evolution of IoT in support to communication infrastructure aids new services for various fields like home network, smart city, retail, logistics, medical and aeronautics. However, this evolution poses new issues and
challenges to manage the usage and management of network. Joint initiative by industries like Alcatel Lucent, Orange, Thales etc, along with Carnot Institute identified some of the potential challenges related to IoT and Smart networked objects in [11], to provide awareness among various industries and academicians. Along with these challenges, this section pro- vides various open issues and challenges for optimizing IoT network.

1. Network routing: The efficient network relies on network topology and network architecture. An efficient routing mechanism needs to be addressed for sending the packets inside the mesh network topology, since we have considered IEEE 802.15.4 as one of the underlying technology for IoT,

a) Issues:

- To provide an effective routing mechanism in the link layer.

- To provide routing in the network layer to happen efficiently with less overhead.

- To select best energy efficient algorithm among various types.

b) Challenges:

- Routing in link layer or mesh-under is addressed by constructing a spanning tree [6], but this method suits only for static routes.

- Routing in the network layer or route-over, is addressed by IPv6 Routing Protocol for Low power and Lossy Networks (RPL).

- The challenge is to choose ideal energy efficient algorithms among different available types because different algorithm uses different methods in selecting the cluster head and technique in route selection [12].

2. Mobility: Mobility related to network refers to changing of mobile IP subnet from its point of attachment to the IP backbone network. There are two types of mobility with the context of the network as micromobility and macromobility. Micromobility refers to the movement of subscribers within the two points of the same network and macromobility refers to the movement between the networks.

a) Issues:

- To provide macro-mobility in the network with better QoS.

- To provide better QoS in the case of micro-mobility in the network.

- To provide an optimized route in nested mobility.

b) Challenges:

- Mobile IP (MIP) provides macro-mobility in the network and achieves efficient packets routing, hand-off, lower packet loss, etc, but the challenge is to reduce the overhead rate since MIP has a higher overhead rate.

- The challenge is to provide an optimized route for nested mobility, i.e. optimal path should be selected to send packets between a corresponding node and the mobile node, within the same mobile network without considering how deep the mobile, the network is nested [14].

3. Multicast: Multicast is used in the network basically to show or to notify their presence to other nodes in the group or to request the resource from the concerned source whenever there is no idea from whom it has to be requested [11].

a) Issues:

- Different rate of data transmission in different protocols.

- Track or to recover the missed out packets at the link layer.

- Multicast packet loss due to sleeping of nodes to conserve energy.

- Multicast Protocol for Low Power and Lossy Networks (MPL) is addressed only for ZigBee communication.

b) Challenges:

- Transmission of data packets at uniform speed is challenging since different protocol standard sends data packet at the different rate due to which recipient faces multiple different rates of incoming packets.

- Most of the wireless protocol acknowledgment at the link layer is disabled for multicasting, due to which sender cannot able to track or recover the missed out packets at the link layer. Hence challenge is to provide a mechanism to recover such missed out packets.

- MPL is proposed instead of IPv6 neighbor discovery optimization for 6LoWPAN, where there is no need for maintaining the table on topology information, but the challenge is to make this suitable for all communication types since it suits only for ZigBee communication.

4. Security: Security is a key requisite for any device connected to the Internet, due to the higher degree of vulnerability to attack.

a) Issues:

- To provide security for data present in IoT network from various types of attacks.

- Exposition of the network due to flaws in the technology and its implementation.

- Penetration into the network through side channel attack

b) Challenges:

- IoT network security comprises of security for content in the network, security from an illegal resource authorization and from intruders.

- Security vulnerability at network happens due to two main reasons like security risk of entire IoT network setup and flaws during technology and protocols implementation and modeling [9].

- Attempt to break into the system by finding the weakness in the cryptography system's physical implementation through electromagnetic leaks, timing information, energy consumption and many others lead the intruder to penetrate into the system [1]. So challenge for the designer is to implement stronger cryptography algorithm.

5. Heterogeneity: Heterogeneous network encompasses the different type of integrated network, where the end user/device can communicate with these communication modalities, which have different capacity and characteristic constraint such as wired, wireless and satellite communication modalities having different capacity and characteristics. Heterogeneity is the vital issue that IoT applications are facing when different types of devices or protocols are made to interoperate [11].

a) Issues:

- Achieving performance of the applications used in the heterogeneous network.

- Conservation of energy in the heterogeneous network.

- Resource integration for the heterogeneous network.

- To provide robustness in the heterogeneous network.

-To provide trustworthiness and security for the heterogeneous network.

b) Challenges:

- The primary challenge is to deploy high performance applications in the heterogeneous network and achieving the same performance from these applications without modifying network or technology. Secondly, challenge in the trade-off between exposing or hiding network state or variability, when to expose or to hide the network state on the basis of time and magnitude [8].

- Heterogeneous network drains more energy when compared to the homogeneous network due to inefficient resource management and lesser flexibility. This makes a challenge for energy aware IoT devices to preserve energy for longer usage.

6. Interoperability: Interoperability is due to heterogeneity among protocols and communication stack of objects or devices. Different devices in IoT applications use different network technologies. So there exist many issues and challenges to provide interoperability among these underlying technologies.

a) Issues:

- Populating the data from end devices directly to the Internet.

- Establishing the interoperability among various different device types.

- A nonstandard approach used in the developing and manufacturing devices.

- Establishing interoperability among various flavors and cloud types.

b) Challenges:

- Legacy devices and systems don't communicate with IP based devices and don't support TCP/IP protocol directly without the use of gateway in between them.

- Discrepancy in protocols and communication occurs between original equipment manufacturers (OEM) devices, wherein one manufacturer device does not support other manufacturer devices.

7. Scalability: Scalability in a short word defined as the system should autonomously handle IoT entities growing rapidly at the edge network to ease up network performance.

a) Issues:

- To support inter-organizational communication in large scale operation.

- To select best load balancing technique.

- To select best architecture for better scalability.

-To provide autonomous M2M communications among neighbor nodes in case of concurrent data

b) Challenges:

- To provide inter-organizational communication involving larger entities requires autonomous interactions and requires collaboration between them, which is a challenging task [4].

- To select best method for balancing the load among different devices and congestion less routes plays a crucial role since this increase availability and scalability [3].

6. CONCLUSION

Several advancements in IoT have been already seen in the literature and also in the realtime applications where the network of sensors and mobile devices are interconnected and linked to the Internet through IP-based technologies. With network optimization as one of the main challenges that IoT would face in the forthcoming years. This review paper depicts comprehensive sur- vey on the most important aspects through some of the novel approaches related to network optimization for IoT communication is presented. Various algorithm types for multi-objective problems, robust shortest path tree problem, QoS aware energy efficient cooperative clusters, hierarchical sensor networks, approaches for optimizing energy efficiency in IoT.

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WIRELESS AD HOC NETWORKS AND THEIR SECURITY THREATS

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ABSTRACT

In the review study on several wireless networks and their security challenges are covered. Some types of Wireless Ad hoc Network WANET are included in an overview. Now a days Mobile Ad hoc Networks are popularly used i.eMANET. A growth in wireless devices like lap tops, smartphones or wireless wi fi networks makes MANET more popular. MANET is a decentralised network. So MANET are more robust as compare to others centralised networks. VANET, SPAN, FANET are some Ad hoc network types. These wireless networks are vulnerable to attacks also question of an authentication arises. MANET does not follow authentication as they respond to a large number of people. This review work discusses different attacks and how they can be prevented.

Keywords: WANET, MANET, VANET, Security, Wormhole.

I. INTRODUCTION

Wireless Ad hoc networks are decentralized networks. It does not contain existing infrastructure such as a router which is used in wired network type nor an access point is introduced in a wireless network. MANET is Ad hoc as it does not use existing infrastructure whereas each node participates individually in routing. In MANET, each node contributes to the routing process by sending data to network nodes, in turn, they become self-configuring dynamic [1].Every Device in MANET is free, it can freely move. So, it is able to communicate in all possible ways. Thus, it can change links dynamically on regular basis. It can also alter its links with other devices. It must be able to perform the function as a router since it should forward traffic that is not a concern to itself. It is quite a difficult task to implement MANET in which each device contains information to properly route traffic. [1] To build the MANET in big size, it founds following difficulties:

- 1) To make it capable to route packets to each and every other node in the MANET.
- 2) It is also difficult to maintain the percentage of overhead traffic required to keep real-time routing status.
- 3) All nodes have their own throughput to route, which is irrespective of the needs of others.
- 4) It must utilize limited bandwidth, that's parts or slices. Such networks are self-contained and can be linked to the internet. Between nodes, One or more transceivers are placed between the nodes and those

transceivers are distinct, so as make this topology more dynamic and independent. Over a link layer-based ad hoc network. Thus, MANETs have a routable networking scenario on top of a link layer. Different types of wireless Ad hoc networks are classified considering the area to be covered, further, they are classified as per today's need and applications. [4]

- a. WLAN (Wireless Local Area Network): Here, it is used to connect two or more devices.
- b. Wireless Metropolitan Area Networks (WMAN): It is implemented to connect multiple wireless local area networks.
- c. Wireless Wide Area Network (WAN): It covers large cities to connect wirelessly.
- d. Vehicular Ad hoc Networks (VANET): These are specially designed to achieve communication between vehicles and roadside equipment. Radio waves have vital importance which forms a communication between vehicles on the road.
- e. **Flying Ad hoc Networks (FANET):**In this type unmanned aerial vehicle is used to cover remote areas wirelessly, it also provides mobility. FANETs are mostly used in Air Force. Here the unmanned aerial vehicle is nothing but an aircraft without a pilot which is remotely controlled.
- f. Navy Ad hoc Networks: Navy ships usually prefer satellite communication among ships or with ground stations. But due to shortage of bandwidth, this is not sufficient, latency is more. Ad hoc network provides a solution to delay in communication and bandwidth problems.
- g. Wireless Ad hoc Networks during Disaster for Rescue Purpose: At the time of earthquake existing tower may be collapsed, soan instant Ad hoc network is the only solution.

h. Wireless Ad hoc Network for Hospital: Medical equipment and other devices su

h. Wireless Ad hoc Network for Hospital:Medical equipment and other devices such as sensors, videos, etc. can be connected with this wireless technology. Wireless Ad hoc network played a precious role during the **Pandemic situation** for the treatment of corona patients.

Advantages of Wireless Ad hoc Network:

- WANET is decentralized, so, nodes are movable, no fixed infrastructure is needed. It never affects single-point failure.
- Each node can communicate with any other node freely, so communication among nodes becomes faster.
- As no fixed infrastructure is used, it becomes cheaper or economical.
- At any time of instant new nodes can be added, thus scalability is very good.

Challenges in WANET:

These networks are typically at critical places and situations where sufficient resources are not available. Some of the challenges are enlisted below: **Security:**The infrastructure deployed for WANET is wireless, anyone can break security during the transmission of information. Thus, security becomes a very important issue. [3]

Bandwidth:The bandwidth allotted is limited/restricted. This restricted radio spectrum is a big challenge in routing procedures.

Battery Constraints:Each node requires power, if power need increases the size and weight of a node will be more. A node becomes bulky and heavy.

Medium: A probability of data crashes is extremely high in WANET because the transmission channel prepared by all the devices is in straight transmission covering the area. When a device receives data, no other device in its neighborhood, apart from the sender, must transfer. A device can acquire access to the mutual medium when its communications cannot disturb any constant session. [8]

Routing: An important challenge that affects the performance of WANET is routing. Degradation in performance is due to unicasting, multicasting, and geocasting demands by the nodes in contrast to a wired network. This is due to rapid changes in network topologies and with different mobility speeds. [7]

Wireless Network Classification:

Wireless networks provide connection flexibility among the nodes at different places. Also, it is a scalable network, one can extend the network to any building or area without a physical-wired connection. These networks are classified into two types,Infrastructure networks and Ad-Hoc networks as shown in Figure 1.



Figure1: Architecture of WANET

Access Point (AP): AP in Infrastructure wireless networks represent a central controller for each device. The network is joined through an access point by any node. In order to make the route ready when it is needed, the access point arranges the linking among the Basic Set Services (BSSs).

AdHoc networks do not include firm topology, no central control is provided, so complexity is increased in the transmission and reception of data packets.

Wireless networks are further classified as:

Single Hop: In single-hop wireless networks base stations (BS) and wireless devices communicate directly using electromagnetic waves.

Multi-Hop: In multi-hop wireless networks wireless devices indirectly communicate with the base station by sending data from one device to another and so on.

Applications WANET:

Some applications are enlisted below as per the utilization in several fields,

In the Military field: Ad-Hoc network is very very important in the military to form a wireless network to establish communication among their vehicles, armed forces, and army headquarters. The wireless network has vital in case of a war situation, to form instant communication with prime security.

Cooperative work: The WANET can provide access to the external office atmosphere and surroundings as compared to the inner environment. That is office meetings can be arranged at outside office buildings such as lawns in building premises. Thus, employees can share information for cooperating with each other regarding any assigned task.

Confined level: Ad hoc networks are capable to freely associating with immediate, in addition, momentary hyper- media networks with the use of laptops, computers for sharing the information with all the contestants.

Bluetooth: A personal wireless ad hoc network like Bluetooth is most useful for individuals. This Is a small range network whose devices such as laptops, cell phones belong to individuals.

Business Sector: Ad-hoc networks could be used for rescuing and emergency processes in adverse situations, such as floods, fires, or earthquakes.

SensorNetworks:To operate home appliances wirelessly from a distant place, Weather Sensing-related activities.

Educational sector: The conference rooms or classrooms or laboratories equipped with computers having wireless connectivity could implement in the educational sector.

TYPES OF ATTACK ONWIRELESS NETWORKS:

The major issue of Wireless communication technology is its security. As intruders can easily attack on these networks to hack information. Thus, safety and security became the most important concerns in wireless networks.

Some common types of attacks are mentioned below:

Sinkhole Attack:

Wireless systems are prone to a variety of attacks like a sinkhole attack. This is a typical way to the base station that a rogue node broadcasts in order to further mislead its neighbors. The rogue node has the potential to modify data, disrupt normal operations, or even confront a slew of extra network security challenges. It's a deliberate attack on transmission. As a sink node, the node seeps into the network and draws all data packets on it. This exploit puts all network traffic at risk. A sinkhole attack will change the packet flow direction by enabling selective forwarding. It pulls his neighboring nodes, in particular, to a risky node. It is possible to create the environment required to attack Wormhole. This suppresses communications in a certain region by informing neighboring clusters that it is a sink node. A sinkhole attack will change the packet flow direction while permitting selective forwarding. It pulls his neighboring nodes, in particular, to a risky node. [5]



Figure 2. A Sinkhole Attack

It is possible to create the environment required to attack Wormhole. This suppresses communications in a certain region by informing neighboring clusters that it is a sink node.

Selective Forwarding Attack:

Predatory nodes refuse to assist packages in order to prevent particular packets from being exchanged further using this type of network attack. Packets may be dropped selectively or arbitrarily by the opponent.

The attacker tries to alter the network in reaction to the packet error rate. Furthermore, there are two forms of selective forwarding:

Insider Attack:

Approvals of sensor nodes may be altered, or worse may end up attacking specific nodes and launch an attack on the whole network using any key. It's tough to pinpoint such an occurrence.

Outsider Attack: The channel between genuine nodes is congested, and the route between both genuine nodes is stopped.

In a targeted transmission attack, malicious nodes It's black hole that can't move any communications and just loses them to ensure they don't spread farther[5,6]. Yet, despite this failure, such a warrior is relocating the risks of surrounding nodes and planning to seek a new path. A more subtle kind of attack, the opponent moves packets in a methodical manner. Uninstalling or changing packages by a rival The Traffic endures, originating from a range of designated nodes, and suspicions of their wrongdoing are limited.



Figure 3. Selective Forwarding Attack Because they use many types of attacks, it is very

important. For example, an attacker may simply listen in on conversations, replicate node data, generating traffic purposefully. Sensor node information is disappointing. The wireless sensor network is strongly connected to their physical settings are being impacted by current protection issues.



Figure 4. Sybil Attack

Wormhole Attack:

A wormhole is one of those attack in which hackers carefully position themselves within the network while listening to the network indefinitely and capturing wireless data. An attacker then gains access to part system and collects messages through a small bandwidth link. It may also replicate them over a tunnel in different areas. An attacker may deceive nodes that normally travel numerous hops from the basic station to believe they are in close vicinity in terms of hops. This leads to a hole, if an opponent has a better path to the base station about the wormhole, leading to the traffic potentially getting attracted with the alternate routes being not as good. A wormhole attack makes use of multiple infected nodes and a private route known as a tube. When wormhole vulnerability is capitalized, the attacker funnels the packets that it receives at one point in the network, to another section of the network, and then pushes them again in the network. Because the tunnel has such a low value of latency in between nodes, that it can lead to it being picked up as an active path. This attack might start right away by tunneling every requisition to the principal node with DSR and AODV based systems. If neighboring nodes in the destination country get this Requisition packet, they need to retransmit while discarding other Requests on the path. As a result, finding routes other than the wormhole becomes highly difficult. Because it controls practically all routes identified after a wormhole, this aids the attacker in launching

an attack on the infrastructure. Wormhole Attack is posing a severe danger to the WSNs. One of the most common attacks in WSNs is the wormhole attack, which involves an infected node packing packets from one network point to a remote point. Hackers in a wormhole attack may communicate quickly since they are connected directly to the other nodes in the WSN.



Figure 5. Wormhole Attack

Hello Flood Attack: Many wireless sensor network algorithms allow nodes to transmit hello signals between neighboring nodes. When a node receives a message, it should assume that the transmission is inside the transmitter's radio range. In some cases, however, this idea may be inaccurate; an Attacker employing ample of transmission power may convince an adjoining network node to be his neighbor. A node hence persuaded to become a buddy by the invader, ends up passing False information with a high rate of transmission.

Many of the neighboring nodes support the broadcasting of Hello packets. The emitter is assumed to be within signal range by the node. The flood attack attempts to stop transmission

Hello, messages that notify adjoining neighbors to be obtained from the nodes in this attack alert. If this is the case, this message is sent to a node, with the assumption that the transferring node is at the start, ready to make connections and join. Routing table, as a buddy. The base station, for example, communicates with all sensor nodes in a network by the path of the closest neighbor. To increase the strength of the network, send a message to all nodes. The message causes to be unsure about the message that will be sent to the neighbor's nodes. After that, both nodes take on board. If the attacker node is the starting point, the Hello message originating from the base station will be the shortest. The resource is readily monitored by network and base attackers, causing them to be cut off from the network entirely. The Hello flood attack is a basic attack done at the network layer. These attacks are caused by a node that routes a hello packet, causing a multitude of nodes making it the parental node, whether it is located in close vicinity or not. Due to the fact that both communications must be routed to these parental multiple hops, the latency is increased.

Hello, packets are transmitted to a huge number of nodes throughout a big area of the network. [10]

In the AODV protocol, there is a solution for flooding attacks where each and every node has its own blacklist, which is maintained by each node. It is chosen and mentioned as to RREQ, it can transmit. Every node keeps a count of RREQ requests sent by associates, and if the number of RREQ requests exceeds the previously determined threshold, the nearby nodes ID are blacklisted. RREQ from barred nodes is eventually dropped by network nodes. The only issue of the procedure is that it is time consuming. If the RREQ is not in place, the network will not be able to protect itself from flooding. The number is less than the threshold value. It has been noticed that such an attack has can affect the throughput to an extremity of 80%.



Figure 6. Victim network before the attack



Figure 7. Victim Network after the attack

Spoofed Attack:

Suchan attack is a result of a hostile party impersonating another user on the network and then ending up targeting other network hosts. This leads to data being lost or vulnerable, dissemination of malware, or giving up unauthorized access. The principal ways of such an attack are IPSpoofing, addresses, ARP attacks, and server spoofing. TCP IP Suite protocols have many security loopholes causing both the packet's source and destination, become vulnerable to such attacks if transmitting and receiving hosts are comparable. Attacks like IP spoofing and ARP attacks can be used to launch attacks on hosts in a network. Spoofing attacks employing TCP IP suite protocols can be shielded by employing firewalls having better packet checking or mechanisms verifying both parties of a message. Spoofing is a method of concealing a message or identifier connected with a reliable approved source. Spoofing dangers range from well-established phishing threats to caller ID spoofing, which is commonly used to deceive the network during email-based spoofing. As well as a spoofing attack, other components of a network, such as IP address, DNS, or in some cases and an ARP service, are also attacked. Existing Solution to In order to prevent Link Spoofing Attacks, detection mechanism based on location information is utilized in combination with GPS and cryptography employing Time Stamp [67]. Each node is is secured with a time stamp and GPS based info. Each node broadcasts its positional Information making use of GPS to all the other nodes. As a result of which every node has an awareness of location information about the other nodes. Link Spoofing is done by making use of the distance amidst neighbor nodes, is checked to see whether a link can be established if there is a connection between the two nodes or not.[9]

Figure 8. Spoofed attack Colluding Mis Relay attack

Serve

In a colluding miserly attack, a group of attackers cooperates in secret to change and discard routing packets in order to disrupt the usual flow of traffic. The Purpose of a network is difficult to defend against this kind of attack. Detect. whenever node T sends any data, as shown in figure 9,It simply passes the data packets to Attacker 1.Packets to the attacker's second node without altering them but in case of similar packets reaching the attacker, it sinks them without tinkering with these routing packets.[1

Victim Computer

Attacker



Another form of a network attack is a denial-of-service attack layer. The source node commences the process, as depicted in Figure 1.A request for route finding to deliver packets to the target, use RREQ as a node. As indicated in the diagram, there is an attacker node that also passes RREQ to the target node; if the RREQ sent by the attacker is the first to reach the target node's neighbors, and then the path for sending the packet from the attacker node to the target node is determined. The source will be routed through the Attacker node. And what happens if the original RREQ transmitted by node Source reaches the node's neighbors. They will be discarded if they are a target node. As a result, the Source Node S will never be able to find the proper path. The attacker node is not included [6].

II. CONCLUSIONS

Ad hoc network has extensive uses in human life. It has vital applications in abnormal situations such as flood, pandemic and so many natural disasters.

Wireless Ad hoc networks are easy to use, so they are becoming more popular. But, security is main concern with the WANET.

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HEALTH MONITORING SYSTEM USING IOT INTERNET OF THINGS

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ABSTRACT

Among the applications that Internet of Things (IoT) facilitated to the world, Healthcare applications are most important. In general, IoT has been widely used to interconnect the advanced medical resources and to offer smart and effective healthcare services to the people. The advanced sensors can be either worn or be embedded into the body of the patients, so as to continously monitor their health. The information collected in such manner, can be analzed, aggregated and mined to do the early prediction of diseases. The processing algorithms assist the physicians for the personalization of treatment and it helps to make the health care economical, at the same time, with improved outcomes. Also, in this paper, we highlight the challenges in the implementation of IoT health monitoring system in real world.

INTRODUCTION

In 2017, the Report on the Status of Chinese Residents' Nutrition and Chronic Diseases issued by the Ministry of Health pointed out that the mortality rate of chronic diseases, represented by cardiovascular diseases and diabetes, is about 85.5% each year, and chronic diseases account for about 75% of all diseases in China [1]. Internet healthcare focuses on chronic high-risk diseases and subhealthy groups due to many subhealthy groups, together with the long course, complex etiology, and high treatment costs of chronic diseases. It follows that human health monitoring based on the Internet of Things (IoT) is popularized. As a result of the rapidly expanded aging population in China and the improvement of living standards, the subhealthy population increases with chronic diseases. Creating efficient, convenient, safe, and reliable healthcare conditions and services is a basic need for Chinese people. It is highly urgent to develop a health monitoring system to achieve remote real-time health monitoring [2–4].

IoT technology uses smart sensing devices and the Internet to provide an effective solution to the challenges faced by the networks, public and private sector industries, and government organizations worldwide [5]. The IoT innovations have emerged a new paradigm in using smart systems and intelligent devices to analyze data for various applications [6–10]. A basic IoT structure with generalized architecture is presented in Figure 1.



The various applications [11–15] in which IOT can comprise security and surveillance, automation of agriculture, healthcare, traffic management, the emergence of smart cities, etc. [16–19]. At present, there has not been a unified concept of the Internet of Things. Li Hang defines the Internet of Things as a kind of Internet that is based on various information sensors, radio frequency identification technology, global positioning system, infrared sensors, light, heat, electricity, machinery, chemistry, biology, location, and other information of a target [20]. Health monitoring is the continuous collection of individual health-related physiological parameters and related influence factors through a certain monitoring system. That follows the process, analysis, and summarization of data to generate health-related information spread to the corresponding individuals or groups, guiding disease prevention and control, promoting health management, and accelerating health conditions.

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At present, there is a variety of studies on human health monitoring systems based on the Internet of Things worldwide. The development of human health monitoring systems based on the Internet of Things in foreign countries is earlier than that in China. Significant progress has been made in remote consultation and remote monitoring of blood pressure, blood glucose values, and some medical data (long- distance transmission). Rezaeibagha and Mu [21] designed an Agent system that can monitor vital signs such as blood pressure, pulse, respiratory rate, and body temperature, which was connected to wireless sensors. Agnisarman et al. [22] have designed a remote video medical diagnosis system, which used the Internet of Things technology to facilitate the doctor's medical diagnosis process, with multifunctional modes such as online consultation and video dialogue. Mugica et al. [23] designed an ECG monitor matched with the Android system's intelligent terminal to realize remote monitoring. Tamilselvi et al. [24] proposed a health monitoring system that can assess patients' primary symptoms like their oxygen level, body temperature, and eye movement using the IoT platform. Acharya et al. [25] developed a kit for healthcare monitoring using the IoT platform to assess the parameters like a heartbeat, ECG, temperature, and respiration using various intelligent sensors. The major limitation of this system is that data visualization is ineffective due to the lack of interface. A pulse rate detection system was presented by Banerjee et al. [26] using a noninvasive method. This method uses a realtime monitoring platform for interactive IoT applications. Gregoski et al. [27] presented a smartphone- based technique for heart rate monitoring using mobile and camera interaction. Oresko et al. [28] developed a smartphone interactive tool for identifying cardiovascular diseases to monitor the level of heart rate during the progression of time. Trivedi et al. [29] developed a mobile-based method for monitoring analog data for surveillance applications. The Arduino platform is used for digital conversion, and Bluetooth transmission is required to transmit physical quantities to the device. Kumar et al. [30] suggested a safety device incorporating the IoT platform at three separate layers: control, device, and transport layer. The information is uploaded on the cloud platform using Wi-Fi and Ethernet. Desai et al. [31] proposed a wireless sensor network-based approach to track smart homes and heartbeat monitoring using the Spartan3 and FPGA interface.

IoT's evolution has increased nowadays with smart devices' tremendous ability to share information between them [32]. The reliance on IoT on various applications has widened its importance in the healthcare sector for remote monitoring of patients' criticality levels [33, 34]. This technological advent has come across various domains of safety, health, and human wellbeing [35, 36]. IoT is advantageous in computation, processing, and storage utilizing cloud-based solutions [35–37]. It is also beneficial in processing and storing the geographical data on the cloud platform, which can be shared between the devices for various applications [38, 39]. The current human health monitoring system based on the Internet of Things has some limitations, such as increasing users and uploaded databases, no guarantee for users, poor real-time performance, and low data utilization. A human health monitoring system based on the Internet of Things is designed in this work. The system can uninterruptedly and accurately monitor the human body's heart rate, blood pressure, pulse, body temperature, physiological information, and other vital sign parameters. This work uses wireless sensors to retain the information for health monitoring. The data is integrated using the Internet of Things for processing, connecting, and computing to achieve real-time monitoring. The proposed system demonstrated relatively accurate and stable test ability improving deficiencies in the existing health monitoring platform [40, 41]. This article contributes in daily health management using the human health monitoring system based on the Internet of Things which is instrumental in heightening health service quality and level.

This article is organized as follows: Section 2 presents the material and methods defining the various modules designed for the health monitoring framework. Section 3 presents the results and discussion of the analysis done in this study, followed by the article's concluding remarks in Section 4.

MATERIALS AND METHODS

The health monitoring system using IoT consists of various modules like pulse acquisition module, body temperature acquisition module, heart rate acquisition module, and blood pressure acquisition module. All these frameworks are elaborated in this section.

The Framework of the Health Monitoring System Based on the Internet of Things

The health monitoring and medical information system based on the Internet of Things integrate technologies such as wireless networks and mobile computing, aiming to provide patients with remotely receivable sensing, sound, image, and video multimedia information, enhancing medical diagnosis accuracy the quality of clinical services. The patient's blood pressure, heart rate, body temperature, pulse, and other information can be collected accurately by wearing related equipment. Information is transmitted using sensor network technologies such as Zigbee, Wi-Fi, Bluetooth, ultrawideband, and short-range wireless transmission, as shown in Figure 2.



The Framework of Health Monitoring Terminal System Based on Internet of Things Human

In the human health monitoring system based on the Internet of Things, the terminal system is mainly responsible for collecting and monitoring normal human health data. When abnormal data occurs, the terminal's alarm system will raise the alarm. At this time, it is necessary to conduct research and analysis on abnormal data and perform timely data processing. For example, the monitor's specific situation is confirmed first, and then, emergency rescue measures are carried out. Therefore, monitoring various indexes of the subjects is highly critical. To sum up, based on the existing research state quo and results and the market demand, the terminal system's hardware framework is designed for human health monitoring based on the Internet of Things. The terminal is mainly divided into a health monitoring project module, a data acquisition module, a data receiving module, a data transmission module, a data processing module, and a display and alarm module, as shown in Figure 3.



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Pulse Acquisition Module

Generally speaking, the photoelectric pulse sensor is divided into two types: transmitted wave monitoring and reflected wave monitoring according to how to detect light [42]. Their key components are the same (i.e., stable light source and light-receiving sensor). The impulse data sensor of Rohm Semiconductor Group is selected in the study, as shown in Figure 4.

Body Temperature Acquisition Module

In this study, the voltage output integrated temperature sensor is selected for the health monitoring system terminal, and the hardware circuit is designed. The digital conversion of the output analog signal is realized through the displayer, as shown in Figure 5.

The temperature sensor converts the temperature signal into a voltage output, performs low-pass filtering on the output signal to remove noise, and then amplifies the temperature sensor output voltage to a voltage level by the amplifier circuit [43].

Heart Rate Acquisition Module

The light volume method's principle is to measure the heart rate using the difference in the blood vessel's light transmittance caused by the pulse's beating [44]. The light source is converted into an optical signal using a photoelectric sensor, and the optical signal is then converted into an electrical signal by a filter circuit. The selected wavelength is 650 nm-750 nm. The signal flow of the heart rate sensor is shown in Figure 6.



When the light passes through human peripheral blood vessels, the volume change caused by pulse congestion affects the light source's light transmittance. The light signal reflected by the photoelectric converter through the human body's

The signal acquisition and processing are dependent on the op- amp LM324. The sensor is a BP300 sensor, which is sensitive, accurate, and precise. Besides, air pumps, resistors, and capacitors are also necessary components. The pressure sensor converts the pressure signal by converting the blood flow pressure signal in the inflatable bandage into a voltage signal close to the microcontroller's voltage amplitude. The one-chip computer collects and processes the signal and is responsible for the control of the entire circuit.

Peripheral blood vessels is converted and output by the amplifier circuit. The heart rate is output in analog voltage. This value is acquired using the heart rate acquisition module.

Blood Pressure Acquisition Module

Blood pressure monitoring methods can be divided into the direct method and indirect method (Oscillometric method). The indirect method avoids the direct method's shortcomings, such as being complicated and traumatic [45]. It monitors the pressure value on the body surface using the relationship between the vessel's pressure and the FM flow change. It is easy to operate, hygienic and concise without particularly severe medical restrictions, and does not harm health. As a result, the indirect method is more commonly used. Not only is the blood pressure monitored without any trauma to the human body but the monitored values are also more accurate [6–15]. The system diagram is shown in Figure 7.

RESULTS AND DISCUSSION

The experimentation outcomes are analyzed in this section discussing various compliances and assessing outcomes obtained from their implementation. Various modules like pulse acquisition, body temperature monitoring, ECG, and physiological information acquisition are observed in the upcoming subsections.

Compliance Test of the Pulse Acquisition Module

It is evident from the pulse test results that the three subjects' pulse values are all within the normal range (the pulse rate of an average adult is 70~90 beats/min). The pulse signal acquisition test is performed three times for each person, and the average pulse value acquired is 78, 78, and 79 (beats/min), respectively. The thermometer's corresponding values are 77, 79, and 78, indicating that the system's test results are relatively accurate, as shown in Figure 8.



Although there is deviation sometimes, it is within the acceptable range. This is because the sensor of the pulse acquisition module is associated with the circuit design. It can be further improved in the future to acquire more accurate results.

Compliance Test of Body Temperature Acquisition Module



Three people were selected as test subjects to conduct temperature measurements to make reasonable judgments on the temperature monitoring module's performance to evaluate the system's accuracy more rigorously.

As shown in Figure 9, three persons' temperature using a thermometer is 36.4° C, 36.7° C, and 36.5° C, respectively. The temperature test was carried out three times for each person, and the average of each person acquired by the system is 36.5° C, 36.4° C, and 36.5° C, respectively. It is evident that this system's measurements are very close to those of a thermometer and can monitor body temperature. It also indicates that the temperature test of this system is relatively stable.

Compliance Test of ECG Information Acquisition Module

In monitoring the ECG information collection module, the first step is to update or load the user's latest ECG measurement record information. Simultaneously, the corresponding detailed operation page will be displayed so that the real-time ECG image is acquired. Considering that the ECG data points are complicated, slight adjustments can be performed in the image's functional area to achieve the best results to view a particular segment's image curve. The ECG operation interface is shown in Figure 10.

The Compliance Test of the Physiological Information Acquisition Module

It is found that as the number of keywords input by users increases, whether it is a traditional character matching system or not, the accuracy to obtain information is further raised, as shown in Figure 11, to verify the rationality of the semantic recognition and matching system and improve the traditional character matching system, through simulation experiments.



Therefore, in addition to measuring pulse and temperature, users should also be provided with more physiological-related information to understand their physical condition better.

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CONCLUSION & FUTURE WORK

In this paper, we found the importance and fruitful benefits of implementation of IoT in remote health monitoring systems. The compact sensors with IoT will make a huge impact on every patient's life, that even though they are away from home and physician, this helps them to reduce the fear of danger. The sensory data can be acquired in home or work environments. Also, the challenges in sensing, analytics and prediction of the disease are also highlighted and those can be addressed to provide a seamless integraton into the medical field.

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IMPLEMENTATION PROCESS OF REPAIRS AND REHABILITATION

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ABSTRACT

Repair and maintenance of the building is one of the major concern of a housing society. Many housing society gives priority to maintenance work, it have great impact on the quality of life of building. But maintenance and repair is a complex process. Active participation by everyone in the building is needed with special repair and maintenance committee. This paper discusses various factors and stages included in repair and rehabilitation process.

Keywords—Repairs, rehabilitation, agreement.

I. INTRODUCTION

The construction material mainly reinforced concrete is being used extensively for various types of construction projects. However, the deterioration of Reinforced Concrete structures is recognized as a major problem worldwide. Apart from requiring regular maintenance, many structures require extensive Repair, Rehabilitation &Retrofitting. Over a period of time, as these structures become older, we find in them certain degradation or deterioration with resultant distress manifested in the form of cracking, splitting, delaminating, corrosion etc. Such deteriorated structures can be rehabilitated and retrofitted by using various types of admixtures & modern repair materials.

Three various stages are to be recognized while taking up a repair job. Thefirststageinvolves documentation of damage, its type, prognosis of repaired structure and recommendations on repairmethodology. For major jobs it will be worthwhile to engage an independent consultanttodothis job. Thesecondstagerequires preparation of detailed drawings, sketches, execution guidelines and notes, material and works specifications and tender document. The tender document should adequately cover various elements to the extent possible. Specific provisions interms of material specifications should be included. It should clearly define modalities of payment, works measurements and records. This will facilitate in receiving a fair and competitive proposal for therepairworks. Guidelinesprepared for executingthe jobshould bepracticalandflexiblesoastoencouragetheingenuity of the contractorexecutingthejob. Thethirdstageisactualexecution of repairs. This is a specialized job and those who have the necessary expertise and resources in terms of tools and plants should be engaged. The supervising engineer should have a good understanding of the procedures and give an attentive supervision.

II. CONDITION SURVEY

Condition Survey is an examination of concrete for the purpose of identifying and defining area of distress. While it is referred in connection with survey of concrete and embedded reinforcement that is showing some degree of distress, its application is recommended for all buildings and structures. The system is designed to be used for recording the history of the project from its inception to completion and subsequentlife.

Condition Survey of a building/structure is generally undertaken in fourdifferentstagesto identifytheactualproblem so as to ensure that a fruitful outcome is achieved with minimum efforts & at the least cost. The four stages of Condition Surveyare:

- a) PreliminaryInspection,
- b) Planning,
- c) VisualInspection,
- d) Fieldand Laboratorytesting

III. LEGAL DOCUMENTATION AND RECORDS

A. Estimate of work:

A repair estimate in an estimated amount which can be said as cost to repair a structure. The reason for the estimation is because there can be unseen damages that will affect later to the repairing cost.

Repair estimate help the client to prepare for the final cost of the repairs.it can be break into categories like: breaking, supporting, plastering, paint, labor and materials required. Most repair estimates are prepared by consulting structural engineer.

B. Bill of Quantities:

Bill of quantities is a document used in tendering, in which materials, parts and labor are itemized. It is also of terms and conditions of repair contract and itemizes all work to enable a contractor to price for bidding process. Thequantities may be measured in number, length, area, volume or weight.

The bill of quantities is issued to tenderers to prepare a price for carrying out the construction work. The bill of quantities assists tenderer in the calculation of construction cost for their tender.

C. Tendering:

Tendering is done to get the best offer from the service providers. It is mandatory in government and public sector, in addition private sector too adopts this to know the best available price. Open and restricted tendering are major types of tendering process. For Open Tendering, PMC appointed by society issues an advertisement of "TENDER NOTICE, in leading newspaper. The advertisement gives details of services for which the tender enquiry is issued and asks the venders to by the tender documents from them.

In both the above tendering methods, Tender documents are usually sold for certain price to cover the expenses of tendering process. It contains all the details such as eligibility criteria for selecting contractors, complete description of work with detail specification, approximate quantity, time of completion, procedure for inspection of work for quality control, payment terms, warranty and other obligations of contractors under the contract etc.

In a tender process there are three parts, 1. The technical bid, 2. The financial bid, 3. The infrastructure bid. All of these should be satisfied for the tender to be considered. The envelopes are open in sequence that, means first, second andthen third. The contractors are ask to submit their bids in a sealed envelope before a specific date and time. These are collected in a sealed box, lock and kept with responsible officer till open. The bids are open on the specified date before a panel of society office bearers, PMC officers and all the representative of contractors who submitted their bids. Bids are read out and noted in a file. After these, the PMC will tabulate all the bids to determine who coated the lowest price.

D. Draft tender

A draft tender is a document for executing certain specified work subject to certain terms and condition like bill of quantities, specification and the time frame within which it is completed. A draft tender has following important thing mention in it, Background of project and scope of work, Billof quantities and detailed technical specification of items of works, Earnest money deposited and security deposit, Arrangement of accommodation for workers and store/ godown, Bank guarantee clause, arbitration clause, Liquidated damage clause and fraud, breach of contract terms clause, Third party insurance, safety, workers insurance, damages to society property, Water and electricity supply. Depending upon the work or the project side and its location there can be some particular clauses or items omitted or added in the drafttender.

E. WORK ORDER

Work order is a document provided to the contractor by the society for services, bearing the date and signature to theauthorized personnel. Work orders issued to contractor contain the amount of contract, time of completion, modes of payment. It is often given along with the agreement copy. A work order may include one or more of the following. Instructions, cost of work, bill submission, start date and duration to execute the work order, information about the location and entities to execute the work order, person to whom the work order is assigned.

F. AGREEMENT AND CONTRACT

A contract is an agreement made between two parties which the low will enforce. It is defined as 'as an agreement enforceable by low'. some essential elements of a valid contract are Offer and acceptance, an offer must be extended to order to begin a contract. This should include details of the agreement and its terms and conditions. Once the offer is extended it's in the hands of the offeree to either accept the proposal and its terms and condition. Legal relationship, The meeting of the minds in contract low refers to the moment when both parties have recognized the contract and both agreed to enter into its obligation. This is also called a Mutual agreement. Lawful consideration, something of value must beexchanged in order to have a valid legal agreement. Capacityif parties, each party must be fully able or have the legal capacity to enter into the contract in order for it to be considered valid. Free consent, each party must have free consent to enter into an agreement. It is not under any type of influence that either of the parties may have. Lawful objects, Each party must show legal intent, meaning that they intend for the result of their agreement to be completely legal. Writing and registration, The agreement is written in legitimate and legal language so that there is no ambiguity in the document. If it is a contract, it must be registered with thegovernment by paying the legal fees and stamp duty.

G. MEASUREMENT BOOK

Measurement book is used on site for recording the measurements to calculate the materials required to the further construction process, work done by the contractor or material received or services rendered. The measurement book is the most important record, since it is the basis of all accounts of quantities, whether of work done by daily labor or by the piece work system or by contract, or of material received, which have to be counted or measured. It maintains the account of work. It contains, Name of the work, Name of the contractor, Date of measurement, Location Date of work order, No. of measurement. It is used for billing if quantities for the clearance of bill.

H. BILL / R A BILL

The payment to the contractor for works or supply or material are made on the basis of measurement recorded in the measurement books. When the work is completed or sufficiently progressed, the detailed measurement are taken usually by the PMC and recorded in the measurement book and an abstract for quantities are prepared and the cost is calculated at the rate of the contract agreement. From the abstract of quantity and the rate, a bill is prepared for payment. Bill is the account of work done and includes the particulars and quantities of work done and amount due. Reference to the agreement number, order number are also given in the bill. voucher is a written document with details which is kept in record as a proof of payment. For any payment, a bill is prepared and payment is made on the bill, duly checked and acknowledge by the payee, by signature or revenue stamp as required and after payment is made, bill becomes voucher which is kept in record. The various standard forms of bills and vouchers are used for payments, recording to the nature of works. White forms are used for running bills and yellow forms are used for final bills, the different types of bills are, First and final bill, this form is used for making payment to the contractor both for works and suppliers, when a single payment is to be made on the completion of whole work or supply as final payment. This type of bill is generally adopted for pretty works or split up works in projects, RA bill form A, this form is used for advanced payment without any measurement. It may be used for running bill payment for advanced for unmeasured work only or combination of unmeasured work and measured work or if 'on account' payment is to be made but an advance payment already made for the same work is outstanding. RA bill form C, this form is used for contracts both for works executed on piece work system and for suppliers received. This form is widely used specially for medium sized works executed through contract and split up works or projects. Lump sum contract bill, in the

L.S contract methods, a number of intermediate payments are made in L.S contract running account bill form before final payment is made. In the final L.S bill the full amount as entered in the contract is paid adding the amount of authorized extras and deducting authorized omission and the intermediate payments already made.

I. SECURITY DEPOSITS

A security deposit is a sum of money held in trust either as aninitial part- payment in a process is also known as an earnest payment, or else, to ensure the client against default by the contractor and for the cost of repair in relation to any damage. When contract security is required, the contractor may, in lieuof a performance bond and a labor and material payment bond, provide a security deposit. When a security deposit is delivered, it must be, in the amount of 10% of the contract price for construction contracts and at least 10% for other contract types. The deposit must be either a clarified cheque, bank draft, a bank letter of Irrevocable Guarantee or standby credit, or such other acceptable security. Letters of IrrevocableGuarantee or credit must be retain in a fireproof safe for the duration of contract return of contract security deposit, it will be generally returned with the interim certificate of completion payment. However, any portion of the security deposit which require for the purpose of the contract that is funds required for deficiency, claims by subcontractors for non- payment, unfinished work. It may be retained. Irrevocable letters of guarantee or credit must be returned to the contract or upon completion of contract or upon expiration.

J. TYPES OF PAYMENT

Payment to contractor are made in variety of ways are, First and final payment, the term indicates a single payment made for a job or contract on its completion. In this case the payment finish by one payment after the completion of work. This is usually applicable for small work. Running or interim 'on account' payment, this means payment made on the running accounts to a contractor for works done or supplies made by him, duly measured and entered in measurement book. This is effected when only a part of the whole work or supply has been done and the work and supply is in progress. During the progress of the work, the contractor is paid from time to time. Final payment, this is the last payment made to a contractor on a running account, on completion of this contract and the full settlement of the contract. Advance payment, this means the payment made on running

account to a contractor for work done by him but not measured. Advance payment is not generally made to the contractor, but may be made under special circumstances when the work is sufficiently progressed, but measurement cannot be taken for certain valid reasons. The value of work done shall not be less than the advanced proposed. Detailed measurements shall be taken as soon as possible and advance payment adjusted in the final bill. Secured advance payment, this payment is made on the security of material brought by the contractor to the site of work, when the contracts fir the completed items of work. This type of payment may be allowed by the executive engineer in the interest of work up to an amount not exceeding 75% of imperishable materials. Limb, sand, paint and varnishes are considered as perishable materials and no advance is permissible.

Preparation, examination and payment of bills, the bills for payment shall be prepared with respect to the measurements recorded in the measurement book. All entries in the measurement book with regard to the description and quantities of work and supplies made are checked. Arithmetical calculation of the contents and area are verified. When, the bill is on running account then it is compared to quantity etc. with the previous bill.it is checked whether deduction in respect of the following have been properly made. Recovery for advance payment, Recovery in respect of departmental materials issued to a contractors. Hire charges for departmental materials issued to the contractors, Amount to be withheld towards security deposit. Recovery towards penalty for slow progress, non-return of empty gunny bags etc. In case of final bills the field officers should be certify about the due fulfillment of contract and satisfactory completion of work. The memorandum of payment is then made. The competent officer records a formal pay order specifying both in words and figures the net amount payable. However the contractor is required to acknowledge the gross amount payable inclusive of recoveries proposes in the bill. When the bill is passed for payment, every page containing the detailed measurement will be scored out by a diagonal red ink line. The number and date of the voucher for payment will be entered in the measurement book.

IV. CONCLUSION

Construction project consist of business development, profit and resources utilization. Because of this, PMC plays very important role in repairing project, and usually involved in the project from inception to its completion. In all phases PMC manages the project by various services like scheduling, cost budgeting, value engineering, risk identifying, monitoring and controlling, time line optimization and resource allocations.

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NO FINE CONCRETE

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ABSTRACT

Water logging is a major issue at parking and walkways, especially during rainy season, as pavements and floors are normally impermeable. This result in post construction activities like excessive repairs and providing unnecessary storm water drain systems, which are not only costly but may also get clogged during peak flow. Thus, it becomes very important to think of an economical solution which helps in getting rid of all above problems. The best solution to above problem is pervious concrete. No fine Concrete is a special concrete used to allow water to intentionally pass through the surface of a pavement and allow storm water to eventually absorb back into the surrounding soils or evaporate. Metakaolinin 20% and glass fibre in 2% of cement will be added to no fine concrete to check the effect of it in the compressive strength and cubes will be casted. Compressive strength will be evaluated at 7 days and 28 days.

Keywords— no fine, concrete, permeable, water logging, impermeable, pavement.

I. INTRODUCTION

No fine concrete is the special type of high porosity concrete which is used for flatwork applications which allows water from precipitation and other sources to pass through, so reducing the runoff from a site and recharging ground water levels. The use of pervious concrete may recharge ground water, reduce storm water runoff, and prevent glare and skidding during rainy season by allowing water to infiltrate freely through its pores. In addition, pervious concrete can be produced at low cost, thus it can be considered among the most attractive sustainable urban drainage systems. So, main aim of this research is to use supplementary cementations materials to develop a high strength no fine concrete with lesscost.

II. LITERATURE REVIEW

Pervious concrete is a type of lightweight concrete that is porous, obtained by detaching sand from the normal concrete mix. Furthermore, it really is known as no-fine concrete. The advantages of this type of concrete are lower density, less cost due to lower cement content and no use of fine aggregates, relatively low drying shrinkage, lower thermal conductivity, no capillary movement of water and better insulating characteristics than conventional concrete because of the presence of large voids.[7]

The usage of supplementary cementitious materials, (SCM), such as Silica fume, Fly ash, Metakaolin, Hypo sludge, Rice husk ash etc. in concrete was experimented and concluded that it can be a new innovative usage in making of concrete.[6]

Civilization is the part of human life, and technology which is advancing rapidly from centuries. Many efforts are made so far in developing of new construction materials. In the construction industry, concrete technology is plays a vital role. The increasing amount of waste is a concerning reality that has across the sustainability issues of the environment. They used industrial waste as a substitute of cement to make porous concrete.[5]

A test of compressive strength of porous concrete with different w/c ratio was done. At the end of 28 days after testing he concluded that the compressive strength at w/c ratio 0.53 was greater than that of 0.56 and 0.6.[3]

An experiment was carried out on the applications of pervious concrete and also develop a strong and durable Pervious cement concrete mix using additive polycarboxylateas addition.[4]

Polypropylene monofilament and fibrillated fibers as raw materials in varying percentage was used and carried out an experiment to determine mechanical properties of porous concrete reinforced with the fibers. The results showed that asthe percentage of fibers increases the compressive strength is increased.[9]

AN experiment was conducted regarding environmental benefits of PCPs, in terms of storm water runoff reduction, underground water quality improvement, heat-island effect mitigation, traffic noise reduction, and skid resistance improvement. The hydraulic performance of PCPs is determined by its mix design, pavement design, construction practice, and service environment. In general, it is difficult to simultaneously optimize the mechanical and durability properties and infiltration performance of PCPs. New technologies need to be developed to help improve the durability of PCPs without significantly increasing its maintenance requirements or sacrificing its infiltration properties.[1]

Natural pozzolana is used as a supplementary cementitious material to partially replace of Portland cement in concrete. This research work is made previous concrete on 10%, 20% by weight replacement of cement with and without pozzolana. Mix design is based on the no slump method from the American Concrete Institute's Committee 211.3R-02. This concrete is tested for its properties, such as density, void content, water permeability and the compressive strength with various ages. According to the results, pozzolana replacement of cement increased as the compressive strength and permeability and durability of pervious concrete decreased.[8]

Experimented was conducted to find the influence of incorporating two different types of recycled aggregates from construction and demolition waste, brick ceramic aggregate and crushed concrete aggregate, on the performance of pervious concrete under compression and flexural strength. At the end of 28 days the compression strength with recycled aggregates was 5.79 Mpa which is in the allowed range of ACI.[2]

The compressive strength and the infiltration rate of concrete in which the fine aggregate was removed from 0 to 100% was find out. They concluded that almost 50% compressive strength decreased by reduction of 100% sand from the design mix. On the other side, infiltration rate for 28 days shows direct relation above 40% reduction of sand and highest 273% of infiltration rate by reducing 100% sand from the design mix. The 90% reduction of sand from concrete give considerable compressive strength of 2150 psi and infiltrationrate of 165.79 inch/hour, which can be recommended for pavements of parking and walking area.[7]

NDT tests were done to increase the effectiveness of the quality assurance of pervious pavements. Predictive models for hydraulic conductivity and compressive strength of pervious specimens were derived using only UPV combined with total void ratio. The results confirm that UPV offers a technique for rapid assessment of inplace properties of pervious concrete, either to supplement or replace core testing in some cases. Combined use of UPV and void ratio was found to outperform the models based on a single test result. Based on the obtained results, statistical models were put forward for predictions of pervious concrete's hydraulic conductivity and compressive strength.[10]

The study was conducted to analyse the hydrological and structural properties of pervious concrete which is reinforced with glass fibre in various ratios (0.5%,1%,1.5% by weight of cement). Compressive strength and flexural strength obtained is compared with the normal pervious concrete.[11]

The compressive strength of porous concrete is relatively low because of its porosity but at the same time we increase water absorption quality. Due to low strength it cannot be used as a road pavement. The pervious concrete can only be applied to footpaths, parking and where low strength is required.[19]

Experiment carried out in which cubes of pervious concrete with mix proportion varying from 1:5 to 1:6 with size of gravel such as 10mm were casted and their compressive strength and permeability were checked at the end of 28 days.[12]

The paper evaluates the factors affecting the strength and hydraulic parameters of pervious concrete, presents results of long-term infiltration monitoring and cleaning operations. The specific objectives of the study were to determine compressive strength of pervious concrete cube after 28 days curing; determine the infiltration ratio of pervious concrete slab.[16]

Pervious Concrete Pavement various mix proportions were prepared by replacing cement with silica fume (6% by the weight of cement), by adding super plasticizers (0.13% & 0.25%) and varying size of aggregates. The water-cement ratio was kept constant 0.34. Different properties of pervious concrete e.g. workability, compressive strength, split tensile strength, flexural strength test at 7, 28 & 56 days and bond strength tests at 28 & 56 days were studied experimentally.[17]

In this research study done the (OPC) cement has been replaced by Rice Husk Ash accordingly in the range of 10% and 20% by weight of cement for 0.30, 0.35, and 0.40 water/cement ratio. The compressive strength test and flexural strength test was carried out for 7, 14 and 28 days. So the aim of the investigation is to study the behaviour of pervious concrete while replacing the RHA with different proportions in concrete.[13]

An Experiment was carried out in which Pervious concrete has little or no fine aggregate and has just enough cementitious paste to coat the coarse aggregate particles while preserving the interconnectivity of the voids. Pervious concrete is traditionally used in parking areas, areas with light traffic, pedestrian walkways, and greenhouses and contributes to sustainable construction.[15]

The study was carried out to look into the impact of size of aggregate (20mm and 10mm), w/c ratio (0.32 & 0.28), super plasticizers (auramix 400 & conplast sp 430) and different percentage of fibre (i.e 1% & 2%) on the

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behavior of pervious concrete and were described the resemblance with 4 criteria: Compressive strength, split tensile strength, flexuralstrength, and permeability test.[14]

In concrete fine aggregate was replaced with coarse aggregate in the range of 50 - 100 % by weight. Various mechanical properties of the mixes were evaluated. Coefficient of permeability was determined by using falling head permeability method. The relationship between the strength, abrasion resistance, permeability and total void present in aggregate based on angularity number has been developed.[18]

III. METHODOLOGY

To add glass fibre in 1% of cement so as to check in change of the compressive strength of no fine concrete and also to replace 20% of cement by metakaolin. Coarse aggregates to be used should not be bigger than 10mm IS sieve. To check the compressive strength and permeability of no fine concrete containing glass fibre and metakaolin and compare it to normal no fine concrete. Compressive strength determined by compression test through compressive testing machine.

Compression strength= P/A

Where, P = maximum load (in kn) applied to the specimen,

A = cross-sectional area of the cube on which load isapplied.

In general compressive strength is dependent on size of coarse aggregate, void ratio, bond between mortar and coarse aggregate. In 7 days cubes of permeable concrete gain 30% of its strength, in 21 days of permeable concrete gain 70% of its strength, and for 28 days it gains 95% strength.

С	6.8				
С	7.1				
С	7.25	7.05			



Figure 1. Testing of cube for compressive strength

Mix Design: Pervious concrete uses the same material as a conventional concrete, except that there is usually no or little fine aggregate. The size of the coarse aggregate used to keep fairly uniform in size to minimize surface roughness and for a better aesthetic. Water to cement ratio is kept 0.35. Generally, A/C ratios is 1:4 by mass. These A/C ratios lead to aggregate contents of between about 1300 kg/m3 to 1800 kg/m3. Higher A/C ratios (greater than 4.5:1) have been used in laboratory studies, but significant reductions in strength result. However, mix design implemented based on literature study and trial mixes is given in Table. 1.

Sample	A	В	C		
Size of C.A. mm	10	10	10		
Cement kg/m ³	438	350	438		
C.A. kg/m^3	1946	1946	1946		
Metakaolin kg/m ³	-	88	-		
Glass Fibre kg/m ³	-	-	4.38		
Table 1 Mir Dropartions					

Table 1. Mix Proportions

IV. RESULTS AND CONCLUSION

The cube samples are removed after a 7-day curing time and surface dried at room temperature without direct sunlight. Thenumbers for compressive strength are all averages. There are three different samples. The results of the tests are listed below.

Table 2. Compressive strength for 7 days



Figure 2. Graph showing compressive strength of 7 days cured samples

The following are the conclusions made by this study. According to the Experimental results, it has been observed that The compressive strength of no fine concrete with metakaolin is greater than the normal no fine concrete. However, no fine concrete with glass fibre doesn't show any increase in compressive strength.

SAMPL E	COMPRESSIV E STRENGTH MPA (7 DAYS)	AVERAGE COMPRESSIV E STRENGTH MPA (7 DAYS)
А	7.41	
А	7.35	
А	7.5	7.42
В	11.5	
В	11.2	
В	11.8	11.5

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VILLAGE ROAD DESIGN STRATERGY IN INDIA: A CASE STUDY

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ABSTRACT

Upgrading and maintaining rural road networks keeps community services, education and health reasonably within reach of villagers / tribes and quickly moves produce from tribal villages to markets and distribution centers. It is important to do. There are 43,025 homes in Maharashtra, of which only 84% are connected by all-weather roads.

The total length of the road network in the state is about 626,521 km. There are numerous kinds of ground roads available from a design point of view. There are 6825 unconnected residential units, of which 6135 have a population of over 100. The existing soil, climatic and topographical conditions in the Legal district of Maharashtra, India, are appropriate for the improvement of agricultural, marine and horticultural products. This contribution seeks to cope with the problem of street design in such villages, which can reach the overall development of the district.

Keywords—Rigid Pavement. Flexible Pavement, Habitations Village Road, WBM Road, Gravel Road.

I. INTRODUCTION

Raigrh District, the geographic coordinates of 17°51'00" and 19°08'00"N and 72°50'00" and 73°40'00"E, It borders the Thane district to the north, the Ratnagiri district to the south, and the Pune district to the east, and the Arabian Sea forms the western border, which is about 250 km long. This district has 19 towns and 1919 villages out of which 60 villages are inhabited. The District has area 1486Sq.m occupied by forest. 3286sq.m cultivated area whereas as net sown area is 1356Sq.m. Typical soil present is Black Cotton, and mean maximum and minimum temperatures are 17.7°C and 31.8°C. Average annual rainfall is 2253mm to 7598mm.The existing surface of the selected route from SH 172 VASAP toSARABKOND GIJEWADI(LR-104) OF MAHAD

TALUKA OF RAIGARH DISTRICT is gravel surface with fair geometry. The proposed road is to have Black Top standards.



Figure 1



Figure 1.1

II. FIELD WORK

The details of the fieldwork survey are traffic surveys, road condition surveys, and road inventory surveys, including those conducted during the status and feasibility studies.:

- Traffic surveys, Pavement condition and road inventory surveys.
- Survey on existing road surfaces and PCI indexes
- Collection various facility data available with selectedroad network to calculate the utility value.

The figure 1 and figure 1.1 shows the map of Raigarh District and road map of Mahad taluka in Maharashtra state in India

2.1 Data Collection

Traffic surveys were conducted on the on the selected route which is required to calculate ADT(Average daily traffic). Simultaneously the pavement condition index, total length of road, Population as per 2011 census, Year of construction and at the last total number of habitation benefited from selected road.

The following table 1 gives the details about road SH 172VASAP to SARABKOND GIJEWADI(LR-104) OF MAHAD TALUKA.

Road No	Total	Population	Habitation	PCI	ADT
	Length	As per2011	Benefited		
SH172	6 KM	639	VASAP GIJEWADI MANECHIDHAR	1	3

XXX-X-XXXX-XXXX-X/XX/\$XX.00 ©20XX IEEE

Table 1

2.2 Road Inventory Survey

Detailed road inventory surveys were carried out to collectdetails of all existing road and pavement features along the existing road sections. The data collected included, but not limited to - Terrain (flat, rolling mountainous), Land-use (agricultural, commercial, forest, residential etc.), Lane width, pavement type, road shoulder pavement type and width, road shoulder / local soil type (texture classification), horizontal curve: vertical curve, intersection type and details, road intersection type and details, water area (lake and reservoir) location, embankment Height or cut depth, land width RoW (if available), culverts, bridges and other structures (type, size, span placement and location), roadside tree cultivation, both sides within the RoW Existing supply facilities, general drainage conditions, etc.

2.3 Road surface conditions and PCI data

Conditions are based on field measurements. For bituminous roads, the main indicators of road surface load such as cracks (narrow and wide), repairs, chips, rutting, dents, etc. are visually estimated in relation to physical measurements and gravel / WBM. If the road is far away, cracks and dents can be used to estimate dents, corrugations, and material loss. Also Based on PMGSY strategy PCI index of selected road calculated the table of PCI index given in table 2 below.

middle of the house. Usually in rural areas, the route is predetermined because there are marked trails. This road project aims to level the existing dirt road to the highest blackstandards.

2.5 Land Acquisition

Usually in rural areas, the route of the proposed roads is predetermined, due to the existing tracks planned. Existing tracks will generally have a minimum width equal to the length of a Ganter chain ie 33 "0" or Engineer "s chain lengthie 66" 0 ". some rare occasions, where such pre-existing tracks do not exist, for their convenience in transporting agricultural products, farmers on the sides of the existing roadway, donate part of their land for a nominal width of the track , ie up to a maximum width of only 20 "0". Hence, in these cases only when the proposed route must pass through the fields land acquisition problem arises. As this road project is for gradation only and having sufficient existing road width, the problem of land acquisition is not anticipated.

2.6 Sub Grade Investigation

The fundamental objective of the subgrade investigation is todetermine the suitability of the existing subgrade to support the flooring in the widened part.. The strength and degree of compaction of the existing substrate was determined by performing various field and laboratory tests. The figure 2 below shows the existing gravel road being used by villagers to transport their produce.

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Sr. No	Normal Driving Speed	PCI
1	Over 40 km/hr	5
2	30-40 km/hr	4
3	20-30 km/hr	3
4	10-20km/hr	2
5	Less than 10km/hr	1

Table 2: 2.4 Alignment



Figure 2: 2.7Test pits

Utmost care has to be taken in deciding the proposed roadalignment as it plays a pivotal role with regards to the total cost of construction. Special attention should be paid to the following items that save construction costs

- □ Where possible, alignment should follow ridges for easy drainage.
- □ The alignment must pass through minimal transverse reliefs, must be straight and flat to avoid horizontal and vertical curves.

The alignment must preferably pass through the out skirts of the habitation rather than passing through the midway of the habitation. Generally in rural areas, The alignment should referably go through the edges of the house rather than the

Sub grade soil samples were taken by digging test pits at the interface of the carriageway and shoulder so that both thepavement and the shoulder composition could be known. To determine the field density, core cutter was used. Following tests were conducted on the soil samples collected from the field.

- □ The pavement layers were measured and logged
- □ The moisture content in the field was determined using anapid moisture meter at the site.
- Grain size analysis and Atterberg limits were determined in the laboratory for soil classification.
- Maximum dry density and optimum moisture content were determined in accordance with IS 2720 part 7
- □ OMC compacted samples at 3 different energy levels, on samples for unimpregnated and impregnated CBR 4 days of reshaped samples at soil moisture density4 daysoaked.
- □ CBR of samples remolded at field moisture density.
- 2.7 Soil classification

The soil he found was black cotton potting soil that was suitable for embankments and posed no problem with regardto the construction of the roadway. CBR test also performed according to IS: 2720.

III. DESIGN STANDARDS

3.1 Design Parameters

The guidelines prescribed in IRC: SP; 202002 are generally adopted. These guidelines are applicable to other district and village roads. These roads ensure accessibility to villages in the rural area of the country, the geometric design standards of rural roads should not be limited to the established minimum and softer than minimum values should be preferred when conditions are favorable and the cost is not excessive. . Higher standards at the start may be justified in cases where an improvement in road geometry (such as widening the

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width of the foundation) is expected at a later stage due to increased traffic. The following parameters are considered for selected road.

- Terrain classification
- ➢ Road land width
- Carriageway width
- Shoulder width
- Side slope
- Sight distance
- Stopping sight distance
- Intermediate sight distance
- Overtaking sight distance
- Camber & Horizontal curve
- Super elevation
- > Rate analysis and Quantity Estimates

IV UTILITY VALUE OF SELECTED ROAD

The Utility value of road is the ratio of the totalweightage of road to the length of road.

Road	Lengt				
No	h	Habitation	Weightag	Total	Utility
	Of	Benefited	eOf	Weig	value
	Road		Habitatio	htage	
	(KM)		n		
SH	6	VASAP	21.360	32.14	5.37
172		GIJEWADI	8.320		
		MANECHIDHA	2.460		
		R			

The Total weightage of selected road is calculated basedmarking systems on following factor.

- Educational Facilities (Max 10 Marks)
- Population (Max 50 Marks)
- Medical Facilities (Max 07 Marks)
- Veterinary Facility(Max 03 Marks)
- > Transport & Communication Infrastructure (Max 15Marks)
- Market Facilities (Max 12 Marks)
- Administrative Centers (Max 03 Marks)

DISCUSSIONS AND CONCLUSIONS

V. PAVEMENT DESIGN

Based on field data, Traffic study, PCI data, Existing condition and all other facility available with selected road aswell as by keeping the economics in consideration the following composition has been suggested.

VI. CONCLUSIONS

Rigid pavement have high compressive strength, which has a tendency to distribute the weight over a especially massive area of land. Other advantages include Low maintenance costs, long life with extreme durability, high value as a basis for future resurfacing with asphalt, decrease in base and foundation requirements, ability to be placed directly on poor soils, none oil and grease damage and solid edges.

On the other side, Flexible pavements contains a series of layers, with the best quality materials at or close to the surface. The strength of a flexible pavement may be a results of buildup thick layers and thereby distributing the load over the sub grade; the surface material doesn't assume the structural strengths like rigid pavements. Some

of the other advantages include – adaptability to stage construction, Availability of low-priced sort that may be simply built, simple to repair geological phenomenon and settlement and resistance to the formation of ice glaze.

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DEVELOPMENT OF DEVICES USING SENSORS FOR DEFLECTION OF GIRDERS, BEAMS, SLABS OR BRIDGES

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ABSTRACT

This paper presents the reviews on deflection measurement in bridges and girders using sensors. Sensor is a device that provides usable output in response to a specified quantity which is measured. This study also investigated operational and structural health monitoring (SHM) as well as damage evaluations for buildings structures. It also discusses some important approaches for the high rise buildings and structural health monitoring multi store buildings. Hence, we should follow the proper methods of sensors and deflection listed in this study to avoid any future inconvenience.

I. INTRODUCTION

A girder is a support beam used in construction. It is the main horizontal support of a structure which supports smaller beams. A beam is a structural element that primarily resists loads laterally to the beam's axis. Its mode of deflection is primarily by bending .A concrete slab is a common structural element of modern buildings, consisting of a flat, horizontal surface made of cast concrete.[6]

Bridge is an important component of modern transportation systems, which puts forward higher requirements on the safety of bridge structure. Therefore, safety monitoring is quite necessary. As science and technology develops, an increasing number of devices are used on bridge monitoring.[1]. Structural Health Monitoring (SHM) is considered to be a promising technology to improve the health and safety of civil infrastructures and achieve their sustainable management. Other than acceleration and strain responses, deflection measurement from the SHM system is critical for evaluating structural safety conditions [2]. The long-span girder bridge, which has the advantages of simple structural configuration, mature construction technology, and low maintenance cost, is a very competitive structural type within the span length of 50–300 m. After analyzing the deflection characteristics of this bridge in the process of operation using the proposed mathematical method, and proposed a grading warning system on girder deflections of the bridge, which could be used in bridge operating condition assessment based on deflection monitoring data [3]. The main methods used to monitor and analyze the dynamic behavior of super high-rise buildings include total station, accelerometer sensor, digital vertical meter, and Global Navigation Satellite System (GNSS) technology. We used the Wuhan Greenland Center (WGC) which is under construction with a 636 m designed height as the research object. GB-RAR was utilized to derive the dynamic deformation information of the WGC from the north-south and east-west directions. Wavelet analysis was used to eliminate the noise in dynamic deformation signals and the accurate dynamic characteristics of the building, such as horizontal displacement, oscillation amplitude, and displacement trajectory, were extracted [4].SHM systems provide information about any significant change or damage occurring in a structure. The primary purpose of structural damage detection is to identify the reason, location, and type of damage, so as to measure the damage severity and predict the structure's remaining service life. Finite element method (FEM) was used for steel bracing to identify damage by adopting two methods; namely, the bayesian estimation method and the weighted least squares methods in the initial stages for the eigen-sensitivity based FE model [5].

II. LITERATURE REVIEW

A. BRIDGES, GIRDERS

Two wireless inclination sensors conducted a zero calibration are respectively put both sides of Beida Bridge's midspan. With two sides fulcrum for reference point, the maximum midspan deflection is up to 248.49 mm, while the value in 2005 is 195 mm and the value in 1995 is 181 mm, all these show that the current deflection of the bridge's midspan is larger[1]. The basic modal parameters, modal scaling factors and flexibility of the studied bridge were identified. After that, the structural deflections predicted from MRIT data using a developed impacting device and traditional sledge hammer were compared to those calculated from static measurements with LG-FBG sensors to demonstrate the reliability of the proposed method for deflection measurement and prediction. Finally, the modal truncation effect on predicted deflections was investigated [2]. The generalized Pareto distribution extrapolation method based on peaks-over-threshold theory makes better use of underlying data, which is very efficient for the prediction of traffic load effects. Based on the cellular automaton method, a microscopic traffic stream simulation approach was built using the intelligent driver car-following model and acceptable distance lane-changing model, which can simulate the on-bridge random traffic loads for any given traffic conditions. The studied case indicates that the deflections of a long-span girder bridge under the action of

the coupling vibration of a stochastic traffic stream and bridge display a transient-state change rule, and are influenced by the pavement condition (road roughness). Through extreme extrapolation, it is discovered that the extreme girder deflections become truncated in long reference periods, demonstrating that girder deflections in normal traffic conditions are limited. A grading warning system on girder deflections is proposed with red (danger), orange (serious), yellow (little serious), and blue (normal) being the four grades. If the girder deflections under dynamic traffic loading exceed the corresponding limit, it indicates that the bridge has been degraded significantly, or there are many abnormal overloading trucks traveling across the bridge. Therefore, reinforcement and maintenance should be implemented on the bridge [3].

B, BUILDINGS-

During the monitoring of the WGC, the GB-RAR effectively extracted the dynamic characteristics (e.g., horizontal displacement and oscillation amplitude) of the building. The maximum horizontal displacement amplitudes at the top of the building in the north-south and east-west directions were 18.84 and 15.94 mm respectively, and the corresponding accuracies were 0.15 and 0.17 mm, respectively, suggesting that the accuracy of GB-RAR monitoring was high. However, the monitoring accuracy gradually decreased with the increase in floors. The roof displacement trajectory of the WGC was clearly identified. The displacement trajectory was accompanied by slight fluctuation, which may be caused by the combined influences of construction vibration, wind load, and other factors. The results demonstrate that the GB-RAR is effective for dynamic monitoring of super high-rise buildings. A certain negative correlation was identified between the temperature and displacement changes in the north-south and east-west directions at the roof of the building, and the correlation between the displacement changes in the east-west direction and the temperature changes was strong [4]. Ambient vibration methods range from measured dynamic responses to real-time monitoring such as mode shapes, modal damping ratios, and natural frequencies. Various types of sensors are used for structural health monitoring such as fiber optic sensors, piezoelectric sensors, micro electro mechanic al system sensors, accelerometer, temperature sensors, and accelerometers. Predictive analysis and data acquisitions can be applied to buildings using sensors, so sensor inputs are safe and reliable in accordance with building conditions. SHM can be applied for different types of buildings, including multi-story buildings, commercial buildings, and heritage buildings, and various works have been discussed in detail. The static and dynamic behavior of buildings can be used to predict damage at an early stage by adopting SHM techniques along with finite element analysis reports. The in-detail analysis of software, hardware, and real-time data along with future perceptions are based on the operating principles for SHM in buildings [5].

III. RESEARCH GAPS

By Measuring inclination and applying mechanics of material, the deflection of structure can be calculated. This method is simple and easy to operate and of high applicability. The design is preliminary and further improvement is necessary. More importantly, more tests need to be carried out before it can be of practical use [1]. The structural deflection has been adopted as an important parameter indicating bridge's behaviors. However, the following challenging problems point out to the fact that it cannot be accurately obtained from a field test [2]. According to the classical extreme value theory, a method to predict the extreme girder deflection based on short-time simulation data was built, which can obtain the deflection characteristic under any evaluation periods and provide the foundation for bridge state warning [3]. The population and public infrastructures in large cities have intensively increased with limited land resources in recent years. By using GB-RAR and the other methods can monitor the construction effectively in the future [4]. Development is necessary to enhance the life span of sensors and their data transformations for long-term monitoring purposes; hence, advanced sensors should be designed with a high sensitivity and range. The prediction of damage should be implemented in various environmental activities, so that monitoring can be executed in buildings to an even greater extent. To improve consistency, DAQ and predictive analysis are needed to maintain communication between buildings and sensors for both short-term and long-term monitoring. A greater understanding of instrumentation, mathematical techniques, and signal processing is essential to understand the behavior of buildings in terms of monitoring and predicting damage. Further research is mandatory to practice SHM at low cost, especially for wireless communication [5].

IV. METHODS AND METHODOLOGY

1) Robot deflection measurement

Surveying robot is a kind of intelligent measurement instrument, which can automatically search, lock, accurately target and thus record angle, distance, coordinates and image information [1].

Laser image deflection measurement:

Laser image deflection measurement is realized by means of the good directionality of the laser. The laser fixed on the bridge creates a laser spot on the stationary optoelectronic receiver, whose center moves equivalent as the bridge distorts at equivalent as the bridge distorts at different levels [1].

GPS deflection measurement:

As a generation of satellite navigation and positioning system, GPS has not only global, 24- hour continuous and precise three-dimensional navigation and positioning capabilities, but also good anti-interference and confidentiality [1].

2) Electro-optical imaging deflection measurement

Electro-optical imaging deflection measurement is the way in which a target with an optical point on it should be set to be measured on the bridge. Then the image of the optical point will be formed on the CCD receiving area through the optical system (optical lenses) [1].

3) Inclination deflection measurement:

Free from the confinement of the side condition such as sunshine, rain, fog, and etc. inclination deflection measurement of bridge is the deflection monitoring has large measuring range and is capable to complete one / two dimensional measurements which are suitable for deflection measurement of large/medium size bridges (2013).

4) Multiple reference impact test

The MRIT had the merit of easy-performance and it was a cost-effective method for bridge condition assessment. According to the previously mentioned limitation of available excitation devices, the development of a new impacting device was firstly presented in this section. Then the impact testing scheme of the studied bridge using the impacting device was introduced in the following Development of impacting device. Falling of a heavy steel block controlled by an electric motor hits the bridge deck for excitation, and the magnitude of the generated impact force can be controlled by the falling height and the mass block weight. An infrared detection sensor is designed to monitor the steel block position and automatically control electrodynamic brakes in order to avoid secondary impacting induced by steel block rebound. A dynamic load cell is mounted on the bottom of the steel block to measure the generated impact force[2].

5) Vehicle dynamic model

There are various vehicle dynamic models, in which the quality spring model, half-vehicle model, and full vehicle model are frequently used. In the structural dynamic analysis, the quality spring model simplifies the vehicle to a larger extent, which will cause large computational deviation; the full vehicle model can fully consider the vertical and horizontal swing characteristics of a vehicle, with high computational accuracy. In the paper, the full vehicle model is utilized. describes the full model of a two-axle vehicle which has seven freedom of motion. The car body is a rigid body supported on a suspension system, with three freedom of motion: vertical translation (Zs), horizontal swing (α s) and vertical swing (θ s). Each suspension system is independent and is composed of a damper (csi) and linear spring (ksi). The generalized mass of car body is defined by its mass distribution and physical dimension, all the weight (mti, I = 1, 2, 3, 4) of vehicle wheel, action bar and axle concentrate on the mass block of vehicle wheel, and a damper(cti) and a linear spring (kti) are used to simulate vehicle wheel respectively [3].

6) Road roughness

The realistic bridge pavement is rugged, which obviously affects the vibration characteristic of a vehicle and influences the coupling vibration behavior of the vehicle bridge system. The road roughness characteristics are usually assumed to be smooth and Gaussian random processes. There are many assumptions about road roughness, and the frequently-used is the ISO/WG4 standard [3].

7) Extreme value modeling of traffic load effect

Traffic load is integrated with high randomness both in time and space. In the design or evaluation of bridges subjected to traffic load, characteristic load effects in a long period (such as 1000 years) are generally used. However, it is only possible to obtain bridge traffic load effects in short periods due to the limited service life of measuring sensors. Therefore, extreme value modeling theory is needed.

In the research field of bridge traffic load, many scholars studied extreme extrapolation methods. The generalized extreme value distribution model based on block maxima is frequently used. In the block maxima theory, only the maximum from each block is selected, which does not take full use of the extreme information of initial data[3].

8) Reference Time Selection

The start time of radar data acquisition was selected as the reference time for data processing. Assuming that the deformation of the building at this time was zero, the deformation calculated based on the radar data at other times were all related to the reference time[4].

9) Window Processing

The radar data acquired by the IBIS-S system (i.e., the ground-based interferometric radar) were the frequency domain sampling data of the radar signal echo. The frequency domain data must be transformed into the spatial domain through discrete inverse Fourier transform, that is, focusing to extract the deformation information of each resolution range. Since many steel frame structures are found around the monitored building. The echo signal of these resolution units is generally strong, and their side lobes can interfere with the signal of adjacent resolution units, which may distort their deformation signals[4].

10) Gross Error Detection

Considering that the WGC is in the construction state during the monitoring period, the actual monitoring environment is complex, and the radar signal is simultaneously affected by various factors, such as construction vibration, wind load, temperature, and sunlight. Gross errors may be found in the deformation time series obtained based on the radar signal. Therefore, the gross error in the deformation time series of the monitoring target point should be detected [4].

11) Wavelet Analysis Denoising

After gross error detection, the deformation time series of the target point may still have a certain amount of noise. To reduce the influence of noise and improve the signal-to-noise ratio, a wavelet threshold denoising method was used to process the deformation time series of the target point. During the processing, the wavelet function "sym4" was selected, the deformation time series was decomposed into seven layers by wavelet multi-scale analysis, the threshold value was estimated by Heuresure criterion, and the threshold value was quantified by soft threshold method[4].

12) Monitoring Scheme Design

The WGC under construction underwent dynamic deformation because of solar radiation, construction vibration, wind load, temperature, and other factors. Traditional monitoring methods (e.g., GNSS, total station, and sensors) need to be in contact with the building, and the monitoring points are difficult to arrange when monitoring the dynamic characteristics of the building. The large tower crane on top of the building during construction caused serious effects (such as signal blocking and multipath effect) on GNSS measurement, making it difficult to effectively obtain the dynamic characteristics of the building using GNSS. Satellite-based SAR cannot obtain the high-accuracy horizontal displacement dynamic information of the building because of the influences of the revisit period, imaging angle, and monitoring distance. GB-RAR can set reasonable monitoring base points based on the monitoring requirements, adjust the most favorable radar imaging angle to achieve the noncontact high-accuracy continuous deformation monitoring of the building, and can simultaneously monitor multiple target points in the radar field of view [4].

13) Measurement Campaign

We used GPS positioning to determine the field positions of working base points S1 and S2 in the two monitoring directions on the basis of field investigation, the intervisibility condition between radar and the monitored object, and the main monitoring building of the WGC within the main lobe of radar scanning. Working base points S1 and S2 were located in the north and west directions of the building, respectively. We installed the IBIS-S-1 system on working base point S1, and the distance between the radar installation location and the WGC was 246 m. S1 was located at the roof of a two-story building of a farmer. The IBIS-S-2 system was rigidly fixed on working base point S2, which was located in the Wuchang River Beach Park with a distance of 241 m from the monitored building[4].

14) Strategies of Damage Detection in Buildings Using SHM

Sajedi and Liang conducted an experiment using 44 shake tables. They developed

a framework model of a 3-story RC moment frame building, with 180 ground motions and a 5400 nonlinear time history analysis, as specified for input using Openness software. The simulation report showed that 96%, 87%, and 90% accuracies were predicted for damage existence, location, and severity, respectively. The laboratory experiment showed a 92% accuracy predicted for damage classes. Gao *et.al.* demonstrated a novel embeddable tubular smart aggregate (TSA) evolved from piezo materials and conducted an experiment recording the time of arrival and performing impedance analysis and sweep frequency analysis, and results were satisfactory for 2D concrete structures. They adopted an n4sid algorithm and a Bayesian time-domain, respectively, and compared
the T-SSID and UKF. The UKF approach was preferred due to the fast approach towards damage prediction. Soltaninejad *et.al.* developed a simulation for two adjacent buildings to anticipate pounding as per a 36-case single-degree-of-freedom model by comparing a short time matrix pencil method (STMPM) and discrete wavelet transform (DWT) [5].

15) Static Analysis in SHM of Buildings

Behnia et.al. executed the real-time monitoring of a concrete structure in Novem-

ber 1999 and June 2000 by employing piezoelectric sensors adopting an acoustic emission technique to anticipate damage in terms of frequency, amplitude, severity, cracks, and time domains subjected to static loading conditions, and findings suggested that this method is suitable for the in situ monitoring of a structure. Fortino *et.al.* conducted a laboratory experiment to check the efficiency of Wireless Sensor and Actuator Networks (WASN) to implement SHM for a building management framework. Hackmann demonstrated an FEM using MatLab for a truss and cantilever beam by adopting a damage localization assurance criterion (DLAC) algorithm to keep memory usage, latency, and energy consumption less than 1%, 65%, and 64%, respectively [5].

16) Dynamic Analysis in SHM in Buildings

Ivanovic *et.al.* monitored a 7-story RC hotel building with dimensions of 62×150 ft

in California using a range seismometer and a transducer to anticipate two ambient vi-bration surveys on 4 and 5 Feb 1994 as well as 19 and 20 Apr 1994 to detect vertical, transverse, and longitudinal deformations. Jin *et.al.* presented a comparison of PCA in two different approaches called adaptive principal component analysis (APCA) and con- ventional principal component analysis (CPCA) to practice SHM, and results indicated that APCA provides superior results since it detects intrinsic behavior and time consumption. Chang *et.al.* experimented with a twin-tower-scaled model that was 1.17 m tall, 1.50 m wide, and 1.50 m deep using an accelerometer and a developed numerical model for the 7-story building to predict dynamic behavior such as natural frequencies and mode shape using OMA based on a neural network, and this helped to predict stiffness reduction in the building. The results showed that this method only applies to a single damaged column, not for multiple-damage conditions [5].

17) Finite Element Analysis in SHM

Shih *et.al.* developed a dynamic computer simulation technique to assess damage in flexural members such as beams and plates in buildings by adopting two multi-criteria methods, namely, modal strain energy and the modal flexibility method. They experimented and demonstrated an FEM using SAP2000 for three beams, two continuous and one simply supported, by employing an accelerometer to predict building damage. Findings suggested that these two methods provide similar results for single damage, whereas multiple damage is more complicated, so further research is necessary on multiple-damage conditions. Cabboi *et.al.* carried out real-time monitoring and FEM analysis by em- ploying strand software on a heritage building called the San Vittore bell tower with a 37 m height located in Italy using a piezoelectric accelerometer. PCA was applied to remove fluctuations due to environmental variations; as a result, a 10% reduction in stiffness was found [5].

18) Damage Diagnosis in Buildings

Rahmani and Todorovska as well as Yuen and Kuok suggested two algo-rithms, namely, time shift matching (TSM) and non-linear least square fit (LSQ) based on robust interferometry, to monitor a 9-story Millikan library approximately 21×23 m with a 43 m height located in California using multiple networks of sensors, and monitored a 22-story hall in East Asia with a height of 64 m using accelerometers by adopting a Bayesian spectral density approach for approximately one year to predict modal frequency; relative humidity and ambient temperature are necessary for the long-term monitoring of buildings[5].

VI. CONCLUSION

This review discusses steps and methods for the deflection of the girders, bridges, beams and slabs. It also discusses the building structural health monitoring of all parameters using static, dynamic, and finite element methods to detect or predict building damage. The whole structural health monitoring consists of four characteristics: the presence, location, and severity of the damage and the remaining service life of the building after damage. This article also discusses the important approach for the deflection of bridges and girders like laser image deflection, inclination measure deflection, GPS measurement deflection etc. It also discusses some important approaches for the high rise buildings and Structural Health Monitoring in the multi store buildings like the processes, hardware and sensors.

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FEASIBILITY STUDY OF PEDESTRIAN SKYWALK IN NERAL AREA: A CASE STUDY

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ABSTRACT

Pedestrian grade separation system of skywalk has been a very important structure in a developed cities like Mumbai and even after the several successful operation of skywalk in the world, the awareness regarding this is not yet understood by local authorities. This paper reviewed about the flow characteristics of the pedestrians related with the "age" and "gender" parameters. This paper also concluded the causes like speed reduction and accidents by the pedestrians. This study also researched about the walking speed of the male pedestrians is more than the females and also the adults took less time to cross the skywalk as compare with the children and older.

Keywords-Grade separation pedestrian system, skywalk, pedestrians

1.0 INTRODUCTION

Walking is considered as the most relevant form of mode for them who using public transport and for people having no vehicles. Due to heavy traffic pedestrian are not having a smooth and comfort walk and it also increase the delay time of pedestrian. Due to irregular shape and poor maintenance of footpath pedestrian are not using the footpath. Due to insufficient facility furnished for the pedestrian movement, there exist a struggle among pedestrian and motor car with the aid of using sharing a restricted area of road, and it end result boom the street coincidence ratio. To overcome this problem a skywalk is provided to reduce the conflict between the pedestrian and vehicle movement and it also provide a safe, comfort and smooth walking freedom for the pedestrian. The purpose of skywalk is to provide an effective disposal of commuter from station area to location like bus stop, taxi stand, off road etc

1.1 PEDESTRIAN PROBLEMS

- Accident with the running vehicles
- Age: The bulkiest groups of victims in pedestrians are children under 15 years of age group; they have more chances of injury also.
- Intoxication and Drug effects: Alcohol and drugs impair the behavior of pedestrians to large extent which may be cause of accident.
- Dusk and Darkness:- During dusk and darkness motorists cannot see pedestrians clearly.

2.0 LITERATURE REVIEW

2.1 Ankit Gupta et al. (2016) large number of studies has been reported on focusing to identifying the means to reduce pedestrian delay. Many research have been examine for the improvement of pedestrian facility, we have to analyze the requirement of skywalk at guttahalli road and satellite road. The purpose and goal of this take a look at is to discover whether or not there may be a want of the skywalk or now no longer and to discover the commuter or pedestrian use the skywalk or now no longer.

2.2 Manmohan K.et al.(May 2012) have suggested a construction of skywalk at intersection after finding the delay time of pedestrian at intersection. After collecting the data he has estimated the delay time. Then with the help of VISSIM Software he has constructed a model representing the real scenario of the pedestrian movement. And ultimately gave a end both supplying a pedestrian section it's far higher to assemble a skywalk.

2.3 R. Daff el at. (Aug 2011) have presented a pedestrian planning to improve the pedestrian facility at Income Tax intersection in Ahmadabad. They have discover a pedestrian waft feature primarily based totally on hourly volume, and the evaluation of pedestrian put off time and version is created at intersection for the easy and snug stroll for the pedestrian. Sarkar and Janardhan carried out a pedestrian behavioral examine at an inter-modal switch terminal with inside the Calcutta Metropolitan district. Speed, density, glide and area relationships have been developed. Speed density version became observed to be linear and different accompanied quadratic relationship.

2.4 M.M., Hamed et al.(2010) Did a pedestrian conduct comparative examine at the Indian and German pedestrians withinside the comparable experimental conditions. Speed of Indian pedestrians become determined to be much less depending on density in comparison to hurry of German pedestrian. It became located that the

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unordered conduct of the Indian pedestrians became greater powerful than the ordered conduct of the German pedestrians. The speed-density dating became located to be non-linear for each groups.

2.5 J.J.A. Montufar et al. (2009) carried out study at four locations in north India. For up path loose glide pace various among 82.21 m/min to 88.ninety three m/min while for down path it various among 80.0. 80.0 m/min to 86.38 m/min. The minimal and most jam density turned into discovered to be 2.59 pedestrian/m2 and 4.18 pedestrian /m2 respectively. Space required for pedestrian motion turned into 0.21 to 0.42 m2 /pedestrian even as at unfastened go with the drift area requirement turned into 0.50 to 0.81 m2 /pedestrian. It changed into concluded from the consequences that with the growth in frictions confronted with the aid of using a pedestrian, opposite to the everyday belief, the pedestrian velocity additionally increases.

2.6 J. A. Shah et al. (2006) studied the pedestrian float traits at the walkways at 3 places in Khulna Metropolitan City, Bangladesh. This take a look at confirmed that the traits of the vicinity have impact at the pedestrian go with the drift traits. The free - float speeds of this observe have been located decrease than the Asian and Western countries. The observed free -flow speed and densities were found proportional to each other

3.0 OBJECTIVES OF STUDY

- To research the feasibility study for the pedestrian in urban area
- Comparative study of pedestrian flow and traffic volume during weekdays and weekends
- Walking speed study based on the age and gender criteria
- Correlation study of speed and traffic volume of both the vehicles and the pedestrians

4.0 METHODOLOGY

4.1 Selection of study area

- Where the pedestrian traffic is more
- Vehicle moment is continuous
- Width of the road is constant
- Where accidents occurring more with the pedestrians and vehicles

4.2 Methods in traffic volume study

There are different methods for data collection as listed bellow

- Direct observation method /Manual method
- Video observation method
- Time lapse photography method

For this study data collected is done in two way direct observation methods and video graphic observation methods. In observation method, primary data collection and secondary data collection are two different way to collect the data. Pedestrian extent depend and questionnaire survey is completed to decide the pedestrian float characteristic. Pedestrian were also asked about socio economic profile, travel patent and eagerness to use the skywalk. In video graphic survey observation, the video camera is installed at selected location in a particular way that it capture the pedestrian movement and approach road.

4.3 Collection of data and analysis

- Past Accident Record
- Pedestrian volume study
- Traffic volume study

4.3.1 Past coincidence file all avenue injuries regarding human dying or private harm taking place at the Highway and notified to the police inside 30 days of occurrence, and wherein one or greater cars are involved, are to be reported.

S.no	year	No.of	f deaths	No.of	injuries
		Male	Female	Male	Female
1	2015	4	2	08	04

Table: 4.1 accident record

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Fig: 4.1 bar chart for accident record

4.3.2 Pedestrian volume study

As a way to explain the current status of the transportation system, engineers are required to collect diverse data and information in this manner, focus is set in collecting data related to the volume of pedestrians in the system. The data can have several applications, for example it can help to perform safety analysis studies, look for modifications in infrastructure, and forecast future trends in society, business development, among others the collected data is the basis for obtaining the information needed for the planning, designing and decision-making processes. It is important to know the actual behavior of pedestrians so future projects can be proper developed. For example, if the pedestrian's concentration zones are known, future bus/trams/metro stops could be created in order to distribute better the volumes. In traffic engineering, volume studies are most of the time needed, for example to measure demand or usage of pedestrians defines volume as "the number of persons crossing a point during a particular given time period".

4.3.2.1 Manual count

There are several equipments used to perform manual counts, for example tally sheets, hand counters, boardmounted counters and electronic counters. Tally sheets are most commonly used in manual counts due to the fact that they provide the possibility to classify volumes and write observations, plus they are rather cheap.

4.3.2.2 Equipment used

The personnel were provided with all the required material to perform systemized counting. Some of these included instruction forms, count forms, location map, clipboards, pen and pencils and time watches. Tally sheets together with a time watch were used as the main tools for undertaking the manual counting.

Days	Number of	of pedestrians
	Morning	Evening
	8:0-10:0	5:0-7:0
Monday(1)	903	1012
Tuesday(2)	732	836
Wednesday(3)	892	898
Thursday(4)	990	749
Friday(5)	741	921
Saturday(6)	822	882
Sunday(7)	1010	998
p N d O e · s o t f t r	Days	I Morning LEvening

Table 4.2 pedestrian volumes

Fig: 4.2 bar chart for Pedestrian volumes record

4.3.3 Traffic volume study

Traffic extent research are performed to decide the extent of visitors transferring at the roads and classifications of roadway automobiles at a specific segment at some stage in a specific time. A traffic volume count is commonly Undertaken both mechanically with the setup of a brief or everlasting digital visitors recording device, through manually (manually looking at or through counting) and through video graphic method. Volume of a day or an hour can vary greatly, depending on the different days of the week or different periods of day. Traffic extent survey is the willpower of the number, motion and classifications of roadway motors at a given location

		Type of vehicle									
S.	Days	Bi	ke	Aı	ito	Car		Сус	le	Lcv	
No		М	E	М	E	М	E	М	Ε	М	E
1	Mon	189	213	110	98	98	123	10	07	130	257
2	Tue	137	201	89	87	108	117	05	04	183	213
3	Wed	165	159	126	78	110	163	08	04	176	228
4	Thu	198	130	107	113	96	124	09	09	189	247
5	Fri	232	196	98	105	89	119	08	06	238	198
6	Sat	268	178	139	148	101	97	10	07	265	253
7	Sun	215	169	163	178	124	165	02	02	289	263

Table: 4.5 I faille volumes of uniferent modes of vehicles in Neral ar	Table:	4.3	Traffic	volumes	of	different	modes	of	f vehicles i	in Neral	l are
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5.0 CONCLUSIONS

- 1. This survey study was take into an account of the time saving of a pedestrian, comfort safety and security, which is to be consider at the time of providing the pedestrian facility.
- 2. There is a want of opportunity mode of shipping for the pedestrian to lessen the congestion. So by providing a skywalk it reduces the congestion and traffic problem near the station and also reduce the pedestrian delay time and pedestrian can move safely and comfort
- 3. In this study the pedestrian time saving is the only benefit consider for the pedestrian. By providing the skywalk it also reduces the delay time of pedestrian. And provide a safe movement for the pedestrian.
- 4. In this study pedestrian delay time of the existing condition is to be found and proposed for providing a skywalk with design facility required for the skywalk.

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FLOOD CONTROL MEASURES FOR MUMBAI CITY (RIVER NULLAH DEVELOPMENT)

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ABSTRACT

Mumbai City has the Jungle of Sanjay Gandhi National Park with hills, rivers, lakes, creeks, mangroves forests and the Arabian Sea. Part of this rich heritage, the cities four major rivers are Dahisar River, Poisar River, Mithi River and the Oshiwara River. The Dahisar and Poisar River Originates from the Tulsi Lake locate at the southern part of Sanjay Gandhi Nation Park. The Oshiwara River begins its journey in Goregaon and the Mithi River originates from the Vihar and Powai Lakes.

About 50 years ago the rivers were clean and were at their purest form. But now these rivers are transformed in the major Nullah's of Mumbai. The main cause of this is "Urbanization"

In rainy season, Mumbai suffers from flood due to heavy rain. MCGM gives disaster help to public. Desilting works done by BMC before rainy season only.

There is no any special authority for rivers and nullahs and for all storm water system. So require a special authority for it, which solve the all problem of surface runoff, flooding and nullahs.

There is necessary to develop infrastructure for nullahs to alive rivers. We kindly try here to suggest some ideas to keep nullahs clean and how can convert them into rivers again.

Keywords:-Nullah, River, MCGM, Infrastructure, Desiltingworks

INTRODUCTION

Mumbai, the city of glamour having a beauty beach of Arabian sea. Mumbai is the island. There are tallest towers, buildings, expressways, airport, metro, mono and railways it means Mumbai is the economical capital of INDIA. The size of the Mumbai city is small but the population is too high. There are slums and nullahs in Mumbai. If someone ask a question to new generation that there were the rivers in Mumbai then they will get surprised, but it is true. These rivers converted into huge nullahs.

In Mumbai 70 years ago, there were 4 big river flows with laughing and dancing in natural manner, namely MITHI, OSHIWARA, DAHISAR and POINSOR. They start from national park mountain and ends at Arabian creek. The rivers were clean and were at their purest form. But now these rivers are transformed in the major Nullah's of Mumbai. The main cause of this is "Urbanization"

In rainy season, Mumbai suffers from flood due to heavy rain.MCGM.gives disaster help to public.Desilting works done by BMC before rainy season only.There is no any special authority for rivers and nullahs andfor all storm water system.So require a special authority for it, who solve the all problem of surface runoff,flooding and nullahs.There is necessary to develop infrastructure for nullahs to alive rivers. We kindly try here to suggest some ideas to keep nullahs clean and how can convert them into rivers again.

I. LITERATURE SURVEY 2.1 GENERAL-

The literature survey was carried out on the topics like flood control by using river nullah development. Whether you hear ?Is Mumbai adversely affected bytsunami or by high tide, by wind. Then answer is No.

But from past one and half decades, Mumbai majorly affected by heavy rain. More than half Mumbai goes under water or affect by heavy rain. MUMBAI runs 24 hours but due to heavy rain, get stopped. No trains, buses, autos; no school, no office.mens get stuck. There is majorly loss of public properties.

2.2 Overview of literature-Naresh Kamath and EeshanpriyaMS,2021

They informed about the pilot project of mithi river cleaning to improve water quality. This project begin from vakola nullah in BKC Mumbai and project will complete in 18 month.

Sukanya and Charuchandra, 2020

They publish about the weather climate change. As well as they said it was observed that hundreds of fish and crabs washed onto juhu beach in Mumbai. This isn't the first time dead critters from the ocean have been on Mumbai's beachs, they are symptoms of the polluted waters that surround Mumbai, waters that inundate the city every monsoon, waters that are likely to keep coming back as the climate changes.

Tanvi Deshpande and Kumar, 2019

observed on Mumbai nullah, they informed that only 32% of Mumbai's nullah cleaned in 2019 and desilting work, metro work, road work proceeding in snail's pace.

Lyla Bavadam, 2018

The neglect and institutionalized abuse of River Mithi, which originates in Sanjay Gandhi National Park in Mumbai, forebodes another disaster if the city's infrastructure and development are not taken in hand.

Ronald Rodrigues, 2017

published that locals turn poisar river into nullah and the reason were debris, garbage industrial waste dump into nullah encroachment along with nullah.

Akash Sakaria, 2019

said that Mumbai's river needs a lot more care the adjusted report of Ramon Magsay say award winner Rajendra Singh (Waterman of India) as we have to act and action should come from within. Awareness is necessary to clean the surrounding nullahs.

METHODOLOGY

Rain water collect in nullah but can't flow properly because nala already engaged by garbage; plastic and other discarded materials. As well as nala has so many turns and having narrow width that's why rain water can't flow property in natural manner. Developers and builders makes it narrow and gave shape as they required therefore this flooding situation occurs every year in city. 26th July 2005 was black day for Mumbai. TheMumbaikar suffered and lost lot of properties. Last monsoon was too bad. Rain water in Nalasopara, required 3 to 4 days to drain off.As a precaution and treatment, MCGM spent lot of money on desilting work and increasing depth of nullahs at required spot.But this is not a final and permanent solution on flooding in Mumbai. It is required to keep gutter and nalla clean. It should be free from solid waste.Nalla get back converted into river and increased aesthetic look.

Why infrastructure is necessary?

1) There is no such authority to keep the rivers alive.

2) Only some NGO's do some occasional activities like River Marching.

3) Provision of authority to other rivers too like provided to Mithi River.

4) Improvement in the cleaning work should be done as the authority does desilting work in the Mithi River just 2-3 weeks before monsoon arrives.

5) To spread awareness of cleaning of river in rural and slum areas.

6) To start taking fines for polluting the river.

7) To appoint officers who are willing showing their interest in this matter. 8) It is necessary to built a special department forNalla'sInfrastructurt.

DUTY -

- ✓ Inspect old nallas and make proper and important changes
- ✓ Reduce maximum turns and give fairly straight-slope alignment
- ✓ Every small stream water gutters connect to main nalla. They should be well screened.
- \checkmark Ulter the narrow nallas and increased their width.
- \checkmark Rehabilitation of those who came under nala project.
- \checkmark Prevention on thrown of solid waste in nala
- \checkmark Give margine of minimum 10 meters should be provided to the nala.
- ✓ Provide parapet wall to nala
- \checkmark Prevention on release of drainage from buildings and slums.
- \checkmark Release the drainage water in river or creek or sea after proper treatment.
- \checkmark Adopt and develop aqualife in nala.

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- ✓ Convert nala into river and increase asthetic look.
- ✓ Maintain river water always clean and free from harmful bacteria.
- \checkmark Flooding zone connect to river through pipes.
- ✓ Aware the public about cleanliness and responsibilities towards environment.

Government should give permition for project sanction fund without delay for development. **BENEFITS-**

- 1. Cleanliness will be maintain daily
- 2. Water will be flow without disturbance.
- 3. Water cannot store or accumulate anywhere due to providing slope and straight alignment.
- 4. Water cannot pollute.
- 5. Aesthetic look
- 6. Possible to use this water for municipal purpose.
- 7. Become a tourist place
- 8. Decrease 70% to 80% chances of flooding and chocking of nullahs.

Approximate Estimate for renovation of river for span of 1km



Fig no.1



Fig no.2

METHOD 1-

AREA=10 . 1000m=10000 sq.m Consider, require 2000 rupees for 1 sq.m area 2000 . 10000 = 20cr.rupees.

Therefore, construction cost for 1km span is 2cr.only.

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METHOD 2 -

According to given plan,

Vol. of columns = 4680 cu.m

Vol.of bed = 2000 cu,m

Total volume = 6680 cu.m

If 2000 rupees require for 1 cu,m.....(according to estimating)

Then, $6680.\ 2000 = 1.336$ cr rupees.

Our ideas -

1 Under-ground drain pipe -

There are not available any proper and permanent provision to drain-off rainwater at flooding prone area in Mumbai. Accumulated water drained off with the help of pumping machines.

Therefore it is necessary to provide underground drain pipe having fine screen at top laid with proper slope and join to river (i.e. Developed nullahs).these pipes should be provide at various affected areas and at required place.

2 Alignment –

Nullah should have proper simple and fairly straight alignment. Alignment should have proper falling gradient.

3 Drain water treatment plant -

There are only sewage water treatment plants in Mumbai. Nullahs water directly released in creek and ocean without any treatment. And mostly drainage water from slums comes in nullahs. Therefore established drain water treatment plant is necessary. Drain pipes should laid along to developed nullahs and connect to plant. Treated water then released in creek or ocean.

4 Standardize as a Tourist place -

Improved nullahs make up in such way that there should be provide proper site margin along nullahs. Adopt trees and construct joggers track along adopted river. Resulting look gives effect as tourist spot.

Infrastructure

Existing Structures:

- 1. Irregular gradient.
- 2. Illegal drainage lines.
- 3. Releasing sanitary waste without treatment.
- 4. Choke ups due to garbage thrown in river.
- 5. Not proper maintenance.



Fig no.3

New Infrastructure:

- 1. Underground drainage pipe system provided with screens at their openings to avoid choke ups in pipes.
- 2. Alignment should be fairly straight.
- 3. Curving's should be reduced or avoided.
- 4. Sanitary drainage line should be laid along the river banks with proper treatment plant before disposal to creek.15 meter margin for jogging track, sitting, refreshment, etc.

Case Study-

Irla Movement



Fig no.4

De-barricading the city and its unification

There is a constant effort in carrying out public campaigns to explain the need for de-barricading the city and achieve unification, particularly its public spaces and the natural areas. This has been successful in the seafront projects in Bandra– another coastal suburb of the city, where spaces are open. In spite of the many significant social and environmental merits of the Irla movement and the project, the leadership there has gone ahead in proposing fences around the public parks and walls between the nullah and the adjoining gardens. Thus, public spaces, as much as the city, are yet again vulnerable to fragmentation and restrictions on free movement. They may have their reasons: vandals have abused and vandalized these places even during their construction.

It may be just theme or dream-

We are suggest here, an authority who overcome the flooding and drainage problem and surely convert the nullahs into river again in Mumbai. There are several problems and questions arise against the authority such as rehabilitation, land acquisition, political pressure and topography.so one may think that to keep rivers alive in Mumbai and converting nullahs into river may be just a theme or dream only and practically impossible.

Problems will arise during development -

Following are some problems may arise during development.

- 1. Demolition of encroachment
- 2. Rehabilitation of project affected people
- 3. Political pressure
- 4. Disturbance in existing infrastructure
- 5. Delay in Sanctioning project and provision of fund.
- 6. Unauthorized construction.

Establish the authority has to be mandatory - Todays, we face a various problem like global warming. Our ecosystem going to imbalance. There is lac of healthy environment and uncertainty of raining. Rivers in Mumbai going to die and they merged into dirty polluted nullahs who responsible to unbalanced ecosystem and reduced the aesthetic look. So in account of environment and ecosystem it is necessary to establish the authority to keep rivers alive in Mumbai. It should be as a mandatory. **Things to do** –For effective work and to achieve the aim of rivers-nullahs development following things should be done by public and government.

- 1. Positive and active cooperation of residing public.
- 2. Active correlation and cooperation between related departments of government.
- 3. Positive approach and active interest of politicians.

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- 4. Awareness of local public about green Mumbai and clean Mumbai.
- 5. Authority should be honor and responsible.
- 6. Authority should be under ministry of environment only.
- 7. Positive interaction between public and authority.
- 8. Prevention on release the chemicals and residue in nullahs from industries. **Expected Result**
- 9. **Expected result-**Good output will be come if there is separate authority works to keep rivers alive in Mumbai.
- 1. Increase Aesthetic look of Mumbai due to clean river.
- 2. Reduce pollution
- 3. Reduce flooding problem in Mumbai.
- 4. Reduce drain off and runoff problem in Mumbai.
- 5. Rivers in Mumbai standardize as a tourist place.
- 6. Joggers track
- 7. Meeting point
- 8. Religious point

CONCLUSION–Adoption of such authority (river-nullahsdevelopmentauthority) is very necessary for run off solution and better environment.

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APPLICATION OF GIS IN DISASTER MANAGEMENT

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ABSTRACT

Geographic Information Systems (GIS) have been used in many fields of science, technology and business. One of these fields is civil engineering. Spatial information and analysis capabilities have been used to assist the planning, modelling, design and implementation of civil engineering projects and activities .There are many GIS-based tools and applications geared toward civil engineering .Proper use of these tools and applications necessitates training in GIS theory ,technology and application- specific issues.

Keywords-GIS, formatting, Technology, science, planning

I. INTRODUCTION (HEADING1)

A Geographic Information System (GIS) or Geographical Information System is any system that integrates, captures, stores, analyses, shares, manages, and displays data that is linked to location or so-called geographic data. GIS merges computer database technology with geo-referenced and cartographic information, resulting in digital maps and databases with fundamental applications in areas such as natural resource management, ecosystem conservation, environmental studies, utility management, infrastructures and transportation planning, town and regional planning, municipal government and also commercial applications. It is an ideal tool for integrating data from the land itself (e.g., data gathered from satellites) and socio-economic data (e.g., tax records).



Figure 3: Risk Triangle (Chricton 1999)



Figure 4: Disaster Management Cycle (Holloway 2003)



Fig 1: difference between Vector and Raster data (Source: Buzzle.com)



Figure 5: Flood in Kolhapur in 2019

Flooding has many impacts. It damages property and endangers the lives of humans and other

II. LITERATURE SURVEY

Anil Malik (2018): Urban flooding can occur on account of several reasons including heavy rainfall, sudden release of water from a bund or dam, tidal waves, etc. However, the main underlying cause is usually the slow absorption of water by the land. The 2016 flooding of Chennai and the 2017 flood in Mumbai were examples of urban flooding.

Faisal and H. A. H. Khan (2017): Clearly, identifying pattern of the flood will help to prevent it and reduce more damage by taking necessary steps in time. In addition, it is also important to calculate the loss. Since flood problem is very common to this region, it should grab some more attention.



Shiv P. Aggarwal Et al. (2009): The inputs from remote sensing and conventional methods such as satellite/rain gauge-based precipitation, land use land cover, soil texture, DEM, etc. can be integrated in geospatial environment to simulate the rainfall-runoff process, which becomes an input to the flood fore- casting models.

III. METHODOLOGY

In case of floods, the support of a 'hydrological oriented' GIS structure is particularly required for: Collecting rainfall data coming from the available remote sensors. Identifying the area of potential occurrence of extreme meteorological events on the basis of the whole set of remotely sensed information. Running the distributed rainfall-runoff procedures using, as an input, the rainfall scenarios predicted at the small scales by stochastic space-time rainfall models. Providing predicted and/or simulated hydrographs at the sections of interest along the drainage network for different probability levels. Providing the maps of eventually flooded areas and the vulnerability of the landscape with reference to the predicted events.

STEPS TO BE FOLLOWED:

CONCLUSION

The concept shows a simple yet cost effective way to utilize GIS for creating flood hazard map from the available datasets. Since no satellite data is required to purchase for creating such a map cost of production remains very low. The more common approach is to use a satellite image, acquired during a flood, as the key information for flood vulnerability of an area. These hazard maps would facilitate floodplain zoning and other remedial land use planning measures.

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ANALYSIS OF AQUIFER PROPERTIES USING "SINGLE WELL PUSH PULL TEST"

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ABSTRACT

The features of the aquifer are established in this study using a single well push pull test near a chemically damaged area in the Mumbai region, where ground water is contaminated. In order to draw water from the earth's surface in the future, the properties of the aquifer must be determined. In this test, samples from various bore holes are collected and examined in a laboratory to determine the features of the ground water aquifer. This test involves injecting a prepared test solution into an aquifer, then extracting the test solution or groundwater mixture from the same location. According to the results of the aforementioned test, the solution or water tested by this method is unaffected by any chemical reactions and is suitable for drinking and other everyday purposes. And the aquifers that are discovered can be both contained and unconfined. Chemical reactions in ground water have also been discovered to have a greater impact on unconfined aquifers than confined aquifers. According to the findings of this study, the push pull test method might be utilized to collect quantitative data on a wide range of chemical reactions in ground water.

Keywords— Confined, Unconfined, Groundwater, Drawdown, Test, chemical

INTRODUCTION

An aquifer is a water-bearing subterranean layer of porous rock, rock fissures or unconsolidated materials (gravel, sand, or silt) from which groundwater can be collected using a water well. The study of water movement in aquifers and the characterization of aquifers is known as hydrogeology. Aquitard, for example, is a phrase that is related to aquitard. Aquiclude (or aquifuge) is a solid, impermeable zone beneath or covering an aquifer, whereas aquiclude (or aquifuge) is a low-permeability bed that runs parallel to an aquifer. If the impermeable land overlies the aquifer, pressure could drive it to become a restricted aquifer. An aquifer is a saturated rock formation that allows water to freely flow. Permeable and porous rock types include sandstone, conglomerate, cracked limestone, and unconsolidated sand and gravel.Columnar basalts, for example, are good aquifers because they are fractured volcanic rocks. Between volcanic flows, the debris zones are generally porous and permeable, making them good aquifers. A well must be drilled into an aquifer in order to be productive. Rocks like granite and schist are poor aquifers because to their low porosity. These rocks, on the other hand, produce suitable aquifers if they are severely fractured. A well is a hole drilled into the ground to gain access to a water supply under the surface.

LITERATURE SURVEY

For finding the characteristics of aquifer, single well push pull test techniques available in the literature to assess, simulate and predict aquifer characteristics. Following research was done by researchers on single well push pull test.

J.d.istok el al (1997). The studies were carried out to assess rates of aerobic respiration, denitrification, sulphate reduction, and methanogens in a petroleum-contaminated aquifer, according to the findings. The findings indicate that the push-pull test approach could be effective for getting quantitative data on a variety of in situ microbial processes and determining aquifer properties.

Stefan Bachu (May 1997), The regional scale hydrogeological regime of formation waters was analyzed for the whole sedimentary succession in the northern portion of the basin, according to this study, based on a wide collection of core and formation water analyses as well as drill stem tests collected by the oil industry. The findings were then linked to hydrocarbon generation and accumulation, as well as the existing geothermal regime in the area, in order to assess aquifer features.

B. F. Sule, et al, (2013), from this investigation it is found that the data gives pumping test results, discharge, drawdown and geophysical and borehole constructional methods. He also employs the Theis Residual Recovery method to determine aquifer properties.

Magnus Uzoma Igboekwe,et,al,(2012), The purpose of the survey was to assess the resistivity of the consolidated and unconsolidated formations in the research region, as well as the depth of the Aquifer. The depth varies from 16.0 and 30.0 meters below the earth's surface. This means that it is more economical to sink boreholes in such a region than in other regions with deeply buried aquifers.

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METHODOLOGY

The single well push pull test is used for calculating the aquifer characteristics and it is observed to be best method for computation of aquifer characteristics. The methods of finding out the characteristics of aquifers are as follows:

- 1. Single well push pull test
- 2. Two well push pull test
- 3. Tidal method
- 1. What is a Push-Pull Test?

In a push-pull test, a prepared test solution is injected (push) into an aquifer, followed by the extraction (pull) of the test solution/groundwater mixture from the same location. The tests can be carried out using existing monitoring wells or multilevel samplers. The test solution is made up of water, one or more tracers, and one or more additional solutes; the kind, combination, and concentration of solutes are chosen to investigate specific aquifer properties. During the injection phase, the test solution is injected into the aquifer, where it flows away from the well and penetrates a roughly cylindrical volume of the aquifer (Figure 1A). During the extraction phase, the flow is reversed, and the concentrations of tracer, reactive solutes, and likely reaction products are measured as a function of time in the same well (Figure 1B). Tracer concentrations are used to modify the concentrations of test solution components for dilution. During the extraction phase, mass balances are calculated by integrating dilution-adjusted concentrations. Calculation of reaction rates is based on the mass of solute consumed and/or product created. Phases A and B: Injection ("Push") and Extraction ("Pull").



Fig. A "push-pull" test's injection and extraction phases

2. The steps for creating a pumping test are as follows: The following concepts and reconnaissance work should be employed while designing a pumping test:

The number of times per year that a pumping test is required.

- Natural groundwater fluctuation agents including barometric pressure fluctuations, earth tides, and tidal variations could have an impact on water levels in observation wells during the pumping test.
- Use of groundwater off-site, which may have an impact on water levels during the pumping test.
- The effect of the pumping test on surrounding water users, as well as the depth of setting and kind of pump used in the control well
- Well withdrawal frequency and water level monitoring.

2. Well Reports and Pump Tests:-

Some aquifer properties can be estimated using data from well reports (drillers' logs). Aquifer depth, thickness, and type are determined by looking at the static water level, the location of water-bearing zones, geological materials, and pump test results. The description and placement of geologic formations and water-bearing zones within them can help identify whether an aquifer is shallow (water near the surface) or deep (water deeper than 30 metres, or 100 feet), as well as whether it is made up of consolidated or unconsolidated materials. The type of an aquifer determines whether it is confined or unconfined. A layer of less permeable material above the aquifer puts pressure on the groundwater in a restricted aquifer. When a well is drilled, the water level in the well will rise over the top of the aquifer. When a well is bored, the water level in the well will be the same as the top of the aquifer since there is no layer of less porous rock above an unconfined aquifer.

Pumping Rate Measurement and Control:



Fig: - Set up the well head and discharge for a constant-rate pumping test.

An aquifer system is subjected to a regulated pumping stress during a pumping test. To ensure a satisfactory conclusion, the flow rate must be properly measured, controlled, and recorded throughout the test.

- 3. Measuring flow rate Flow rate can be measured in a variety of methods during a pumping test, including the following:
- Container and stopwatch
- In-line flow meter
- Orifice weir
- Weir or flume

Flow rates should be recorded frequently enough to show a steady rate or to track intended rate variationsIn the event of a temporary test interruption (e.g., a power outage), the pumping stop and restart timings should be documented so that the test may be appropriately understood. Keep in mind that the discharge rate often reduces when the water level in the control well drops. The flow rate should be evaluated and changed at least once every hour, according to Kruseman and de Ridder (1994); however, more frequent assessments may be considered until it is obvious how often rate adjustments are required (Stallman 1971). To estimate the discharge from a pumped well, a circular orifice weir is used.



Fig. Discharge measurement with an in-line flow metre

Control of flow rate : Controlling the flow rate is also required for a successful pumping test. As a general guideline, Stallman (1971) recommends limiting the pumping rate within 10% for a constant-rate test or each constant-rate step. The pumping rate should be within a 5% tolerance, according to USBR (1995). Additional guidance on what constitutes an acceptable rate variation tolerance during a pumping test may be provided by state and municipal standards.

Water-Level Measurement

Measuring Water Levels:-

During a pumping test, water levels in wells can be measured manually or with sensors and data recorders.

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2. Manual Methods

Manual water-level measurement techniques include chalked steel tape, electric water-level sounders and airline methods.



Fig. Steel tape is covered in carpenter's chalk before being used to measure the water level.



Fig. Water level measuring with an electric tape

Time of test - The decision to end a pumping test should be based on the hydro geology conditions at the test site as well as the test's objectives. Longer testing may be required to estimate a specific yield in an unconfined aquifer or to discover boundary effects. Plotting and evaluating pumping test data as it is obtained in the field might assist you in determining when a pumping test should be terminated.

- Have all of the test's objectives been met?
- Have you obtained enough late-time data in an unconfined aquifer to predict a specific yield?
- Was the test conducted long enough to detect and determine aquifer boundaries?

Other factors, including as budgetary constraints and regulatory restrictions, may have an impact on the length of a pumping test. In many circumstances, applicable requirements stipulate a minimum time for a test, although other test objectives may necessitate longer testing.

CONCLUSION

Form this study it is concluded that for finding out characteristics of aquifer this method is more accurate than the other method as well as the outcomes obtained more accurate than other methods and the characteristics determined are satisfied the all conditions required for the ground water area and this methods is suggested for all types of dam construction for testing the ground water characteristics and aquifer characteristics. From this study it is also suggested that for any area which may be near to chemically affected or near to sea area this methods gives an results for calculating the aquifer characteristics .This methods uses less time as compared to others methods and initial cost is less as compared to others methods. And operating system is also easy and time consuming methods and suggested to all civil engineering and water resource engineering works. A well is a hole drilled into the ground to gain access to a water supply under the surface. This type of water would normally need to be pumped to the surface. If water is pumped from a well faster than it is refilled, the water table drops and the well may dry up. When water is pumped from a well, the water table is frequently dropped into a cone of depression. Groundwater usually runs down the slope of the water table towards the well.

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REVIEW PAPER ON CONSTRUCTION OF GFRG PANELS AS WALLS IN BUILDINGS INSTEAD OF CONVENTIONAL WALLS

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ABSTRACT

Glass fiber Reinforced gypsum (GFRG) wall panel is made essentially of gypsum plaster reinforced with glass fibers. These panels are hollow and can be used as load bearing walls. The hollow cores inside the wall can be filled with in-situ or reinforced concrete. This paper represents the guidelines for the use of GFRG wall panel as a lateral load resisting component in buildings based on numerical analysis procedure to arrive at its capacity estimation under axial compression, compression with in-plane bending and shear. Variation of buckling load of unfilled GFRG wall panels of various widths is reported. The axial load carrying capacity of 1.02m and 2.85m high wall panel, obtained from the numerical analysis and the test results comparable for this load case. While assessing the axial load capacity for design under compression, a minimum possible eccentricity (causing out-of- plane bending) is accounted for. An engineering model is proposed to assess the strength of unfilled and concrete filled GFRG wall panels in multi-stored building system subjected to lateral load such as earthquake.

Keywords- Light weight, Low Cost, Prefabricated, Green product

INTRODUCTION

In India, there is a huge requirement for building materials due to the existing housing shortage mainly in urban India. And till date, it takes a lifetime worth of savings to buy a house. And most of us who buy the houses from their lifetime savings have to pay the EMIs till their retirement age. To overcome this housing hurdle, India needs innovative, high-efficiency building materials for strong and durable housing in an advanced mode of construction at an affordable cost. All these issues and concerns are required in sustainable and overall development. GFRG Panel provides speedy construction and contributes to environmental protection. There have been a lot of efforts made earlier by the industry experts to find an alternative to existing construction technology to make it more affordable. Glass Fibre Reinforced Gypsum (GFRG) is one such technology in the construction field that could reduce the construction cost by 50% or more.

Glass fibre reinforced gypsum (GFRG) panel or Rapid wall is a modern building element devised by the GFRG Building System Australia for mass-scale construction of houses in a very short span of time. A GFRG panel is basically calcined gypsum plaster, reinforced with glass fibres which when filled with reinforced concrete in an appropriate proportion becomes strong enough to act as a load bearing and shear wall.GFRG panels can even resist the lateral loads due to earthquakes and wind. Not only the walls, but the roofs, floors, sunshades and the boundary walls can be also made using GFRG panels. Looking at its success and innumerable advantages, the technology spread like wildfire and is being adopted heavily throughout the construction industry. GFRG wall is also called rapidwall is an energy efficient green building material with huge potential for use as load bearing and non load bearing wall panels. GFRG wall is manufactured using phosphogypsum as a core material which is generated as a by product of phosphoric acid plant. GFRG wall is a load bearing pre-fabricated walling panels. This is suitable for rapid mass scale building construction was originally developed and used since 1990 in austrilia. It can be used for both internal and external walls. GFRG wall is suitable for hybrid construction in multi-storey buildings. GFRG wall is manufactured at FACT-RCF Building Products Limited (FRBL), kochi, kerala.

LITERATURE REVIEW

Eldhose M Manjummekudiyil et al. [2015]- Studied about GFRG Panel strengthening using different concrete mixes filled in the cavities. They used three different concrete mixtures in the panels for testing. The concrete are Nominal mix M25, Flyash concrete and Recycled Aggregate concrete. The main objective of using fly ash in most of the cement concrete applications is to get durable concrete at reduced cost. The addition of fly ash as an additional ingredients at concrete mixing stage as part replacement of OPC and fine aggregates is more flexible method. It allows for maximum utilization of the quality fly ash as an important component (cementatious and as fine aggregates) of concrete. Hence, here

30% of cement is replaced by flyash. From the results obtained from various tests conducted on GFRG panel, it is clear that the compressive strength gets increased with the inclusion of filler materials. Nominal- M25 mix gave maximum strength when used in panels. Recycled aggregate concrete filler also gave satisfactory strength

in compression, and in turn it leads to an economic method of construction. Flyash being a bi-product of fertilizer industry can be effectively used along with the filler material in GFRG Panel.

Abstract :- The construction of building systems using Glass Fibre Reinforced Gypsum (GFRG) panels is a very promising and emerging building technology. Strengthening using different concrete mixes filled in the cavities. They used three different concrete mixtures in the panels for testing. The concrete are Nominal mix M25, Flyash concrete and Recycled Aggregate concrete. The main objective of using fly ash in most of the cement concrete applications is to get durable concrete at reduced cost. The addition of fly ash as an additional ingredients at concrete mixing stage as part replacement of OPC and fine aggregates is more flexible method. It allows for maximum utilization of the quality fly ash as an important component (cementatious and as fine aggregates) of concrete.

Conclusion:- We concluded that strengthening of gfrg panel by different concrete mixes filled in the cavities. We can use concrete such as m25, fly ash in cavities etc. In this they use fly ash because it is economical as compare to opc and it also strengthening the gfrg panel.

DevdasMenon [2014]- Discussed about a demo building constructed in IIT Madras. The building is constructed using GFRG Panels which is made out of gypsum, largely available in form of Phosphogypsum, a waste by product of fertilizer industry and Glass fibre as reinforcing agent which enhances the strength of the panels. The building panels are suitable for affordable mass housing, with the advantages of cost- effectiveness and rapid construction. GFRG panels contain cellular cavities between the outer flanges and the inner ribs, which can conveniently be filled with concrete and reinforced with steel bars, if required, to achieve the desired capacity as load bearing walls. Buildings built using this technology without any columns and beams can go all the way up to 8 to 10 storeys in low to moderate seismic zones, and to lesser height in high seismic zones. The empty cavities in the panels can be used for concealing electrical wiring and other plumbing works. In a typical building, all components, including walls, slabs, staircases, and even parapet walls can be constructed using GFRG. In order to demonstrate this technology, a two storeyed GFRG demo building was built inside the IIT Madras campus. This building, constructed within a span of 30 days housing a total area of 1981 sq.ft., has 4 flats, two having a carpet area of 269 sq.ft meant for the EWS (economically weaker section), and the other two with 497sq.ft carpet area each meant for the LIG. The saving in cost was almost 35%, when compared to conventional construction.

Abstract :- The building is constructed using GFRG Panels which is made out of gypsum, largely available in form of Phosphogypsum, a waste by product of fertilizer industry and Glass fibre as reinforcing agent which enhances the strength of the panels. The building panels are suitable for affordable mass housing, with the advantages of cost- effectiveness and rapid construction. In this they have discussion about demo building constructed in IIT Madras.Buildings built using this technology without any columns and beams can go all the way up to 8 to 10 storeys in low to moderate seismic zones, and to lesser height in high seismic zones.

Conclusion :- Hence, we concluded that in order to demonstrate this technology, a two storeyed GFRG demo building was built inside the IIT Madras campus. This building,constructed within a span of 30 days housing a total area of 1981 sq.ft., has 4 flats, two having a carpet area of 269 sq.ft meant for the EWS (economically weaker section), and the other two with 497sq.ft carpet area each meant for the LIG. The saving in cost was almost 35%, when compared to conventional construction.

Mohamed Said MeselhyElsaeed (2016)- Studied about the GFRG system & design cost model to analyse direct cost for the system during the design phase. The market price for this system is divided into two main aspects; cost & mark-up. Themark-up aspect is divided into contingency, which is mainly related to risk analysis & it differs with respect to site, owner & project. The other aspect is profit margin, which depends on market status & feasibility study for

project. Cost aspect is divided into two phases which are the direct cost & indirect cost. Mark up & indirect cost aspects can't be analysed in this research as they are project oriented aspects. The paper aims to analyse the direct cost aspect for GFRG system & design cost model during the design phase; to achieve optimization level for system. It divided in two parts; theoretical aspect will discuss the building design using Glass Fibre Reinforced Gypsum panels according to design manual, installation manual, and system requirements. Practical aspect concerning cost of Glass Fibre Reinforced Gypsum during operation process, In addition to that, data was gathered from different projects using GFRG system concerning construction cost & installation procedures on site. The direct cost of GFRG system for buildings, assuming that there is three hundred working days per year, eight working hours per day & one GFRG panel is operated in half an hour, and knowing the foot print and built up area for the building.

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Abstract :- It is learning about the GFRG system & design cost model to analyse direct cost for the system during the design phase. The market price for this system is divided into two main aspects; cost & mark- up. Themark-up aspect is divided into contingency, which is mainly related to risk analysis & it differs with respect to site, owner & project. The paper aims to analyse the direct cost aspect for GFRG system & design cost model during the design phase; to achieve optimization level for system. It divided in two parts; theoretical aspect will discuss the building design using Glass

Fibre Reinforced Gypsum panels according to design manual, installation manual, and system requirements. The direct cost of GFRG system for buildings, assuming that there is three hundred working days per year, eight working hours per day & one GFRG panel is operated in half an hour, and knowing the foot print and built up area for the building.

Conclusion :- In this we concluded that they are studying about overall cost of construction by using GFRG PANEL, time required for casting GFRG PANEL, installation process on site. Cost comparison between normal construction and GFRG panel and how much percentage money we can save.

DISCUSSION

We have studies lot of information about GFRG panel like how to make GFRG panel, it's strength, etc in literature review.

While studying about GFRG panel we think that instead of using glass fibres in GFRG panel we can use coconut fiber means coir in GFRG panel.

The coir gives same strength as comparing to glass fibres.

Coir is also a natural material which is easily available and free of cost, in concrete also coir use to increase strength.

Just by replacing coir we can make product which is best out of waste means gypsum which is use for making GFRG panel is waste generated daily by 2000 tones and the coir is also a waste material which comes from coconuts. That's why we can say it is best out of waste.

We know that we cannot construct a tall buildings with GFRG panel but to increase strength of GFRG panel we can use wire mesh in GFRG panels.

The wire mesh will increase strength of GFRG panel for supporting the structure of GFRG panel.

Digram of GFRG panel with wire mesh.



IF we combined coconut fiber (coir) and wire mesh we can make GFRG panel with more strength and we will able to replace conventional wall with GFRG panel.

The combination of coir and wire mesh will increase strength and we can able to use in higher structure.

It is better and economical to replace Conventional wall like bricks wall, concrete wall etc with GFRG panel so it save time as well as it will save cost upto 40% of construction.

Hence we can concluded that Conventional wall should be replaced with GFRG panel. Conventional wall required lot of ingredients like cement, sand, aggregate, bricks etc and it's cost is also more as compared to GFRG panel ingredients. Conventional wall required finishing of plaster, paint etc. But GFRG panel doesn't required finishing. We also concluded that using coconut fiber in GFRG panel in the place of glass fibres. That make product waste out of best. We also concluded that using wire mesh will increase the strength of GFRG panel which we can use where more strength is needed. Hence by using both material coconut fiber and wire

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mesh we come to conclusion that this both materials will increase strength so that we can use GFRG panel and we can use GFRG panel with coconut fiber and wire mesh for higher structure or construction. This is our conclusion of our project.

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HYDROPONIC FARMING FROM TREATED GREY WATER

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India

ABSTRACT

With the advent of civilization, open field/soil-based agriculture is facing some major challenges; most importantly decrease in per capita land availability. In 1960 with 3 billion population over the World, per capita land was 0.5 ha but presently, with 6 billion people it is only 0.25 ha and by 2050, it will reach at 0.16 ha. Due to rapid urbanization and industrialization as well as melting of icebergs (as an obvious impact of global warming), arable land under cultivation is further going to decrease. Again, soil fertility status has attained a saturation level, and productivity is not increasing further with increased level of fertilizer application. Besides, poor soil fertility in some of the cultivable areas, less chance of natural soil fertility buildup by microbes due to continuous cultivation, frequent drought conditions and unpredictability of climate and weather patterns, rise in temperature, river pollution, poor water management and wastage of huge amount of water, decline in ground water level, etc. are threatening food production under conventional soil-based agriculture. Under such circumstances, in near future it will become impossible to feed the entire population using open field system of agricultural production only. Naturally, soil- less culture is becoming more relevant in the present scenario, to cope-up with these challenges. In soil-less culture, plants are raised without soil. Improved space and water conserving methods of food production under soil-less culture have shown some promising results all over the World.

Approximately seventy percent of all freshwater is used for agriculture globally, thus threatening food security especially in developing countries where access to water is potentially volatile. To overcome the threat of scarcity of fresh water for agriculture use of treated grey water comes in place for hydroponic and use in day to day life for common us

I. INTRODUCTION

We are entering an era where abundant, clean water is no longer guaranteed. The mounting demand on this finite and invaluable resource has inspired creative methods for water management, including scientific techniques for wastewater recycling. On the other hand, shortage of potable water and increasing urbanization have strained the ecosystem especially in terms of the amount of water and space available for farming and gardening. Knowledge about rinse water use in home gardening has been increasing since it represents an alternative source of water and nutrients for plant crops. Rinse water recycled and reused in hydroponics helps in waste water management. However, the innovative idea of hydroponics using rinse water for indoor gardening has not been practiced and could be evaluated only through research.

Hydroponic systems irrespective of their scale, are an innovative method of cultivation which reduces dependence on soil as a substrate, and instead derives nutrition directly from the hydroponic solution comprising of water and nutrients.4 While conventional hydroponic systems used fresh water supplemented with nutrients, the last decade has seen increasing interest towards using waste water as a source of hydroponic nutrition.

Domestic waste water can be classified as grey water and black water, with the former derived from routine household cleaning and laundering and the latter representing waste water from sanitation.1, 2, 9 Although domestic waste water has been proven to be a source of agriculturally useful nutrients such as nitrogen, phosphorous and potassium (NPK), biological contamination with organic matter remains one of the major challenges with its use in hydroponics.5, 10 In an effort to overcome this challenge we envisaged an indoor hydroponic system utilizing domestic rinse water which has been proven to have minimal biological contamination owing to the detergents and high temperatures used during laundry cycles. Furthermore, domestic rinse water represents an easy modality of water use and could effectively save up to 1000-1500 liters of water per week in an average household.2 This amount of saved water can cumulatively benefit the urban population in developing countries wherein water shortage is always an impending challenge.

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Soil-less culture mainly refers to the techniques of Hydroponics and Aeroponics. The term Hydroponics was derived from the Greek words hydro' means water and ponos' means labour. It is a method of growing plants using mineral nutrient solutions, without soil. Terrestrial plants may be grown with their roots in the mineral nutrient solution only or in an inert medium, such as perlite, gravel, or mineral wool. Hydroponics is the technique of growing plants in soil-less condition with their roots immersed in nutrient solution.

II LITERATURE REVIEW

NISHA SHARMA, SOMEN ACHARYA, KAUSHAL KUMAR, NARENDRA SINGH and O.P. CHAURASIA (2008): Hydroponics as an advanced technique for vegetable production: An overview

This paper studies that current hydroponic cultivation is gaining popularity all over the world because of efficient resources management and quality food production. In this article various hydroponic structures viz. wick, ebb and flow, drip, deep water culture and Nutrient Film Technique (NFT) system; their operations; benefits and limitations; performance of different crops like tomato, cucumber, pepper and leafy greens and water conservation by this technique have been discussed. Several benefits of this technique are less growing time of crops than conventional growing; round the year production; minimal disease and pest incidence and weeding, spraying, watering etc can be eliminated. To encourage commercial hydroponic farm, it is important to develop low cost hydroponic technologies that reduce dependence on human labour and lower overall startup and operational costs.

Lucia Hernandez Leal, Hardy Temmink, Grietje Zeeman and Cees J. N. Buisman (2010): Comparison of Three Systems for Biological Greywater Treatment

Greywater consists of household wastewater excluding toilet discharges. Three systems were compared for the biological treatment of greywater at a similar hydraulic retention time of approximately 12–13 hours. These systems were aerobic treatment in a sequencing batch reactor, anaerobic treatment in an up-flow anaerobic blanket reactor and combined anaerobic- aerobic treatment (up-flow anaerobic blanket reactor + sequencing batch reactor). Aerobic conditions resulted in a COD removal of 90%, which was significantly higher than 51% removal by anaerobic treatment. A combined anaerobic-aerobic system operated at 32 ± 3 °C and at an HRT of 12 hours did not give an advantage, compared to aerobic treatment, in regard to

From the review, the potential of some natural materials to be used as media in greywater treatment systems also emerged. These natural materials are widely available in most developing countries, and their total integration into the conventional treatment systems should be explored. They can be used to design simple household level greywater treatment systems that target a certain reuse option and thereby increase local level participation.

E. Prof. A. B. Shelar, Ms. Shradha M. Kalburgi, Ms. Neha D. Kesare, Mr. Santosh U. Kushwah, Mr. Sagar J. Choudhari (2019): Treatment of Grey Water using Low Cost Technology For Kushvarta Kund Water

This paper presents a review of existing low cost technologies for treatment of grey water. We have come to know that stabilization tank, root zone method are proved to be very effective for treatment of grey water, the results of stabilization tank are, effective and similar to the results of IS specifications. The the removal of COD from greywater and sludge yield. However, stabilization tank is the low cost method so it is economical with the benefits of this configuration depend on factors such as gas use and energy input. Based on COD removal, sludge yield and energy considerations, treatment of greywater in an aerobic system is preferred over an anaerobic system and a combined anaerobic-aerobic system.

C. .Raj Singh, Sushil Kumar Upadhyay, Chhaya Singh, Neha Chauhan, Indu Sharma, Pooja Sharma and Anju Rani

The present research aimed to examine an efficient technique for planting system i.e. hydroponic or soil less system of farming. The statistical experimental design approach was used to compare the growth between hydroponic system and the tap water system in the growth of Cicer arietinum and Trigonella foenum-graecum. The results showed that chickpea seeds after germination were grown up to 25 to 28cm in 16 days in the water however the same growth was recorded within 10 days in nutrient solution. This system may help both kitchen gardeners and farmers to grow food in places where traditional farming is not possible and cost-effective. The hydroponics system offers conservation of water, soil, air, energy and employment for the quality of life. The hydroponics can enhance the economy of both developing and developed countries by using of limited natural resources.

D. Michael Oteng-Peprah & Mike Agbesi Acheampong & Nanne K. deVries (2018): Greywater Characteristics, Treatment Systems, Reuse Strategies and User Perception—a Review

This paper presents a literature review of the quality of greywater generated in different, especially developing, countries, constituents found in greywater, some treatment systems, natural materials for treatment, some reuse strategies and public perception regarding greywater reuse. The review shows that generation rates are mostly influenced by lifestyle, types of fixtures used and climatic conditions. The study described different reuse strategies, most using discharged greywater for food production and landscaping while others have been used for poverty alleviation in irrigation farming.

Better results from the above all methods F.Amjad Kallel, Mohamed Moncef Serbaji, and Moncef Zairi (2016): An Initiative for Developing Low Cost Hydroponic System Bangladesh

The paper deals to minimize the water crisis of a drought prone area in Bangladesh. In this research an alternative and low-cost effective cultivation method has been developed. In the technique a composition of traditional agricultural fertilizers (Agronaris, DAP, MP, Dolochun, Gypsum, Magnesium Sulfate and Iron Sulfate), cow urine and pond water has been used as nutrient medium. For medium of cultivation recyclable bottles, foams, bamboo, coco coir, semidried Eichhornia leaves were used.

Tomato (Lycopersicon esculentum Mill.); Pepper (Capsicum); Lettuce (Lactuca sativa) were used as experimental plant. In this technique there were no significant changes in growth pattern of the plants as it took the same time duration as traditional agriculture method to complete to their life cycles.

G..Mamta D. Sardare , Shraddha V. Admane (2013):

A REVIEW ON PLANT WITHOUT SOIL - HYDROPONICS

In 1960 with 3 billion population over the World, per capita land was 0.5 ha but presently, with 6 billion people it is only 0.25 ha and by 2050, it will reach at 0.16 ha. Due to rapid urbanization and industrialization as well as melting of icebergs (as an obvious impact of global warming), arable land under cultivation is further going to decrease. Under such circumstances, in near future it will become impossible to feed the entire population using open field system of agricultural production only. Naturally, soil-less culture is becoming more relevant in the present scenario, to cope-up with these challenges. In soil-less culture, plants are raised without soil. Improved space and water conserving methods of food production under soil-less culture have shown some promising results all over the World.

The industry is expected to grow exponentially also in future, as conditions of soil growing is becoming difficult. However, Government intervention and Research Institute interest can propel the use of this technology

H. J. S. LAMBE(2017)

Greywater - Treatment and Reuse

India is facing a water crisis and by 2025 it is estimated that India's population will be suffering from severe water scarcity. Although India occupies only 3.29 million km2 geographical area which forms 2.4% of the worlds land area, it supports over 15% of world's population with only 4% of the world's water resources. The benefits of greywater recycling include: Reduced use of freshwater, Less strain on septic tanks or treatment plants, More effective purification, Feasibility for sites unsuitable for a septic tank, Reduced use of energy and chemicals, Groundwater recharge, Plant growth, Reclamation of nutrients, Increased awareness of, and sensitivity, to natural cycles

III.OBJECTIVES AND METHODOLOGY OBJECTIVES

To study characteristic of household grey water collected from Sewri.(Physical, Chemical & Biological) Treatment of grey water.

Primary treatment - pre- treatment to secondary treatment: - 1. Screening 2. Equalization

Secondary treatment:-.Gravel filtration 2.Sand filtration 3.Chlorination

Our project objective is to recycle the grey water and use it as nutrient water in hydroponic farming.

To design a small residential unit of Hydroponic system with the maximum use of grey water to grow plants.

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METHODOLOGY

Detailed information study and properties of the collected greywater sample is required to plan and manage the system. Following data was collected from the various research papers. This input data is required to compute optimized, efficient and safe working of the system.

To achieve the final objective of our project, it has been divided into two phases.

Phase 1 includes the detailed study of grey water sample characteristics collected from the location and making list of parameters to check and testing of the sample in the college lab to get the untreated greywater sample values of the parameters listed below.

Table 1- List of Parameters to be testedPhase 2 includes the work shown in the flow chart below:

Grey water collection tank
Biofilter tank
Sedimentation tank
Treated grey water storage tank
Hydroponic set up

Biofilter

Sieve- To remove floating matter

Wood chips- To reduce grease and oil from greywater

Gravel & Sand- To remove suspended matter

Biochar- To remove color and odour and organic pollutants

Cotton

Sedimentation Tank

Aluminum sulphate (alum)- To increase speed of settling process

Poly Aluminum Chloride - Removal of colloidal impurities and settling of suspended matter

Ferric Sulphate - To control pH in greywater

Bleach Liquid - To remove ecoli from greywater

Dechlorination

Detergent removal

pH	Turbidity
Total Dissolved	Total suspended
Solid	solids
Chemical	Dissolved
Oxygen Demand	oxygen
Nitrate	Total nitrate
E.coil	calcium
Sodium	chlorine
Electric	Oil and grease
conductivity	
Biological oxygen	Total Phosphorous
demand	_
Magnesium	hardness

IV CONCLUSION

In this project in stage one, we will start with collecting grey water from a residential society. On an average a single residential building generates 795 liters of grey water daily. i.e 795*30=23,850 liters per society weekly. This collected water is treated properly, we will be conducting number of test in a sequence. After the treatment the required minerals will be added to the water if needed. The treated water will be used for hydroponic farming.

Considering our growing population in future it is impossible to supply the demand of market, encouraging the farmers to this technique will be a reform in its own way. It is helpful while we look forward at current situation

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of fertile land, soil fertility etc. this is good time to promote hydroponic farming. Along with it farming with the use of grey water we are reusing the waste water efficiently. This can be added to the upcoming green building.

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STRUCTURAL HEALTH MONITORING IN BUILDINGS

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ABSTRACT -

Usually, life of a residential structure is up to 50 years. It also depends on site location geological and environmental conditions. For this project the selected residential structure was in humid and heavy rainfall zone so the structure starts showing distress in 8 to 10 years. There are many factors which causes deterioration of structure such as earthquake, flood, cyclone, carbonation, chloride attack, environmental pollution, lack of regular maintenance, faulty construction, improper design, etc. For this reason, optimal rehabilitation works are vitally necessary for an accurate preservation process. In most of the cases it is observed that the material used at that time of construction are well graded up to the mark but due to environmental condition building can suffers numerous deterioration process during their service life. Structural heath monitoring is mandatory to identify the strength of the structure. In this a technical survey of the building component in order to check it strength and stability. This project shows the requirement for maintenance and repairs of older building. Also, we are going to discuss various NDT'S in this project with respect to visual inspection. Based on visual inspection and from interpretation of the test results rehabilitation work of the society is to be done. The society can also be suggested for micro-concrete jacketing on some columns, beams and for slab polymer modified mix mortar can be used.

Keywords: Non Destructive test (NDTS), Micro Concrete Jacketing, Polymer Modified mic Mortar, Technical

I. INTRODUCTION

Structural Health Monitoring means the process of implementing the damage detection in the structures and also increasing the lifespan of the structures. From the beginning of the 20th century, concrete was the main building material of many constructions. Reading many concrete structures showed that concrete can be sensitive to various deterioration condition so test and rehabilitation concrete properties are important issues Exploration can be intense is useful for identifying potential damage to buildings and identifying the causes of its opportunities. The concept of non-destructive inspection (NDT) acquisition of property buildings in the model area without demolition a statue or structure from which it was taken. Non-destructive testing techniques (NDT) can be used effectively investigation and evaluation of the real situation of properties. These methods are quick, easy to use and is cheaper and gives a more general indication of what is needed concrete material. This approach will enable us to do so find suspicious locations, thus reducing time and cost exploring the mass of concrete. Special selection The NDT method depends on the concrete location it should be seen as strength, rust, cracking cracks etc.

The NDT being fast, easy to use at site and relatively less expensive can be used for

Testing any number of pointes and locations,

Assessing the actual condition of reinforcement, Main objective of assessment is to ensure that structure and its different parts do not fail under its loading condition.

- Assessment is carried out so that its maximum resistance capacity can be observed.
- Detecting cracks, voids, fractures, honeycombs and weak locations
- To reduce the local damage affecting the life span of structures.
- To remove excessive vibration which causes discomfort to mankind
- Scanning for reinforcement location, stress location
- Assess overall stability of the structure

II. LITERATURE REVIEW

Literature survey is carried out by study of various Research Paper related on Structural health Monitoring and condition Assessment of RC structure.

Study is collected from various research referred and valuable data. The referred journals, project thesis, and reports obtainable by various researchers were referred to and summarized in this chapter in three phases,

Non-destructive tests (NDTS)

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Non-destructive Evaluation (NDE) methods are used for, (a) Concrete Strength determination and (b) Damage detection in structures. [1] The author has specified in his study that Rebound hammer test and Ultra-sonic pulse velocity test have been done on specimens and the column, beams and slabs of two double storied buildings. Also plot the graph between rebound number vs. Compressive strength and velocity vs compressive strength. [2] The author has been analyzing why and how nondestructive testing (NDT) measurements can be used in order to assess on site strength of concrete. The key factors Influencing the quality of strength estimate are identified. Two NDT techniques (UPV and rebound) are prioritized and many empirical strengthened models are analyzed. [3] The author carried out structural Monitoring, periodic measurement of displacements, strains, Stresses and damage 8 evaluation (e.g., crack width) and Vibration characteristics and mainly visual inspection of the Structure. To detect the various crakes and also measuring the width of cracks, to show the layout of that structures. Also using various non-destructive test to detect the cracks and to evaluate the existing condition of the structure. [4] The author has presented a case study include the use of various Non-Destructive Test (NDT), to evaluate the concrete quality of building age was 8 years. NDT used such As Ultrasonic pulse velocity, half cell potential, carbonation depth, rebar locator, cover meter and core sampling. He also focused on standard testing procedure of NDT and sequence of operation for obtaining accuracy as well as the problems created during the testing and the limitations of the tests are considered. [5] He has used Rebound hammer test and Ultrasonic pulse velocity Test on specimen and existing structure and got compressive Strength of concrete and comparison along with actual Compressive strength which is obtain from compressive Testing machine. The structural health monitoring by NDT Methods comprised of UPV and RSH (Schmidt Rebound Hammer) were carried out in laboratory and site. The Experimental investigation using NDT methods showed that a good correlation exists between compressive strength, SRH and UPV.

Sensors

[6] The author has carried out monitoring in two buildings, the Van Nuys hotel and an Imperial country service building, by adopting an empirical mode decomposition (EMD) Approach and vector aggressive moving average (VARMA) model in order to predict the Sensitivity and effectiveness of a damage index based on noise. They reported that the Damage index provides valuable information for analyzing damage and examining the Relationship between the severity of the damage and the damage index to avoid future problems. [7] He has carried out real-time monitoring in a 14-floor building stationed in a coastal area of Chile subjected to dynamic loading. The main objective of the study was to check the withstanding ability of the structure in a tsunami to predict the hydrodynamic forces and detect the damage, and it needs further development in terms of mode deformation. [8] He used DFOS (fiber optic sensors) to study the 9 effect of static traffic loads on the slight deflection of existing bridge concrete structures. In this work, they tested the load on Amsterdambridge705 by using two 36-ton trucks parked at multiple locations on the bridge to record the longitudinal strain of the FOS embedded inside the bridge. The experimental results proved that the monitoring system supervised that the 93.9-m-long part of the optical fiber had detected a small elastic strain in the range of as low as 2 µm/m with a spatial resolution of 20 cm. [9] The author have developed a novel type of DFOS for building temperature and strain measurement. The sensor uses an enhanced single-mode fiber as a composite optical element, which is placed in the glass fiber body. The use of FOS to monitor the state of buildings and structures can always keep improving until better, and there will be more work to conduct in-depth research and exploration in the future. [10] He has investigated the lifespan of sensors used for SHM and pointed out that the average life span would be 10 years, and they suggested That more sensors be fixed in a structure to distribute the load equally and enhance the Durability and service life of sensors. This technique is known as the communication Technology load.

Quantitative Infrared Thermography (QIRT)

Infrared thermography is a modern non-destructive measuring method for the examination of redeveloped and non-renovated buildings. In Civil Engineering, the application of Infrared thermography is not limited to passive Investigations of the quality of thermal insulation of Building envelopes. Defects like voids in concrete or Masonry, delamination's at interfaces can be localized and characterized. [11] The author has been proposed an Infrared thermography measurement system for SHM. The thermography testing [i.e., NDT] has the main purpose to provide information by analyzing the real characteristics of the existing buildings for determined surface anomalies. The infrared measurements give a qualitative image of the thermal protection level of buildings envelope and identify the week zones hidden from eye visual contact. The infrared thermography is useful in detecting invisible defects nondestructively, extensively and safely. [12] He has been proposed methods for SHM to help and overcome many limitations associated with existing 10 SHM methods in harsh or remote environments. The feasibility of the infrared thermography method was experimentally investigated by comparing measurements made using infrared thermography with measurements made using accelerometers.

The results show that because of the imaging principle of the thermal imager and the image processing process, the vibration signal was obtained even under harsh environments within 3.84% deviation in natural frequency. This proves that the thermal imager is a suitable alternative to the optical camera as a noncontact sensor for SHM. Future works can be focused on the application of practical engineering cases such as SHM for offshore wind turbine structures.

III. CONCLUSION

According to the study, we can conclude that there are various tests to detect distress, deterioration and existing condition of buildings by using various NDTs and Visual inspection. NDT tests such as rebound hammer, UPV, cover meter test, carbonation test, and visual inspection, also a combine of Rebound hammer and UPV are most commonly used for Health monitoring of RC Structure in buildings. Structural health monitoring is an important aspect in ensuring successful performance of a structure in its given life span. The method of conducting structural Health monitoring varies highly with the type and usage of Structures which needs to be investigated. Hence it is Imperative that the structure which needs to be investigated Must be studied thoroughly before adopting a proper Strategy to conduct structural health monitoring.

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SOIL STABILIZATION USING LOW DENSITY PLASTIC

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ABSTRACT

Soil stabilization is a process which improves the physical properties of soil, such as increasing shear strength, bearing capacity, etc. Expansive soils such as black cotton soil have always problem of swelling, shrinkage & unequal settlement. Soil stabilization is the process which enhances the properties of soil by mixing of plastic in various proportions. Stabilization increases the load bearing capacity of soil by mixing of plastic fiber in different percentage in expansive soils. Effect of mixed plastic in varying proportion on Mass Dry Density (MDD), Optimum Moisture Content (OMC), specific gravity and California Bearing Ratio (CBR) on Black Cotton Soil. By using the above test on the black cotton soil the compressive strength and its property is increased by using plastic. Plastic waste is become one of the major problems for the world. We have selected a soil find the specific gravity, liquid limit, plastic limit, standard proctor test is carried out to find the maximum dry density and optimum moisture content. Then triaxial test is carried out to find the shear strength of the soil. We have to check the changes in soil parameter by varying the percentages of plastic to get the proper shear strength and bearing capacity. By better stabilization soil it improves it strength minimize the plastic index, reduction in swelling potential and resistance to erosion, surface deflection, improving stiffness of soil, durability, workability and also by densification air is expelled from soil voids without much changes in moisture content. The plastic is one of the dangerous materials which is getting eliminated by using in soil stabilization which results in good quality of soil.

INTRODUCTION

Soil stabilization is the process which improves the soil's engineering properties and makes it more stable. The stability can be achieved through soil strengthening by random distribution throughout the soil mass. The key goal is to establish a soil substance or method that will hold for the engineering project under construction usage conditions and the built life using waste plastic. There are also environmental issues around the world, so it's a good idea to use waste materials as soil stabilization, as it will reduce waste and stabilization prices. Use of plastic products for example plastic bags. It rising day by day contributing to various environmental issues. The disposal of the plastic waste without causing any ecological hazards has therefore becomes a real challenge. The use of plastic waste as a soil stabilizer is therefore an economical use, as there is a lack of good quality soil for embankments. Made of polyethylene, a non-biodegradable polymer, plastic shopping bags are low-cost, lightweight, durable and water-resistant, making them a convenient and reliable packaging material for consumers around the world. Plastic such as shopping bags is used for reinforcing the soil for improving the various properties of soil. Applications of stabilizing of soil are increasing the shear strength of soil, bearing capacity of foundations and for improving the natural soil subgrade for construction of highways and airfields. As plastic is causing most tragic condition in a whole world so we have to find some alternated way to get rid of plastic? Now many research papers have been published on using plastic in soil through different ways, referring some researches paper soil stabilization through using plastic is consider as success. Experimental investigation on reinforced plastic soil results showed that, plastic will be used as a good stabilizer so on encounter waste disposal problem in addition as a cost- effective solution for stabilizing weak soils. Plastic reinforced soil behaves sort of a fiber reinforced soil.

LITRETURE REVIEW

Paper 1: Wasim Ahmad Rather, Suhail Ahmad Bhatt (2021)

It results in improving cosmic radiation price of soil due to addition of plastic strips. It observes that plastic radiation proportion goes on increasing up to 4% of plastic content and decreases further 4% is optimum content of plastic waste within a soil. Utilization of plastic merchandise in numerous forms is enormously increasing day by day. This has Associate in Nursing adverse result in nature and it's unimaginable to limit its uses. during this regard, the disposal of the plastic wastes while not inflicting any ecological hazards has become a true challenge to the current society. Thus, victimization plastic as a soil stabilizer is a cheap and profitable usage as a result of there is lack of fine quality soil for numerous constructions

Paper 2: Rebecca Belay, Tenaw Workie (2020)

A significant and marginal reduction was recorded in the optimum moisture content and in the maximum dry density results respectively. The angle of internal friction and the cohesion intercept increased significantly as the reinforcement percentages and sizes increased. A huge improvement in UCS has been noted for smaller strip size and content. Any further increase in size and content has brought reduction in UCS because increase in size causes in un-compacted weak shear planes. The swelling of the soil was reduced significantly at high percentages of strip content because of replacement in an equal mass of expansive soil by non-expansive plastic. Physical anchorage has also some effect in reducing the free swell. The swelling reduction is in some way similar for different sizes at the same percentage which shows that the dominant factor that contributes to reduction in swelling is percent by weight of plastic content. Increase in plastic size for the same percentage has resulted in an increase in soaked CBR value but increase in plastic content for the same plastic size increases the soaked CBR then decreases.

Paper 3: Hussein Jalal Aswad Hassan & Jabar Rasul (2020) Soil stabilization with fibre has different trends for UCS, as the increase in fibre content is not resulting in the increase in UCS ascendingly, the increase in fibre content resulted in the increase in moisture ratio values. Therefore, optimum fibre content shall be sought for stabilization with fibers for the highest values of UCS. The length of the fibre showed to have an effect on the strength properties of the stabilized soil, as the increase in length resulted in higher strength properties. This may require more research to find the optimum fibre length that gives the highest strength properties.

Paper 4: Vismaya, Monica Simon (2019)

This paper reports the results of the laboratory experiments carried out to understand the strength and compressibility behavior of PBS treated soil. The UCS and consolidation tests were conducted by varying the thickness and aspect ratios of the PBS for different percentages of PBS. The various thickness ranges used were 15μ m, 30μ m, and 45μ m and dimension of 12 mm x 30 mm and waste plastic bag strips were added at 0.1%, 0.2% and 0.3% concentration. The maximum value of UCS is obtained for soil reinforced with 0.2 % plastic content having an aspect ratio of 2.5. Soil stabilized with plastic strips of thickness 45 μ m is having maximum compressive strength.

Paper 5: Sagar Mali, Sachin Kadam (2019)

Based on the review of the various research paper we can conclude that plastic strips in optimum amount with suitable dimension is feasible for improving the engineering properties of soil. Plastic can be utilized as one of the materials that can be used as soil stabilizing agent in proper proportion of plastic must be there, which helps in increasing the CBR of the soil. Thus, using plastic as a soil stabilizer is economical and gainful use in construction as there is lack of good quality soil for various construction. Reducing the amount of plastic waste and producing useful product from non-useful waste materials for sustainable foundation and subgrade improvement. This new technique of soil stabilization can be effectively used to meet the challenges of society and it can significantly enhance the properties of soil used in construction of road infrastructure, foundation, stabilization of embankment, pavement sub grade and other different fields as per the needs and flexibility.

study is needed to optimize the size and shape of strips and to assess the durability and aging of the strip. Large scale test is also needed to determine the boundary effects influence on test results.

Paper 10: V. Mallikarjun, T. Bindu Mani (2016)

It can be concluded that CBR percentage goes on increasing up to 4% plastic content in the soil and thereon it decreases with increase in plastic content. Hence, we can say that 4% plastic content is the optimum content of plastic waste in the soil. Utilization of plastic products in various forms is enormously increasing day by day. This has an adverse effect in nature and it is not possible to restrict its uses. In this regard, the disposal of the plastic wastes without causing any ecological hazards has become a real challenge to the present society. Thus, using plastic as a soil stabilizer is an economical and gainful usage because there is lack of good quality soil for various constructions.

Paper 6: Sreedeep Sekheran, A. Burman (2018)

From the results and discussions of Standard Proctor Test on plastic reinforced soil, the maximum dry unit weight (MDU) is observed to be maximum at 0.4% plastic content by mass of

OBJECTIVES

OBJECTIVE AND METHODOLOGY

natural soil for (15 mm 915 mm) size of plastic strips. MDU values starts to decrease for higher percentage of plastic content (0.6 and 0.8% respectively) and for greater size of plastic strip

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i.e. (15 mm 925 mm) and (15 mm 935 mm) respectively. It is also observed that, OMC values show just opposite trend of MDU values for plastic reinforced soil.

Paper 7: SK. Mehruddin, Dr. D. Srinivas (2017)

From the standard proctor test carried out, it has been observed that the OMC values initially decreases with 2% plastic waste replacement. However, beyond 2% plastic, OMC was observed to increase up to 5% plastic and then decreased. The OMC value at 2% and 4% plastic was nearly the same. An increase in the MDD value was observed with 2% plastic, which is also the highest MDD value of 1.47 g/cc among all the various tests conducted. Hence, it may be concluded that for best compaction with the plastic strips considered in this study, the optimum content of plastic is 2%. The CBR value increased from 14 % at 0% plastic to 26 % at 2 % plastic. Beyond 2% plastic, the CBR value was observed to decrease. It may be inferred that the strength of the soil increases with plastic strip reinforcement. Hence, it may be concluded that the optimum content of plastic for improving the CBR is also 2%

Paper 8: Mishra and Babu (2017)

Waste house hold plastic bags were used to carry out these experiments. Plastic bags percentage such as 0%, 0.25%, 0.50

%, 0.75 %, 1.00 % and 1.25%. Maximum dry density shows a decrease to 0.75% inclusion of waste bags more reaches maximum at 1.0% of plastic waste and more decreases. The CBR was maximum when the waste bags percentage was 0.75%, more increase in waste bags reduced the CBR value.

Paper 9: Vijay Kumar Patidar1, Dr. Suneet Kaur (2016) Annually, a lot of waste rubber and Plastic are generated and occupied a great space. It is necessary to find a solution to solve this problem. Based on literature, one of the solutions is use of different size waste rubber and plastic in soil reinforcement. Reinforcing sand with waste HDPE strips enhances its resistance to deformation and its strength. However further

Substituting poor grade soils with plastic possessing more favourable engineering properties.

Enhancement of the strength and therefore bearing capacity of the soil.

Dust control for a good working environment.

Waterproofing for conservation of natural or manmade structures.

To promote the use of waste geomaterials in constructions. Finally, enhancing the properties of soil on site.

METHODOLOGY SPECIFIC GRAVITY

a) Clean and dry the pycnometer and weigh it along with the

conical cap (W1 in gm). b) Select about 300 gm of dry soil free of clods and put the same into the pycnometer. Weigh it (W2 in g) with cap and washer. c) Fill the pycnometer with de-aired water up-to half its height and stir the mix with a glass rod. Add more water and stir it. Fit the screw cap and fill the pycnometer flush with the hole in the conical cap and take the weight (W3 in g).

d) Remove all the contents from the pycnometer, clean it thoroughly and fill it with distilled water. Weigh it (W4 in g). e) Now use the above equation for determining G.

Formula: G = (W2-W1)/((W2-W1) - (W3-W4))

W1=weight of Pycnometer in grams. W2=weight of Pycnometer + dry soil in grams. W3=weight of Pycnometer + soil+ water grams. W4=weight of Pycnometer + water grams.

WATER CONTENT

Clean and dry the pycnometer and weigh it (W1 in g). b) Select a mass of wet soil of about 300 gm and place the same in pycnometer and weigh it (W2 in g). c) Fill the pycnometer with distilled water up-to half its height and stir the mix with a glass rod. Keep on adding more water till the mix is flush with the hole in the conical cap. Dry the pycnometer outside and find the mass (W3 in g). d) Remove the contents of PM and clean it. Fill with clean water up-to the top level of the hole in the cap weigh it (W4 in g). e) Now use the above equation for determining water content, where, G value is taken from Experiment No 1

(Determination of specific gravity by pycnometer method) for the given soil. $W\% = [((W2-W1)/(W3-W4)) \times (((G-1)/G)-1)]$
$\times 100\%$ W1= Weight of empty pycnometer in grams W2 = Weight of pycnometer + wet soil in grams W3 = Weight of pycnometer + dry soil in grams W4 = Weight of pycnometer + water ingrams

LIQUID LIMIT

a) A representative sample of mass of about 120 gm passing through 425 μ IS sieve is taken for the test. Mix the soil in an evaporating dish with distilled water to form a uniform paste. b) Adjust the cup of the device so that the fall of the cup on to the hard rubber base is 10mm. c) Transfer the portion of the paste to the cup of liquid limit device. Allow some time for the soil to have uniform distribution of water. d) Level the soil topsoil so that the maximum depth of soil is 12 mm. A channel of 11 mm wide at the top, 2 mm at the bottom and 8 mm deep is cut by the grooving tool. The grooving tool is held normal to the cup and the groove is cut through the sample along the symmetrical axis of the top. e) The handle of the device is turned at a rate of about 2 revolutions per second and the number of blows necessary to close the groove along the bottom distance of 12 mm is counted. A sample of soil which closes the groove is collected. f) The soil in the cup is re-mixed thoroughly (adding some more soil if required) some quantity of water which changes the consistency of soil, repeat the process. At least 4 tests should be conducted by adjusting the water contents of the soil in the cup in such a way that the number of blows required to close the groove may fall within the range of 5 to 40 blows. A plot of water content against the log of blows is made as shown in figure. The water content at 25 blows gives the liquid limit.

PLASTIC LIMIT

a) Select a representative sample of fine-grained soil of about 20 g or more passing through 420 μ IS sieve. Mix it with distilled water thoroughly on a glass plate such that the palm of the soil can be rolled into a thread of 3 mm diameter. Allow some time for the proper distribution mixed with water. b) Take about 10 g of this wet sail and roll it into a thread on a glass plate with the palm of the hand. The rolling must be such that it forms a uniform thread of 3 mm diameter. If the thread cracks before attaining 3 mm diameter, and add little more water, knead it and roll again. If the rolling can be done to diameter less than 3 mm, mix some dry soil, knead it to remove same extra moisture in the soil. This process has to continue till the sample crumbles just at about 3 mm diameter. Collect the crumbled soil (at least 6 g) and measure its water content. c) Repeat the process to get at least three water content determination (after they have been in the oven at least 16hours). d) The average of water content so obtained is the plastic limit of the soil.

STANDARD PROCTOR COMPACTION TEST

a) Select a representative soil sample of about 25 kg. The material used for the test must be finer than 20 mm sieve. Air- dry sample. b) Add sufficient water to the sample (about 7 % for sandy soils and 10 % for clay soils), which will be less than the estimated optimum moisture content. Mix the soil thoroughly and keep this in an airtight container for a period of 20hours. c) Fix the mould to the base plate after cleaning its inside surface. Find the mass of the mould with the base plate (M1). d) Attach the extension collar to the mould. e) Take about

2.5 kg of soil in an air tight container and compact it in the mould in three equal layers each layer is compacted by giving 25 blows by the hammer weighing 2.6 kg and dropping from a height of 310 mm. The compaction must be uniform over the whole area, and a spatula scratches each layer before adding another layer. The filling must be such that the last layer projects into the collar by about 5 mm. After the completion of compaction, remove the collar and remove the excess soil with the help of a straight edge. Find the mass of the mould with the base plate and the soil (M2). Remove the soil from the mould by making use of an ejector and take a representative sample for water content determination. f) Carry out the tests 3 to 4 times by repeating the steps from (e) onwards. Each time use a fresh soil sample.

UNCONFINED COMPRESSION TEST

The sample is prepared in the same way as for a triaxial test. Its natural water content and dry density are determined prior to the testing. The length (Lo) and diameter (do) are also measured.

Set the sample on the pedestal of the equipment and complete all the necessary adjustments for applying on axial loads. c) Apply the axial load at a strain of about 0.5 to 2 % per minute and continue the load till the sample fails OR the deformation reaches 20 % of axial strain. d) Sketch the failure pattern and measure the angle of failure if possible. e) Take a small sample of soil from the failure zone for water content determination.

IV CONCLUSION

Results of various researchers give positive indication to the possibility of using the plastic waste bags for reinforcement and stabilization of soil.

The use of plastic waste bags has significantly helped in ground improvement. Adding plastic bags to soil is an economical solution.

There is considerable increase in CBR value. As the material is waste and biodegradable therefore can be suggested to use for the construction of roads like village roads, temporary roads etc.

The optimum percentage of plastic bags strip is (0-2.5) %

The higher the aspect ratio the better the results.

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REVIEW PAPER ON "CONSTRUCTION OF MODEL OF NOVEL SOIL STABILITY TECHNIQUES TO PREVENT LANDSLIDES"

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ABSTRCT

Civilengineering structure must be safe and stable for that the soil above which it is rest should have sufficient shear strength and bearing capacity. It can be improved by soil stabilization method when soil present at site should be unsuitable. The main purpose of this review paper is to analyze the technique of soil stabilization based on results of research. Soil stabilization improve the various engineering properties such as shrinking, swelling, shear strength, permeability etc. all methods of soil stabilization is classified into two categories namely chemical stabilization and mechanical stabilization. Mechanical stabilization is the process to stabilize the soil by changing the composition of soil or altering its graduation and chemical properties of soil by adding various Glory David Vengulekar properties of soil by adding various admixtures. Various materials are used as soil stabilizer such fly ash, lime, cement recron etc.

Key words: Soil stabilization; Mechanical stabilization; Soil stabilizer; Geotechnical

INTRODUCTION

Soil adjustment is a method used to beautify soil quality, bearing restriction and durability beneath hostile dampness and strain conditions. It alludes mainly to the blending of the discern soil with different soil, concrete, lime, bituminous items, silicates and specific chemical compounds and not un-usualplace or engineered, herbal and inorganic materials. The current styles on soil adjustment have superior imaginative structures of the use of close by reachable ecological and modern waste cloth for the alternate and adjustment of insufficient soil. Improvements probably restricted to the finest degree. In the period in-between secure switch of horticultural and nearby squanders land up checking out task for engineers. Consequently an undertaking has been made with the aid of using analysts to make use of agrarian and nearby squanders/cutting-edge squanders as soil stabilizers. Generation of large quantity of cutting-edge squanders any where at some point of the sector reactivates good sized issues of looking after and switch.

SOIL STABILIZERS USED FOR SOIL STABILIZATION

Fly ASH

Fly ash is a byproduct which is generated from burning pulverized coal in electric power plant and steam creating plant. Fly ash consist silicon, aluminium, iron oxides and unoxidized carbon. Fly ash is micro sized particles and spherical in shape due to this it is easy to blend and flow. Fly ash is classified into two groups, "class F" and "class C" Class F fly ash is also called raichur fly ash and Class C is called neyveli fly ash. Burning of sub-bituminous type of coal and lignite which contains more than 20% calcium oxide gives the class C fly ash. By ignition of anthracite and bituminous type of coal which contains less than 20% calcium oxide, gives class F fly ash. Erdal Cokca (2001) conclude that when soil specimens are treated with 25% of class C fly ash then swelling pressure decreased by 75% after 7 day curing, and 79% after38 days curing. The Pandian et al.(2002) studied the effect of these two types of ash on CBR/strength of black cotton soil.



Fig: 1 Fly Ash

In his study he state that fly ash content increased from 0 to 100 %. He concluded that the increase in strength with increase in fly ash content in soil. Also the phanikumar and sharma (2004) studied the effect of fly ash on engineering properties of soil like swelling, plasticity, strength and compaction etc. and he conclude that shear strength increases with increase in fly ash content. Sabat et al. (2005) studied the effect of mixture of fly ash-

marble powder on expansive soil and stated the proportions of soil; fly ash and marble powder such 65%, 20% and 15% to give the best results. Amut et al. studied the stabilization of expansive soil using

Lime

Lime improves properties of soil so it can help to stabilize the soil. It require sufficient amount of heat not less than 40 Fahrenheit.

By extending dates of construction slaking process increases required amount of heat which is helpful for reaction with soil. Generally lime reacts with fine grained or moderately fine grained soil. Type of lime is depending on the type of soil and the amount is depending on the soil is remodified or stabilized. Following are the types of limes generally used.

- Hydrated high calcium lime
- Monohydrated dolomite lime
- Calcite quick lime
- Dolomite lime



Fig: 2 Lime

Lime can be used alone or combination with cement, bitumen, or fly ash. It effects on the soil by cation exchange or pozzolanic action due to cementing effect. Lime soil mixture gives sufficient durability to resist the structure make sure that heavy vehicles are not allowed within 14 days. Amount can be calculated by using CBR test or unconfined compressive strength. CBR test conducted with raw soil using 4, 5 and 6% lime. For coarse grained soil 2 to 8% and for plastic soil 5 to 10% of lime is required. Fly ash is mix with lime about 8 to 20% of soil weight. Quantity of lime can be calculated by % by weight not by volume for that you must know density of soil by doing compaction testing. Stabilization should be 6 inches for marginal soil, 8 to 9 inches for poorer and 10 to 12 inches for very worst soil. Determination of lime for project you must consider project length, variable alignment, rock, new or old construction. Lime moderately improves engineering property, workability, impermeability and load bearing capacity of soil. It is more suitable in high temperature area as compared to low temperature area and suitable for soils like clay, silty clay, and claye.

RECRON 3-S FIBRE

Recron 3s- fiber used in this study is the most commonly used synthetic material fiber due to its low cost and hydrophobic and chemically inert nature which does not allow the absorption or reaction with soil moisture or leachate and it is a polypropylene fiber which is a stabilizer to improve CBR and UCS values.



Fig 3: Recron 3-S Fibre

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Recron -3sfiber used in the experiment is of 12mm length and it was manufacture by Reliance industries shown in fig. 3. Fibers are randomly mixed in soil due to the fact

for making a homogeneous mass and maintaining the isotropy in strength. The Properties of Recron3s- fibers are Color = White, Specific gravity = 1.334, Cut length = 12mm, Equivalent diameter (um) = 32-55, Water absorption (%) = 85.22, Tensile strength (MPa) = 600, Acid resistance = Excellent, Melting Point (°C) = >250 and Alkali resistance is Good (courtesy Reliance industries).

Expensive Soil (Black Cotton Soil)

Natural black cotton soil was obtained from Godilanka, Amalapuram, East Godavari district, Andhra Pradesh. The soil is dark grey to black in color with light clay content. The obtained soil was air dried, pulverized manually and soil passing through 4.75 mm IS sieve was used as shown in the Fig. 4.



Fig: 4 Expensive soil

2. LITRATURE REVIW

After Studying the Journal Paper we got to know about the **Author is '' Poonam Tripath**i & **D.S. Ray''.**The Title of the Journal paper is "Evaluation and Analysis of Soil Stabilization with

Some Non- Conventional Additives". These journal was published by "International Journal of Engineering Research & Technology (IJERT)http://www.ijert.org ISSN: 2278-0181 IJERTV9IS070265 (This work is licensed under a Creative Commons Attribution 4.0 International License.)Vol. 9 Issue 07, July-2020".Author wants to state that The growth of population has created a need for better and economical vehicular operation which requires good highways, proper geometric design and pavement condition maintenance. The process of soil stabilization helps to achieve the required properties in a soil needed for the pavement construction work. Here the author used different materials such as Silica Fume, Ricron 3s fibre and Terrasil. Here the author also added some material and by Doing Experimental Investigation we got to know the CBR Values of that Materials. One of the main reason for the failure of pavement isdue to lack of strength. Strength can be increased by addingadditive materials to the sub-grade in different proportions. The work presented in this paper deals with the strength properties of natural and stabilized subgrade. In this research, Silica fume, Recron 3-S fibre and Terrasil are used as stabilizers in improving engineering properties of soil. The aim of this study is to evaluate the effect of different percentages of Silica fume, Recron 3-S fibre and Terrasil are used separately and combination as stabilizers to improve the sub-grade characteristics of locally available soil. Mainly we have focused on increasing the CBR of the soil because on increasing the CBR value it helps in reducing the thickness of the pavement and it is alsobeneficial to use economically.

As we studied from these journal paper that the **Author of the journal is "GANESH. M. BHATAWARDE** ". " **AJIT .C . BABAR & PROF A.A.DANGE** .the title of journal paper is "Review on different methods of Soil Stabilization". These information research is taken from the "IJESC,

volume 9 issued no. 4 ". Here the Author wants to tell that every civil engineering structure must be safe and stable for that soil above which it is rest should have sufficient shear strength and bearing capacity.here, different soil stabilizer used for soil stabilization they are fly ash, lime, Bitumen, cement and fly ash. About lime Stabilization ,he has introduce a proper step-by-step procedure. They all concluded that several methods are implemented for modification of various properties of soil using different soil stabilizer and aslo we can decide the percentage of material added to the soil.

Author " G Divya1, R Shiva Krishna2, P V N Sai pavan manoj3, Dr. M Saravanan4". The Title of the Journal paper is "PERFORMANCE OF RECRON-3S FIBER ON BLACK COTTON SOIL". These journal was published in International Journal of Application or Innovation in Engineering & Management

International Journal of Advance and Innovative Research

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(IJAIEM)Volume 9, Issue 5, May 2020 ISSN 2319 – 4847 Author wants to state that This study deals with the stabilization of soils through the application of recronfiber. The main aim of this study is to Determine the percentage of recronfiber that would be added to black cotton soil to obtain the optimum stability of the Soil. The Author has used some materials for soil stabilization such as Recron& Black Cotton Soil. Regard to that they had done experimental investigation. Some of the tests are done in the laboratory for determining Index and other engineering properties of the soil. Tests, Such as liquid limit, plastic limit, proctor compaction, CBR tests were conducted by using different proportions of Recronfiber with black cotton soils. This is to find optimum percentage of fiber. The Author Concluded that Major changes were observed in the properties of soil on the Addition of recronfiber. The following conclusions were yielded from this study. Addition of recronfiber has shown decrement in liquid limit from 69% to 56.25% and plastic limit increases from 29.165% to 44.33%. Maximum dry density decreased to 1.712 g/cc from 1.94 g/cc. The decrease in the MDD may be explained by Considering recronfiber as filler in the soil voids.OMC increased from 10.8% to 16.89%. CBR values of unsoaked with the addition of recronfiber (0.1 % to 0.4%) beyond the value are decreased with further Addition of fiber content. From the above experimental results the optimum percentage of recronfiber is 0.4%

Author "P. Sai Gopal Reddy1, T. Venkateswara Rao2, Nikhita3, Dr. R. Ratna Prasad3". The Title of the Journal paper is "Stabilization of Flexible Pavement SubbaLayer Using Recron 3s"These journal was published in National Conference on Recent Technologies in Engineering and Basic Sciences – 2020ISBN: 978-93-88196-48-278 Author wants to state that Now a day's the population and traffic intensity was expanding rapidly and materialCost also increasing. India is enormous nation with immense assets of nearby materials are used for economical purpose of locally accessibleMaterials in the construction of subbase developments and maintain build their quality. Here the Author has used some soil stabilizer are as follows Recron fibre , Fly Ash , Pond ash, etcHere the Author concluded Different experimental tests are conducted In the laboratory. Compaction tests and California bearing ratio tests were arranged by Using various combinational % of Recronfiber With fly ash material to identify optimum levelOf fiber. The Author Concluded that The fly ash reinforced with Various Combinational % of Recronfiber performs 0.75 % optimum level of Fiber reinforcement.

Author SiyyagallaSubbarayudu, S.Rozwana, Y.Susmitha, M.Mallesh &T.Chandrasekhar The Title of the Journal paper is "STUDY OF SOIL STABILIZATION BY USING RECRON -3S, FLYASH & LIME". These journal was published in "International Journal For Technological Research In EngineeringVolume 4, Issue 9, May-2017 ISSN (Online): 2347 - 4718". Author wants to state that There are various infrastructure projects which are used in highways, railways, water reservoir etc. which requires earth material in very large q quantity. The highways have to be maintained so that comfort, convenienceand safety are provided to the travelling public. Here the author is telling that For any land-based structure, the foundation is very important and has to be strong to support the entire structure. The process of soil stabilization helps to achieve the required properties in a soil needed for the construction work. Here the author has used the materials they are 1.Red Soil 2.fly ash 3.lime 4. Recron& also the Proparation of Red soil. In this project we are going to stabilize the soil by using RECRON-3S, Lime, FLYASH .Here we are using recron-3S as (1%,2%,) lime(2%,3%,4%) and flyash at (10%,12%,15%,20%). With different proportion of soil with additive materials CBR value will be more compare to conventional materials. And from that thickness of pavement can be minimized to the certain extent. The Author concluded that the Strength of soil can be increased to the certain extent by using additive materials in soil. Especially Recron 3s, when mixed with soil and fly ash mixtures gives a wonderful result. Fiber absorbs everything and keeps the road surface intact and many problems can be solved like potholes, cracking & failure of pavements

Author "Addil Bashir Sheikh1, ErTriptiGoyal ".The Title of the Journal paper is AN EXPERIMENTAL STUDY ON THE BEHAVIOUR OF KAREWA SOIL BY USING RECRON FIBRE AND FLY ASH. Author wants to state that the Soil stabilization is very necessary by the addition of additives in suitable dosages for road pavement foundation because it improves the engineering properties of soil to sustain load carrying capacity in terms of quality and quantity of performance. The author mentioned that the Stabilization of soil is the way toward shifting the properties of soil to improve its designing properties, with the goal that it very well may be utilized in different works of structural building.For the Stabilization of the Soil the Author has used some materials they are Recron& Fly Ash. They also had used some Test they are 1.Standart Proctor Test 2 Direct Shear test and 3.Unconfined Compression Test. The Author Concluded that 1. The maximum dry density decreases and Optimum moisture content increases with the increase in the fibre content in the soil mix.2. The optimum mix is mix 4 containing 12 % fly ash and 0.9 % Recron Fibre.3. The maximum shear stress is achieved as 0.574 by mix 3 containing 0.6 % Recron fibre with 12 % Fly ash4. Strength of soil can be increased to the certain extent by using additive materials in soil. Especially Recron 3s, when mixed with soil gives a wonderful result.

Author '' SANTOSH DHAKAR '' & ''S.K.JAIN''. the title of these journal is" Stabilization of soil". These research information is mention in the "International journal of science and Research (IJSR) Volumes issue 6, June 2016. Here the author wants State that if good earth is not available at construction site, it becomes imperative to option for soil stabilization. Soil stabilization is process to treat a soil to maintain or improve the performance of soil as construction material. The objective of this paper is to review the application of different stabilizing agent such as fly ash, cement, rise husk, expanded polystyrene geafoam, lime and waste paper sludge for added the improvement of quality on soil stabilization and possible problem of soil stabilization.

SOIL STABILIZATION METHODS > MEACHINCAL STABILZATION

Mechanical Stabilization is the process of improving the properties of the soil by changing its gradation. This process includes soil compaction and densification by application of mechanical energy using various sorts of rollers, rammers, vibration techniques and sometime blasting. The stability of the soil in this method relies on the inherent properties of the soil material.

Two or more types of natural soils are mixed to obtain a composite material which is superior to any of its components. Mechanical stabilization is accomplished by mixing or blending soils of two or more gradations to obtain a material meeting the required specification.

> Stabilization by Using Adximxtures

- A. Lime stabilization
- B. Cement stabilization
- C. Chemical stabilization
- D. Fly Ash stabilization
- E. Thermal stabilization
- F. Electrical stabilization
- A. Lime stabilizatiON



1. SCARIFICATION AND initial pulverization

First soil brought to line and grade, and then the sub grade is scarified to the specified depth and width and then partially pulverized. The materials other than soil which are greater than 3 inches such as roots, turf, and aggregate are remove. At the time of lime application scarified and pulverized sub grade gives more contact area for lime.

2. Lime Spreading:-

Generally there are two methods for spreading of lime in first step self-loaded truck can distribute the lime mechanically or pneumatically the full width of truck. And in second method the bags of lime are spot on the runway and empty the bags, and then lime is levelled by raking or dragging. And then lime slurry is spread with or without pressure with the help of the distributor tanks or asphalt tank trucks.

3. Initial Mixing, Watering and Curing

Mixing is required to mix the lime throughout the soil. This can be start with scarification but in some modern mixture the scarification is not necessary. And the water is added to mixture of lime and soil. Then the mixture of soil, lime and water is mixed with the help of rotary mixtures. Here the amount of water is approximately increased by 2%

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4. Final Mixing and Pulverization

For the complete stabilization distribution of lime throughout the soil and sufficient pulverization of clay friction are essential. Mixing and pulverization should continue until 60% of material passes through number 4 sieve. and 100% of material passes the 1 inches sieve. Here also rotary mixture is for pulverization.

5. Compaction

After completion of final mixing and pulverization compaction should be start with the help of sheet foot rollers. The lime soil mixture is compacted up to the 95% of maximum density should be obtained. The density value is depending upon the proctor curve. And the final surface compaction is completed by using steel wheel roller.

6. Final Curing

Curing can be done in two ways: first one is moist curing in this curing the surface is maintained in moist condition by sprinkling when it is necessary. And second is membrane curing in this type the compacted surface is sealed with bituminous prime coat emulsion .

B. Cement Stabilization



1. Initial preparation

Frist soil brought to the line and grade and then correct unstable subgrade areas. Scarification and pulverization of soil can be done if it is necessary. And then reshape to crown and grade.

2. Mixing

There are two methods first is mixed-in-place method in this method Portland cement is spread and then mix with soil and water. And second method is central mixing plant in this method soil, cement and water is mixed in proportion and hauls this mixture to placing areas. And also spread this mixture uniformly over the entire area.

3. Compaction

After completion of mixing immediately start a A compaction with the help of pneumatic-tired and sheep foot rollers. And then using steel wheeled roller surface finishing is done.

4. Curing

Sufficient moisture contain require for adequate cement hydration. Here bituminous materials and also other materials such as waterproof paper or plastic sheets, wet straw or sand, fog type water spray, and wet burlap are used for curing.

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PRODUCTION OF CONCRETE BY RECYCLABLE MATERIALS - AREVIEW

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ABSTRACT

In 2019, the Coronavirus (COVID-19) pandemic was discovered in Wuhan, China. Then in 2020, it affected many lives throughout the world. It started spreading through air which affected the respiratory organs, because of which people started using Personal protective equipment PPE. Which includes Disposable Face mask to get rid of the infection by covering Nose and Mouth A face covered with mask will filter out particles containing the virus from inhaled and exhaled air, reducing the chances of infection. This Disposable mask saved us from COVID-19 infection, but this mask also increased the medical waste which is affecting our landfills. And Currently the use of face masks is more than 129 billion globally every month. Due to which a lot of burden is drawn to landfills, which can be reduced by recycling of disposable masks. However, the construction industry requires natural resources day-by-day for production of new materials for construction, but the sagregate can be used as sub-base materials, which reduces the production of concrete waste and using this in manufacturing of concrete helps us to reduce the production cost. So by focusing on the above points we are planning to create a concrete block by using RCA and disposable face masks.

1. INTRODUCTION

The coronavirus (COVID-19) pandemic has created a global health crisis, which has threatened the environment. As per a survey till now there are 25.6 crore cases worldwide. Due to this pandemic there are overall 52 billion disposable face masks produced in the year 2020 and it is estimated that 1.6 billion of these masks ended up in our oceans. This equates to tons of plastic pollution. Since there are a lot of disposable face masks being used, hence it causes a huge amount of bio-medical waste. So to reverse it, disposable masks can be recycled. To categorize disposable masks it should get sorted first by removing the metal strips and ear loops and the physical properties of the masks:- The top and bottom layers of the face masks are made of non-woven fabric that is spunbond while the middle layer of the masks was melted down polypropylene. The construction industry requires natural resources day-by-day for production of new materials for construction, Due to which there is a depletion of natural resources. So by recycling the Debris from construction sites we can reuse it as a resource. Currently, recycled aggregates play a crucial role in the construction industry to conserve natural aggregates due to industrial development. The goal is to assess the suitability of recycled aggregates for the construction of new materials which will help to achieve increase of durability in construction and also Assist us to prevent the environmental deterioration. With the perspective of reducing the pollution we have come across a solution to manufacture a concrete base with the use of shredded mask and RCA. For this base we need a combination of aggregate and one of them would be PLASTIC FIBERS. So we are going to compare the normal concrete blocks with the concrete blocks which have a base of RCA and shredded masks.

2. LITERATURE REVIEW:-

Manik goyal

In this paper study has been made on mechanical properties, durability, structural performance of recycled aggregate concrete. As aggregate represents about 70-80% of concrete components, it will be beneficial to recycle aggregate for construction works & also to solve environmental problems. Recycled aggregate helps to promote sustainable development in protection of nature & reduces disposal of demolition waste. It is clear that recycled aggregate can be used with natural aggregate but higher ratio of recycled aggregate worsen properties & strength of mix.

Sellakannu N. & Subramani V

Sellakannu & subramani V proposed properties of recycled aggregate along with its durability and mechanical properties. - Recycled aggregate is made from material which is usually recovered from con. and demolition waste. -It is a friendly material & it reduces the cost of making concrete. Also, it is known as material for the future.

-Quality of recycled aggregate could be improved by blending with natural aggregate by enhancing manual removal of gypsum before crushing. Use of recycled aggregate in concrete is the best way to protect the environment and economical aspects.

WASTE UTILIZATION IN CIVIL ENGINEERING

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ABSTRACT

Industrial growth has exaggerated the amount of waste generated from energy production, mining, industrial processes and civil work. For economic and connected reasons, the utilization of material in construction as partial or full replacements for traditional geomaterial has exaggerated. This continued, utilization of waste materials in civil engineering construction, consists of papers that discuss policy problem, current practices, performance requirement, engineering characteristics and also the potential uses of a large type of waste material in geotechnical systems, road pavement and construction product

Key Word – Waste Material, Stone- Dust, Slurry Waste, Sustainable - Development and Green Concrete

INTRODUCTION

There is enough scientific and industrial accord that advanced techniques and innovation are being developed in our country that is of rapid growth on industrial progress. Production of waste materials and usage them through these procedures is showing the production of huge amounts of waste and recycled material subtilizing production. The stone trade is one amongst the foremost moneymaking and profitable business enterprises around the world due to the wide use and demand for stone as a construction material stone has played a significant role and a massive position in society since its early stage use in recorded history and its utilization in the construction of building. The classification of stone considerably consists of two main categories supported on the materiality "Calcareous material" or "Marble material" and "siliceous material" or "Roc

LITERATURE REVIEW

Worked on mortar created from of ground granulated coarse furnace, gypsum, clinker and steel dross sand. The experimental results show the applying of steel slag sand may reduce the dosage of cement clinker and increase the content of industrial waste product using steel slag sand.

Experimented use of non ground coarse dross furnace slag as fine mixture in concrete. The study ended that quantitative of GGBs/sand is governing criteria for the effects on the strength and sturdiness characteristics.

A carried out work in laboratory to supply concrete with good properties exploitation oxidizing EAF slag as fine and coarse mixture. The concrete was tested for sturdiness characteristics like soundness, action check, accelerated ageing test etc. The sturdiness of the EAF dross concrete was found to be acceptable, particularly within the country side that its use was planned wherever the winter temperature seldom ever falls below $32^{\circ}F$ (0°C).

Studied alkali activated mortars and concrete exploitation lightweight weight aggregate. Check results showed that the compressive strength of alkali activated mortar decreased linearly with the rise of replacement level of sunlight weight fine mixture despite regardless of the water binder quantitative relation.

Investigated effects of steel dross powder on the workability and mechanical properties of concrete. Experimental results show that mechanical properties can be improved additional because of the synergistic impact and mutual activation when compound mineral admixtures with steel dross powder and furnace dross powder mixed in concrete.

Used steel dross as fine mixture for enhancing the quantity stability of mortar. Experimental results indicated that powder quantitative relation, content of free lime and rate of linear enlargement will specific development in volume stability of various treated ways. Autoclave treatment method is found simpler steam treatment method on enhancement of volume stability of steel dross.

Experimented on substitution of sand by GBF crystallized dross. Tests allotted out on cubes of concrete showed the impact of the subbing a part of sand by granulated slag (30%, 50%) and therefore the total substitution on the event of compressive strength. Compressive strength check results at 3, 7, 28, 60 days and 5 months of hardening ended that the whole substitution of natural coarse mixture with crystallized slag affects positively on tensile, flexural and compressive strength of concrete. The partial substitution of natural mixture with slag aggregates permits a gain of strength at long run however but entire substitution of natural aggregates affects negatively the strength (a loss in strength of 38%).

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According studied use of utilisation mill as fine aggregate in cement mortars. The replacement of 40% steel mill scale with that of fine aggregate increased compressive strength by 40%, drying shrinkage was lower once exploitation mill scale.

MATERIAL & METHODS

Cement

The OPC of 43-grade was continuously used for investigation. Cement was taken from the same source throughout the research work. While storing the cement material, all possible contact with moisture/water content is avoided. Based on the test results, the physical of cement were calculated and tabulated in the given table

SR.NO.	CHARACTERISTIC	REQUIREMENT AS PER IS 8112:2013	TEST RESULTS
		30(min) minutes	
1.	Initial setting time for OPC 43	600(max) minutes	120 min
	Final setting time for OPC 43		200 min
	Compressive strength at 7 days		
2.	28 days compressive strength	33 MPa	34.3 MPa
		44 MPa	44.6 MPa
3.	Consistency	-	30%
4.	Specific gravity	-	3.13

Gravity slurry

The locally available granite slurry dust collected from cutting and polishing unit of manufacturing were used for the investigation.

Granite slurry dust was bought from the similar supply throughout the research work. The granite slurry belongs to the zone – IV as per IS 383-1970

Fine aggregates

The locally available river fine aggregate passing 4.75 mm sieve as

per IS:383-1970 was used as fine aggregate in this study. The fine aggregate belongs to the zone- II as per IS 383-1970

Sieve size (mm)	Sample retained (gm)	% Retaining	Cumulative % Retaining	% Passing
4.75	26	26	2.9	97.1
2.36	19	45	4.5	95.5
1.18	207	252	25.2	74.8
.6	386	638	63.8	36.2
.3	158	796	79.6	20.4
.015	193	989	98.9	1.1
Pan	8	997	99.7	0.3
Total	997		374.6	

Plastic

Plastics are manufactured in various forms like pipe, sheets and film material. They are shaped or extended to get material of density at time. At present, plastic determine use in building mainly within thin covering, panels, sheets foams, pipes material etc.

Glass

Glass is now very much in the construction industry as an insulation material structural part, external glazing material protecting cover material etc.; it is used to make good looking fenestration on facades moreover as standard windows. Solar energy glass, switchable projection screens are a few of the newer uses

METHODOLOGY

An examination survey was directed through a cell phone, call- on and E-message labelling: (1) If the firm uses or get-rid of any waste and recycled materials for erection application, (2) Is the surveyor up to date of other recycled materials which are existing used in construction applications, (3) Are there any recycled and waste materials which are not endorsed for further use in the construction/erection industry and (4)if not utilizing such materials, what are the fence behind not utilizing recycled materials in their research work. All the queries ended with a true for what request

All material were taken towards the room temperature, before starting of the tests. The cement and slurry paste was taken and stored in a dry/hot place, preferably in an airtight metal box. Samples of sand materials for each batch of mortar (cement: sand) were of the desired grade/ strength and in an air-dried condition. In general, IS Sieve 4.75mm sieve size was used for separating the fine and coarse fraction size. The ratios of the waste

and if no, cause for not using the material The study contemplates of several recycled and waste materials counting; cement material, fly ash, foundry sand material, slag material, glass material, plastic material, recycled asphalt material, recycled concrete material, gypsum material, silica fume material etc. and a spot to add extra recycled materials being utilized in the construction/erection industry not listed. The last query was addressed to record any extra testimonial to survey for additional details on the particular topic

PREPARATION OF MATERIAL

And recycled materials, including water content, in mortar mixes, were used for estimating the suitability and stability of the material available, was similar in all respects to those to be associate in the work. Where the ratios of the ingredients of the mortar as used on the construction site are to be specified by volume, they shall be determined from the ratios by weight used in the test cubes samples

RESULT & DISCUSSION

The utilisation of industrial/mining waste in construction industry addresses the sustainability of the environment. The feasibility of slurry waste as fine aggregate in mortar has been successfully established by this study. The present work investigated the influence of using granite slurry as partial/ full 75replacement of fine aggregate or cement was replaced upto 75% by granite slurry waste material up to 100%

To achieve the objectives of the study, physical properties of various building materials like (cement

For future research work, it is suggested to carry out SEM and XRD studies to examine aspects of porosity, i.e. pore size and distribution of pores, so that effect of granite slurry on the durability of cement mortar can be established. More durability studies, including chloride attack, freezing- thawing and fire effects on cement mortar with the replacement of fine aggregate and cement used as filler by granite slurry may be carried out. Pozzolanic fillers, e.g. fly ash, GGBS, material, sand material and granite slurry viz. sieve analysis, specific gravity and chemical properties of slurry waste were determined.

Workability and fresh density of all mortar mixes were found in a fresh state of control mortar and modified mortar. Mechanical properties of control and modified in the hardened state were also determined by 7 days, 28 days & 90 days compressive strength and abrasion resistance. The durability properties of control and modified mortar in terms of water permeability, ultrasonic pulse velocity and acid attack were also determined.

CONCLUSION

Silica fumes etc. may be tried in combination with granite slurry. Similar durability studies may be carried out for other industrial wastes in combination with granite slurry. The granite slurry was used as sand material and cement replacement in the present study. The binding capacity of this slurry in powdered form may be evaluated. New products and technology may be developed with the use of this slurry like bricks paving tiles pre- compressed blocks etc.

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A REVIEW ON USE OF WASTE GLASS MATERIAL AS A REPLACEMENT FOR COARSE AGGREGATE

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ABSTRACT

Construction and demolition substances include particles this is generated at some point of creation, renovation, and demolition of buildings, roads, and bridges. Construction sports eat extra uncooked substances with the aid of using weight than every other business sector, almost 32% of the world's assets Approximately 40% of all uncooked substances extracted from the Earth and 25% of virgin wooden are used for creation, such as 12% of water and as much as 40%. So our purpose is to observe the connection among the glass particle length and water/binding ratio of Concrete primarily based totally substances. Materials used withinside the assignment are Cement. Glass debris of length much less than IS 75 μ m, 75 μ m, 150 μ m, 300 μ m. Water, Sand. We might discover the workability and power of identical grade of concrete with varrying mixture length(Glass debris). At the cease of assignment we might discover the relation among the the cement binding ratio and mixture length

Keywords: creation and demolition, glass debris, cement Binding

1. INTRODUCTION

Construction and demolition substances include particles this is generated at some point of creation, renovation, and demolition of buildings, roads, and bridges. While the growing charge of urbanisation is a vital difficulty for environmental and social reasons, this additionally reasons a fast boom in creation sports across the world. This fashion affords demanding situations in phrases of extra extraction of herbal uncooked substances and the technology of a big amount of creation and demolition (C&D) waste According to a survey of 365 webweb sites, professionals and and a go to it's far observed that the maximum common cloth in webweb sites had been concrete in 183 webweb sites, metallic in a hundred and fifty five webweb sites, wooden in one hundred forty webweb sites and glass in 85sites In 2000 the Survey carried out with the aid of using TIFAC denoted that the whole quantum of waste from creation enterprise became expected to be 12 to 14.7 million tonnes in line with year. As in line with Report with the aid of using MoEF(Ministry of surroundings and forests) in 2008 said that zero.fifty three tonnes of waste is generated in line with day withinside the country.

2. LITERATURE REVIEW :-

1.Ahmed 2021, As in line with ASTM wellknown 35 workability of concrete became measured via stoop cone check. cylindrical specimens having wellknown dimensions as 150 mm diameter and 300 mm period became used for figuring out Compressive power check is carried out beneathneath the same old technique of ASTM36 . Similar cylinders had been casted and examined for spit tensile power as in line with ASTM wellknown. 100 mm cubes had been casted and examined as in line with ASTM37 to assess density and water absorption of concrete.. According to ASTM standard38 became used for drying shrinkage exams . A 100 mm cubical pattern had been casted to assess acid resistance of concrete which became cured 4% sulfuric acid for distinctive period. To preserve 4% awareness acid, alternate each week. Acid assaults became calculated in phrases of mass loss in percent because of assault of sulfuric acid. All exams had been carried out after 7 days, 28 days and 56 days of curing. Three pattern had been casted for every blend and imply cost became take into account end result of that check. Casting of experimental paintings include 3 special phases. The casting of manage pattern which includes normal Portland cement, herbal nice, and coarse mixture became protected in first set. The 2nd set includes partial substitute of cement with glass at the same time as the 1/3 set include partial substitute of sand with waste marble. Instead of blending technique is initiated, the crucial quantity of substances became weighed with the aid of using device of weighing. Rate of mixer is stored regular 30 rev/min for mixing of substances. Initially, overwhelm became positioned into the drum after which sand, every component became dry combined then crucial quantity of OPC, and water became inserted with the passage of time and mixing had been carried out round 10 min for all batches. Waste glass became used as cement substitute in percentage of 10%, 20% and 30% at the same time as waste marble became used as nice mixture in percentage of 40%, 50% and 60%. Furthermore, the quantification of substances in line with m3

2. Curing is the system wherein the concrete is blanketed from lack of moisture and stored inside an affordable temperature range. This system effects in concrete with expanded power and reduced permeability. Curing is likewise a key participant in mitigating cracks. Traditionally, exceptional of concrete in creation works is

calculated in phrases of its 28 days compressive power. . If after 28 days, the exceptional of concrete is observed to be dubious, it'd have drastically hardened with the aid of using that point and additionally could have been buried with the aid of using next creation

3. DISCUSSION AND CONCLUSION

The preceding researchers mentioned the relation among the glass particle length and water binding ratio of concrete primarily based totally substances however theres no evidence of the identical

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REVIEW PAPER ON PREVENTIVE SHORELINE MEASURES INMUMBAI BY USING MANGROVES AND TETRAPOT

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ABSTRACT

The Yin and Yang, or Push and Pull of Nature, according to Chinese tradition. Within oneself, there is a battle between good and evil, but this is not limited to human nature; it also applies to the Blue Vast Ocean. The constant push and the pull of the waves of the sea had made an irreversible change on the land. It is not just the waves that cause disintegration of landbut also the pressure exerted by the water on the land. Over the course of the decades, engineers have developed several techniques to prevent these coastal lines, such as seawalls, bulkheads, and revetments. These involve building some kind of hardened structure that can withstand the continued impact of waves. Some seawalls even include curves to make sure waves don't crash over the top and erode the area beyond the wall. Another way is a structure called a groin, protruding into the sea to reduce the currents directly along the shores and retain the soil and sand. Also a commonly used technique known as breakwaters, it is a structure built parallel to shorelines to breakwaves before they make it to the shore. But all of these techniques have failed after a point of time as water remains the heavy impacting element. Hard armoring structures can also be effective and a long-term solution to erosion of land but it also creates a lot of unintended consequences. This study includes review of these techniques and intertwined into simple solution that can help in dealing with the consequences; studies show that merging of the two, natural and artificial techniques in one reduces the ongoing erosion of land by sea. The TetraPOT can act as an armored structure in the sea, which will be designed in such a way that it will be hollow from within and will have a capsulated place in which the plant of the mangroves a natural habitat plant that can help in getting rid of the erosion, will grow slowly inside TetraPOT and will eventually take place of those armored structure and act as an eco-friendly natural barrier for land and prevent it from erosion.

Keywords— TetraPOT, armored structure, mangroves a natural habitat, eco-friendly natural barrier

INTRODUCTION

Waves and currents are the most common causes of coastal erosion, but mass wasting processes on slopes and subsidence also play a role (particularly on muddy coasts). Extreme weather events (coastal storms, surge, and flooding) but also tsunami are frequently linked to significant episodes of coastal erosion, both because the waves and currents tend to be more intense and because the associated storm surge or tsunami inundation can allow waves and currents to attack landforms that are normally out of their reach.

Such processes can cause undercutting of cliffs and steep slopes on coastal headlands, contributing to mass waste. Furthermore, excessive rain can increase soil saturation, which leads to a reduction in the soil's shear strength and, as a result, an increase in the risk of slope failure (landslides).

Coastal erosion is a natural phenomenon that happens when material transport away from the beach is not counterbalanced by new material being deposited on the shoreline. On time spans ranging from days to years, many coastal landforms naturally experience quasi-periodic cycles of erosion and accretion. This is notably noticeable on sandy landforms like beaches, dunes, and lagoon openings that are intermittently closed and open. Human activities, on the other hand, can have a significant impact on the erodibility of landforms. Construction of coastal constructions such as breakwaters, groynes, and seawalls, for example, can alter coastal sediment transport routes, causing erosion in some regions and accretion in others. Unintended erosion can also be linked to the removal of sediments from the coastal system (e.g., by dredging or sand mining) or a reduction in the supply of sediments (e.g., by river regulation). Natural and human-induced climate change on a broader scale.

When civilization fails to adapt to the effects of coastal erosion on people, the built environment, and infrastructure, it becomes a threat.

According to a recent technical analysis by the National Centre for Coastal Research (NCCR), which is part of the Union Ministry of Earth Sciences, as much as 32% of India's coastline was eroded and 27% increased between 1990 and 2018.

West Bengal's coastline has been particularly vulnerable, with 60% of the coastline eroding during the period, followed by Puducherry (56%), Kerala (41%), Tamil Nadu (41%), Andhra Pradesh (28%), Gujarat (including Daman and Diu) (26%), Odisha (26%), Karnataka (24%), Maharashtra (22%), and Goa (19%).

The coast of Odisha grew by 51%, according to the research.

Andhra Pradesh's coast grew by 48%, followed by Karnataka (26%), West Bengal (25%), Tamil Nadu (22%), Kerala (21%), Gujarat (includes Daman and Diu) (20%), Goa (14%), Maharashtra (9%), and Puducherry (1%). (8 per cent).

The country's shoreline is 6,631.53 kilometers long, with 2,135.65 kilometers eroding and 1,760.06 kilometers expanding throughout this time. The shoreline is stable for about 2,700 kilometers. [1]

LITERATURE SURVEY

Dilip Kumar and Rajib Kumar Bhattacharya "Review of different methods and techniques used for flood vulnerability analysis" (2020), The present study attempted various method and strategies of flood management and its vulnerability estimation since the 1980s.Based on the citation index, morethan 250 articles (from 1980 to April 2020) were analyzed to get a quality based logical analysis of various vulnerability assessment method. Dilip Kumar and Rajib Kumar assessed past and current methodologies on different flood vulnerability evaluation strategies. The findings showed that the researchers for assessment of vulnerability mostly selected flash flood, coastal floods and urban floods. The recently Published paper (after 2017) techniques that is remote sensing data, GIS, hydrological models, and machine learning based algorithm for the vulnerability assessment geographic information system. The conclusions obtained from this study recognized many gaps to be linked by the expansion of a newintegrated vulnerability assessment structure. The proposed integrated framework should be globally appropriate for all types of hazards, considering physical, social, environmental and economic indicators of vulnerability.

Dale N. Bryan-Brown et.al. "Global trends in mangroves fragmentation" (2020), concluded that fragmentation is the main cause for degradation of ecosystem. To provide many important ecosystem services by reducing the capacity of habitats such as mitigation climate change, shoreline presentation and erosion presentation. Some region, such as Cambodia and Southeast Caribbean had not only relatively little loss but also their forest had been extensively fragmented. They also concluded that mangroves are seashore wetlands discovered along coastlines in much of the warm-temperate, tropical and subtropical. The major loss occurred in Southeast Asia by the majority of contempory mangroves, where approximately 50% of the remaining world in mangroves forest area is located such as Myanmar, Indonesia and Malaysia.

Thomas W Crawford et.al. "Coastal Erosion and Human perception of Revetment Protection (2020), studied this research investigation the problem of coastal erosion and the strategy of engineered shoreline protection as a mitigation tool to reduce erosion risk for economically challenged population in Bangladesh with high vulnerability. It is possible and evenlikely that respondent may have pass prescriptions of erosionrates for other sites that in form responses. The study described Nothing research integrating remoting sensing and social science data to answer questions regarding space time patterns of coastal erosion in our region at high risk The conclusion obtained from this study constructing continuous revetment protection would require tremendous investment of sources which makes this prospect unlikely in a developing country like Bangladesh and without significant political will, financial commitment and international aid.

Diego Vicinaza et.al. "Review of Innovative Breakwaters for Wave-Energy Conversation" (2019), Concluded that the evolutionary innovation in harbor engineering was really introduced by the romance, who learnt to build walls underwater and therefore managed to construct solid. The paper Past concise collection of innovative technologies, but always moving from their traditional reference. The purpose was to develop a constructed description of the critical characteristic and add positive value of innovative harbour breakwaters. They also concluded that a potential next round of research should be oriented toward achieving a clear understanding of the relationship between wave climate and hydraulic performance to achieve high reliability and competitive cost and to demonstrate economic potential.

V.Sundaraju, "Scientific management of mangroves is need of the Hour"(2019), Sundaraju studied that in west coast of India 40% of mangroves forest have been converted into housing colonies and farmlands over the last 3 decades. He also concluded that mangroves are shrubs species and trees that grow at the interface between sea and land in sub-tropical and Tropical region of the world, where the required conditions to grow mangroves is muddy soil, Tidal water flow and salinity. Mangroves had been destroyed and facing threats due to industrialization, urbanization and discharge of domestic sewage. Some more threat like aquaculture and saltpans is also mentioned in the report that results into fragmentation of mangroves.

Kabur Sadgegi el.al. "Classification Of Seawalls Their Failure" (2018), studied that The main purpose of civil is to serve as a form of structural defense to control shoreline erosion. Different types of seawall can be used to

achieve this purpose depending on the site conditions. Determination of water level, wave heights and the beach profile are some of the usual step taken in order to design a typical seawall. Placement loss, active erosion and passive erosion are some of the ways which seawall impacts the beach. Several factors such as poor maintenance, corrosive nature of the marine environment, lack of inspection to detect problems early, placing loads atop the soil supported by the seawall can causeseawalls to fail.

Stephanie s. romanach et.al. "conservation and restoration of mangrove" (2018), researched that due to human activities more than 50% of mangrove habitat had been lost in some part of the world. By Spalding et.al. (1997). Mangrove were reported to have occupied 18,100,000 ha worldwide, it was later revised that the global courage had fallen to 13,776,000 ha by Giri et.al. (2011) and then by Hamilton and Casey (2016) again concluded that its fallen down to 8,349,500 ha. Mangrove acts as a shield against tsunamis and storm surges protecting coast line throw waves attenuation (kathiresan and Rajendran, 2005; Wolanski, 2007; Barbier et.al., 2008; The et.al., 2009). They have concluded that in 1999 cyclone that struck Orissa, India (Barbier, 2016) reduces the loss of human life by mangrove.

Neethu G Pillai and Harilal C.C, "Mangroves-diversity, distribution and introduction efforts" (2018), concluded that mangroves are most productive ecosystem of the world as mangroves gives most important ecosystem services and supplies to costal as well as marine system and human societies (Boullion 2003" FAO, 2007). According to Naskarand Mandal in 1999, status and distribution of mangroves in Asia reported that they were distributed mainly in Indonesia, Sri Lanka, Philippines, Pakistan and India. UNESCO in 2016 presented a report that the Sunderland mangroves forest in Bangladesh and the Sunderban national park in India have been known to possess the world's largest continuous stretch for mangroves forest. The research paper also reported that Andaman and Nicobar Island as well as Sundarbans of west Bengals occupy 80% of the total Indian mangroves.

Kamaruddin Eddiwan," Success level of mangrove tree planting real in Kepulauan Meranti district, Riau, Indonesia" (2018), concluded that the success rate of mangroves planting approached to 72%, which indicated that *Rhizophora mucronata* is an easy living mangrove species in a broad range of habitats. He published in his paper that mangrove despite a need of saline water stillrequires fresh water to grow. Kamaruddin concluded that some mangrove ecosystems are damaged due to the change of designation. For that, effort should be taken to replant mangroves trees as an effort to preserve shoreline areas. At the plantation, the height of mangroves trees ranges from60-80cm. the average height of mangrove trees is 70cm at the planting. The mean growth of mangrove tree for 1 year of planting gives the average height of 14.71cm. Further he concluded that the measuring growth of mangrove is important to know because if trees grows well and forms mangrove forest vegetation, then this eco-system will contribute a lot for the life of surrounding lives.

Balaji R. el.al. "Understanding the effect of seawall construction using a combination of analytical modelling" (2017), The authors of this project concluded that in the past times, there has been considerable change in the approach to coastal management by virtue of the improvement in the understanding and knowledge of coastal dynamics and shoreline erosion. In this study, an effort has been made to understand the effect of seawall construction using a combination of numerical and analytical modelling and geo-informatics. It is evident that the construction of seawall along the coast of Fhansa has resulted in a land word erosion of about 20 meters in the downdrift direction of the sea wall, within a year of construction This study highlights they need to examine the seawall beach interaction on a case by case basis, so that a more informed decision can be made while installing a hand structure to control shoreline erosion.

Omid Noirani and Mehdi Behdarvandi "Literature on X- block and Tetrapod" (2017), Concluded that SD armor shape has a significant effect on the reduction of waves overtopping, this study compares the performance of various shapes of concrete are mode blocks of X- block and Tetrapod as the most suitable armors. In this study comma a 3 dimensional numerical model was used for simulation naked image of the effect of waves on the armors of tetrapod and X-block breakwaters. In this regard, in the order to calibrate the numerical model sample of conventional stone armor has been selected and Using available experimental data on a design of armor such as wave dropping, wave heights, period of waves and energy density of a spectral range. The maximum error of the numerical model for the relative height values of the impact rebel waves on the structure off break water is 7.87% for different conditions.

P Ragavan el.al. "A review of mangrove florists of India" (2016), They have come on the conclusion that Mangrove ecosystems are threatened globally YouTube various anthropogenic activities and global climate change. Mangroves are the only marginal ecosystem which shares the resources with adjoining ecosystem (vannucci 2001). Edwards's effect on mangroves could lead to serious consequence for the adjoining fragile

end important ecosystem such as coral reefs and seagrass beds. The status and species composition of mangrove forest is a basic requirement and a prerequisite for the management and conservation of mangrove resources. It is necessary to collect comprehensive species specific information for the maingroups of India, in the absence of which it will be difficult toset up conservation priorities (kathireshan 2010).

Pauline Buffle et.al., "Community- based Mangrove Reforestation and Management in Da Loc, Vietnam" (2016), reported that 100 ha of mangroves were cleared for sea grasses for handicraft, coastal agricultural and timber harvesting, resulted in many disaster and flood. In 2005 after the hit of a typhoon named Damrey, the NGO CARE took aninitiative community based re-forestation of mangroves and diversity of livelihood. Further Buffle reported Community- based Mangrove Management Board (CMMB) organized the mangrove nursery planted and maintained the tree with the help of NGO named Green Teams. The CARE initiative had been largely successful in mangrove reforestation with the survival rates ranging from 70-90%.

Sheng-Hung Lee and Wan Kee Lee, "TetraPOT – A greener sea barrier" (2016), according to Sheng-Hung Lee, TetraPOT is an ecofriendly alternative to traditional tetrapod sea barriers. As compared to the natural process of sand erosion by wave action tetrapods tends to pull more sandaway from the shore line. For long-term survival of mangroves forest it is mandatory to have a stable sea level, otherwise the seeds do not grow and the process of rooting stops. He reported in his paper review that the TetraPOT is a sea defense system that merges the best of both natural and artificial engineering. They are made up of concrete, because TetraPOT contain hollow spaces inside for plants to grow, due to which it consumes less amount of concrete, resulting in light weight and economical construction. As the mangroves grow from inside out, the roots will be eventually results into intertwining the TetraPOT, creating a long lasting sea defense of mangroves and roots provides in keeping the blocks in places. He concluded that the design helps to create a natural habitat as well as prevents soil erosion.

Mohamed Yossef "The effect of groyins on rivers" (2002), Mohamed Yossef had concluded present the results of some field campaign, as well as some attempts to analytically described The interaction between main channel and the groyine-field. He also concluded that Working in the results that were raised through field measurement campaign. Namako he presented some analytical expressions describe the interaction between the groyine-fields and the main channel. He gave a comprehensive grasp of the physics behind the phenomena combined with field data and physical model results.

PROBLEM STATEMENT

The destruction of landmasses owing to floods and the ongoing influence of sea waves, as well as the rapid increasein global warming and its impact on marine biodiversity, areall serious concerns. The re-establishment of mangroves along the shoreline using TetraPOT could be one of the solutions that could be investigated in order to maintain the shoreline.

SUMMARY

As flooding in Mumbai is a recurring issue we had planned to come up with suitable design for conservation of costal land by applying different techniques using tetrapod's in such a way to combine it with another possible, natural conservation technique. A suitable design for tetrapod's that will help out the Mumbai coastal region to stop the increasing water pressure and in turns will help in flood control measures as well as resulting in less shoreline erosion.

The scope of this study is restricted to design a combined technique to reduce the water pressure that hits with the impact on the shore lines. The natural way is the mangroves, and the artificial way is the TetraPOT a giant block of mass made up of concrete that contains hollow spaces for mangroves to grow that acts as armored shield for coastline.

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LIGHT TRANSMITTING CONCRETE -A REVIEW

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ABSTRACT

With the rise in population, there has been a sharp increase in energy consumption, yet continued exploitation of conventional energy sources has resulted in global warming and its associated negative consequences. In order to reduce the amount of energy consumed by structures, as well as future building construction. Many academics and scientists have been drawn to the development of new construction materials that use very little energy. Transparent concrete is an example of a recently produced substance. For all sorts of construction, concrete is the most basic thing or substance. Translucent concrete is a unique concrete because it allows light to travel through it. The optical plastic fibres in this concrete are reinforced, making it transparent. The light can be transmitted from one end of the optical plastic fibre to the other. By utilising natural sunshine, the invention of a light transmitting concrete using plastic optical fibre (POF) makes concrete sensible, sustainable, and energy efficient. The use of this technology will help to reduce the energy consumption of structure and give it an Aesthetic look.

Keywords—light transmitting concrete, optical fibre

I. INTRODUCTION

Concrete is one of the most used materials used in the construction industry. The raw materials needed to make concrete are readily available and economical compared to other types of construction substances and systems. The increase in in rate of development and modernization in the construction sector has come to be considerable in the beyond few years.

Part of industry's development is the inclusion of Optical Fibers in concrete to make what is known as light transmitting concrete or translucent concrete. It is one of the new discoveries and finally developments in the building industry, and it is getting used to create environmentally pleasant and shiny building material. The affordable growth and development of new technology around the world has caused the building of greater civil engineering infrastructure which include excessive buildings and underground construction. This urban growth is observed by a growth in energy consumption. Lightning consumes a significant part- 19% of all electricity in the world. The large quantity of electricity wished for lighting impacts many issues regarding weather change, affordable growth and growing energy prices. This technology is applied to harness the large quantity of potential energy in daylight as a source of light so as to reduce electrical energy consumption. This technology contributes to decreasing the bad image of concrete as being a grey, dark, harsh, rigid and opaque material ^[11]. Light transmitting concrete is made by adding 5% optical fiber by total volume of concrete. Example: When a room is built with translucent concrete on its two walls, it saves a lot of energy in the form of lighting as well as well as used as indoor thermal structures in cold cities.

II. GENERAL BACKGROUND

Light transmitting concrete became first stated on October 27,1922 a patent filed under United States Patent office Paul Liese of Tempeloh of Germany. His innovations were associated with transparent building blocks or panels for concrete walls and ceilings and in the structures made therefrom the detailed studies of P. Liese in his permitted Patent on Aug 4,1925.

Later in 1965, a method of constructing a translucent panel through James N.Lowe,London, England; was patented in United States Patent Office.

In early 1990s forms a light transmitting concrete depending upon the sample of fibers organized size of fibers and the size of structure were developed.

Aron Losonczi (1977) got his Architect M.Sc. degree and he evolved the first Litracon material in 2001 and were given his first patent in 2002. He founded his company Litracon in 2004.He added the idea of light transmitting concrete in 2001 and then effectively produced the first transparent concrete block in 2003,named LiTraCon^[1]

Light transmitting concrete is used in fine architecture as a façade material and for cladding interior walls. Joel S. Furthermore, Sergio O.G. fostered a straightforward substantial material, which can permit 80% light through and just 30% of weight of normal cement. The Italian Pavilion at Shanghai World Expo 2010 recognized as the first significant application of translucent concrete in a building.^[18]

III. REVIEW ON LTC STRENGTH

A. Compressive Strength of Light Transmitting concrete:

The compressive Strength of concrete is one of the most important properties for design of Concrete structures as concrete is used in the structure for resisting the compressive stresses. The Compressive strength of the block can be carried out using a Universal testing Machine or Compression testing Machine. The Block size of LTC block tested by most researchers was of the size 150 mm X 150 mm X 150 mm.

- Nadeem Gulzar et Al (2020) used optical fibre of 2mm having fibre densities of (8x8, 7x7, 6x6, 5x5) were used as light transmitting element. Course aggregate less than 10 mm were used. Compressive strength test was conducted and the load was applied at 5.2kN/m. For the 7x7 fibre density concrete the compressive strength was found to be the greatest at 15.057% greater than conventional concrete cube at age of 28 days.
- J Maheshwari et Al (2018) observed that for 1.5 mm diameter of optical fibre 4% fibres had maximum strength while 2% fibres have least strength. For 2 mm diameter of optical fibre 4% fibres had least strength while 2% fibres have maximum strength. But the strength of the LTC blocks was less than conventional concrete block.
- **Basma F. Bashbash et Al (2013)** used optical fibres of Diameter of 1.5 mm, 2.00 mm, 2.5 mm and 3.00 mm percentages of 0%, 2%, 4% and 6% and cube of 5 X 5 X 5cm. The results that they achieved were that the compressive strength increased till 4% and the compressive strength decreased at 6%. It was also reported that compressive strength increased with increase in optical fibre diameter. This is due to the fact that greater diameters of optical fibres withstand the compressive load better.
- A.A. Momin et Al (2014) made LTC blocks using glass rods of 0.5 mm diameter and optical fibre of 200 micron diameter and concrete of M20 grade. The results that they achieved were that blocks made using glass rod had a greater compressive strength than the same made using optical fibre.
- A Jayaraman et Al (2020) used Waste material concrete for making concrete block. The results wereafter testing at 7, 14 and 28 days 13.65 %, 10.53% and of 5.09 % was reduced respectively as compared to conventional concrete.
- **Dr. T. Siva Sankar Reddy et Al (2020)** made cubes of size 200mm X 100mm X 100mm with optical fibre percentage of 5%,10%,15%. The compressive strength of concrete increased till the percentage of 10 % after which the strength was decreased. The 28-day strength of 15% optical fibre was lower than the one at 5%.
- **Poornima D et AL (2019)** found that the compressive strength of light transmitting concrete with use of silica fume as a 10 % replacement of cement is increased by 17.13% and 15% replacement of cement is increased by 22.76% than conventional energy concrete.
- Abdelmajeed Althomate et Al (2016) used optical fibre percentage less than 2% but got an increment in the compressive strength. But the percentage they used were less than the normal volumetric fraction (2-2.5%).
- Awadhesh Kumar et Al (2017) used concrete grades of M20 and M25 with optical fibre percentage of 0.25%-4%. The results they got were that there was increase in compressive strength till 2% after which the Compressive strength showed a decrement in strength till 4%. The sample with 2% optical fibre for both the grade of concrete had compressive strength value greater than conventional concrete of the same grade.

B. Flexural or tensile Strength of Light Transmitting concrete:

The Flexural Strength of concrete is one of the most important properties for design of Concrete structures as concrete members such as slabs or beams in its life time can undergo several Bending or tensile forces which it has to resist. It is one of the measures of tensile strength. The flexural or tensile strength of the block can be carried out using a Universal testing Machine.

- J Maheshwari et Al (2018) got the results of the flexural test of conventional concrete and light transmitting concrete almost the same. But the value of LTC was a slightly higher than the conventional concrete
- A Jayaraman et Al (2020) The results were- after testing at 7, 14 and 28 days 15.068 %, 19.50% and of 8.09 % was reduced respectively as compared to conventional concrete.

- **Poornima D et Al (2019)** found that the split tensile strength of light transmitting concrete with use of silica fume as a 10 % replacement of cement is increased by 13.61% and 15% replacement of cement is increased by 8.26% than conventional energy concrete.
- **Basma F. Bashbash et Al (2013)** used optical fibres of Diameter of 1.5 mm, 2.00 mm, 2.5 mm and 3.00 mm percentages of 0%, 2%, 4% and 6% and 4 X 4 X 16cm. At a fibre content of 2%, the flexure strength dropped to around 36%. When the fibre content was raised from 2% to 4%, the flexural strength was reduced by 26% and when the fibre concentration increases from 4% to 6%, the flexural strength decreases by 6%.
- **Raghava Maheedhar et Al (2020)** Tensile Strength of Translucent concrete cylinder of 100 X 300 mm was found out using Universal testing machine. When they used a 2mm diameter optical fibre, they were able to achieve a maximum tensile strength of 7 N/mm². While the maximum strain noticed at 3.14 N/mm².
- Omkar Kadam (2017) used optical fibre of Diameter 1.5, 2.0 and 3.0 mm. The flexural strength of the Light transmitting Concrete is lower than conventional concrete. The 1.5 mm diameter had the highest flexural strength among the several diameter.
- Awetehagn Tuaum et Al (2019) concluded that the flexural strength of the Translucent concrete decreases regardless the diameter of optical fibre used. The Translucent concrete's 28-day flexural strength was 9–24 percent lower than the reference concrete's

C. Light transmissibility Test:

The Test for determining the Percentage of light passing through the optical fibres of the translucent concrete is known as light transmissibility test

This is an important test for light transmitting concrete as it helps us determine as to how much of the natural light is passing through the optical fibre.

If the volume of optical fibre higher or the diameter of optical fibre used in the member is more the then the percentage of light transmissibility will be more.

Commonly a device known as LUX Meter is used to determine the light transmissibility. It uses photo cell sensor to measure the light transmitted.^[6]

D. Thermal Conductivity through LTC:

The thermal conductivity of a material is the measure of amount of heat conducted through the said material

Shen Juan et Al (2019) used DRH-type thermal shield thermal conductivity tester and got results that resin translucent concrete had 60% lower thermal conductivity then conventional concrete^[19]

IV. RESEARCH GAP

Reviewing several research papers, it was found that there is not much research on thermal conductivity through the Light transmitting concrete and its effect on the surrounding environmental heating. More research is required on the thermal conductivity of LTC To find ways to increase the compressive strength of light transmitting concrete.

V. OPTICAL FIBRE

A flexible, transparent fiber created by drawing glass (silica) or plastic to a diameter slightly larger than a human hair is known as an optical fibre. Optical fibres are most commonly employed to convey light between the fiber's two ends, and they're widely utilized in fiber-optic communications, where they allow transmission over greater distances and at higher bandwidths (data transfer speeds) than electrical cables. Optical fiber is a data transmission technique that uses light pulses that travel down a long fiber that is often constructed of plastic or glass. The fiber optical cable employs complete internal reflection of light. The fiber are built in such a way that light can propagate together with the optical fiber depending on the power and distance of transmission required. Single-mode fiber is utilized for long-distance transmission, whilst multimode fiber is used for shorter distance transmission. ^[15]

A. Types of Optical Fibre^[1]

The refractive index, materials used, and mode of light propagation all influence the type of optical fibre. The mode of propagation and refractive index of the core are used to create four different types of optic fibres:

• Step index-single mode fibers

- Graded index-Single mode fibers
- Step index-Multimode fibers
- Graded index-Multimode fibers
- B. Working principle of optical fibre

Optical fiber working is based on the principle of total internal reflection. When light traveling in an optically dense medium hits a boundary at a steep angle (larger than the critical angle for the boundary), the light is completely reflected. This is called total internal reflection.^[18]

This range of angles is called the acceptance cone of the fiber. The size of this acceptance cone is a function of the refractive index difference between the fiber's core and cladding.^[18]

Constituents of Optical Fibres-

- Core It is the thin glass cylinder in the innermost layer of the fiber through which the light travels.
- Cladding It is the outer layer surrounding the core. It has relatively lower refractive index than the core. Thus, light passing through the core, can't come out of it and get reflected at the interface.
- Coating It is the plastic covering which protects the fibers from damage and moisture.
- C. Principle behind Light transmitting concrete^[1]

When small openings are put directly on top of each other, optical fibers pass as much light as when they are staggered. The principle is that optical fibers in the concrete operate as slits, allowing light to pass through the concrete. Between the two major surfaces of each block, fibers form a matrix and run parallel to each other. The light is led between the two surfaces of the blocks by the glass fibers. The light information on the brighter side of such a wall looks unaltered on the darker side due to their parallel location. Because of their small size, the fibres merge into concrete and become a component of the material, much like little particles of aggregate. Light transmission occurs through optical fibres when plastic optical fibres are used in concrete examples, allowing light, tints, and even colours to be seen through very thick walls.

VI. APPLICATION^[16]

- Indirect light offers a special impact to room, mainly because of special optic of fibres; the wall panel varies in colours from each point of view. Decorative wall panels can be installed due to its liveliness in fibres, appearing nearly like a work of art.
- If fibres with distinctive diameters are used in abnormal distances in between each the signal light points seem brighter-forming a punctual transparency like impression of a starlit night. The Concrete material disappears into the background. This kind of appearance can be beneficial on Ceiling.
- If required, the light transmitting fibres can be arranged in logos, names or logos for an individual and different appearance create design. Unique prints can be produced, which can be introduced as single-piece production ,also functional facades can be designed.
- Villa in Ahmedabad: A residential house in Gujarat, India, with the size of 1000 sq m needed to be designed with a special eye catcher, the outdoors or wall of the staircase should contain an expanse of light transmitting concrete. Starlight
- Highlighting the roads at night time in roadways. To watch your pavement shine on the time of sunset
- Exterior wall -Translucent concrete as front doors of homes and offices, allows the people inside to see when there is a person standing outside.^[16]

VII. ADVANTAGES

- Transparent concrete is a great source for the sunlight to reach the indoors of buildings and nearby reducing the power consumption during daytime.
- As the transparent concrete consists of optical fibers which work as heat insulators, thus turning into more effective on cold regions.
- It has superb architectural view and also aesthetically appealing.
- Because transparent concrete has such a broad range of applications, it may also be utilised for security and surveillance in areas like restaurants and homes.

• Total environment friendly as it helps in decreasing power consumption during daytime and it also work on very much less energy consuming LEDs, thereby reducing energy consumption. Transparent concrete can be used in places where light can't come properly and thus illuminating the entire place be natural light.^[16]

VIII. DISADVANTAGES

- The important drawback of Transparent Concrete is its high cost due to optical fibers.
- The manufacturing process of transparent concrete requires both professional supervision and professional labour to carry out the casting.^[16]

IX. SUMMARY

Light Transmitting Concrete is an emerging technology in Construction Industry which is still being researched upon. This technology if used properly in the structure could really help reduce the need of lights during day time. This intern will help reduce the electricity usage and also looks aesthetically pleasing. The only drawback of this concrete is its high cost. But still Architects use it as it makes the structure to standout. The compressive strength of the LTC block is approximately same as the ordinary concrete. Hence it could be used for partition walls in framed structure where the walls are not subjected to loads. In LTC only fine aggregate is used or coarse aggregate of smaller diameter is used, as the coarse aggregate could damage the light transmitting concrete.

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KINETIC FOOTFALL - ELECTRIC ROAD SYSTEM

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ABSTRACT

This paper analyses the societal cost of electrifying all road transport under four different scenarios. The first scenario considered in this study is based on today's approach of having electric vehicles with high battery capacity and fast charging stations, the remaining scenarios study the cost of implementing different ERS at a national level. The results clearly show the benefits of implementing road bound electric road solutions that can be used both by commercial and passenger vehicles. Electrification of the transport sector has been pointed out as a key factor for tackling some of today's main challenges, such as global warming, air pollution, and ecosystem degradation. While numerous studies have investigated the potential of electrifying passenger transport, less focus has been on how road freight transport could be powered in a sustainable future. This study looks at Electric Road Systems (ERS) in comparison to the current diesel system. The Framework for Strategic Sustainable Development was used to assess whether ERS could be a stepping stone on the way towards sustainability. Strategic life-cycle assessment was applied, scanning each life-cycle phase for violations against basic sustainability principles. Resulting sustainability "hot spots" were quantified with traditional life-cycle assessment. The results show that, if powered by renewable energy, ERS have a potential to decrease the environmental impact of freight transport considerably. Environmental payback times of less than five years are achievable if freight traffic volumes are sufficiently high. However, some severe violations against sustainability principles were identified. Still, ERS could prove to be a valuable part of the solution, as they drastically decrease the need for large batteries with high cost and sustainability impact, thereby catalyzing electrification and the transition towards sustainable freight transport. Electrifying vehicles is seen by many as a possible solution to reduce environmental emissions and the dependence on fossil fuel. Unfortunately, most environmentally friendly energy storage systems, such as batteries, have less energy density compared to fossil fuel, which will have a negative impact on the vehicle range. A battery with enough capacity for long distance transports will therefore often imply a substantial increase in cost and weight, and reduced transport volume. An alternative would be to continuously transfer energy from the road to the vehicle both for propulsion and charging. A development of an electric road system (ERS) between cities would mean that most of the route could be driven on electricity from the road and the remaining distance can be driven on energy from potentially smaller batteries optimized for city routes.

Keywords— Electric Road Systems, Battery Electric Vehicle (BEV); Fleet; Charging; Dynamic Charging; Cost

1. INTRODUCTION

Electrification of the transport sector has been pointed out as a key factor for tackling some of today's main challenges, such as global warming, air pollution, and eco-system degradation. While numerous studies have investigated the potential of electrifying passenger transport, less focus has been on how road freight transport could be powered in a sustainable future. This study looks at Electric Road Systems (ERS). An electric road, eHighway or electric road system (ERS) is a system that allows for power transfer between a vehicle and the road that it is travelling on. Electric roads are classified into three categories based on how the charging takes place. Still, it is important to reflect on the original aim of pursuing EV technology, namely making the transition towards a sustainable transport system, and to investigate if and how ERS can contribute to reaching this aim. Previous studies have so far investigated technical aspects of ERS or conducted environmental comparisons based on specific life-cycle stages, focusing on the potential for GHG emission reductions However, when focusing only on a concept's potential to simply decrease the sustainability impact of a system, a strategic perspective is missing. Hence, the new concept might be better than the existing solution, but may still be incapable of reaching all the way to sustainability and, thereby, prove to be a costly dead end. The purpose of this study is, therefore, to broaden the perspective to investigate the complete life-cycle of ERS infrastructure from a full socio-ecological, strategic sustainability perspective. ERS have emerged as one of few realistic solutions to make freight transport more energy efficient and sustainable. According to the same study, there are two use case scenarios for ERS: they can either be used in closed systems, for example for bus routes or on mining sites, or in open systems (i.e., highways for the general traffic).By electrifying main roads, convenient long-distance transport would be possible, at the same time as allowing the battery size to be relatively small, delivering approximately 150 km of range depending on how much of the road network that is electrified.

2. LITERATURE REVIEW

ERS increases the peak power demand (i.e., the net load) in the electricity system. Therefore, when using ERS, there is a need for additional investments in peak power units and storage technologies to meet this new load. A smart integration of other electricity loads than ERS, such as optimization of static charging at the home location of passenger cars, can facilitate efficient use of renewable electricity also with an electricity system including ERS. A comparison between the results from the different models shows that assumptions and methodological choices dictate which types of investments are made (e.g., wind, solar and thermal power plants) to cover the additional demand for electricity arising from the use of ERS.[7]

Electric Road System (ERS) is a technology concept that has the potential to heavily reduce fossil fuel dependency and deliver several benefits for the climate, environment and people. The investment cost to implement ERS will be high and decision makers will require knowledge about how mature different solutions are compared to the conventional and alternative technologies.[6]

Results of the present study show that an ERS that encompasses already 25% of the total E- and N-road length would result in electrification of 70% of the traffic on these roads and 35% of the total national vehicle kilometers traveled in Norway and Sweden. In such a case, some of the larger cities in Norway and Sweden, and of course also the cities along the roads between these cities, would be connected by an ERS. Full implementation of ERS would mitigate up to 60% and 70% of the total heavy traffic CO2 emissions in Norway and Sweden, respectively, and 40% and 45% of the total CO2 emissions from light traffic, respectively.[5]

SLCA showed that both ERS and diesel freight transport have some severe sustainability impacts and violations against the SPs, especially in raw material extraction, production and use phases. e loop of material flows and using sustainably harvested, renewable energy. The more detailed LCA showed that GHG emissions can be decreased significantly as long as electricity generation is not coal-based.[3]

Dynamic charging is very useful in our future life in order to indicate the power transfer we had placed an LED at the output of PIC controller. We have used a joystick here for the movement of the vehicle. By the movement of joystick the vehicle moves and when it passes through the coil power is transmitted wirelessly.[4]

Drawing on the method associated with Technology Readiness Levels (TRLs), this article evaluates the maturity level of the different ERS technologies and focuses on the power transfer technology subsystem. Thereby it contributes to discourse on sustainable transportation and the development of ERS.[9]

Easy and convenient charging of electric cars is a desirable characteristic. Automatic cable-free conductive charging from road surface to cars is a potential possibility for simplifying the everyday life for users of electric cars, as well as increasing the efficiency of taxis and car pools. Charging infrastructure for electric cars could utilize the recent development for electric road systems (ERS) in which electrical energy is transferred during movement from the road infrastructure to the vehicle for both propulsion and charging of battery.[1]

Different roles that business models can have in different types of projects when preparing ERS for commercial takeoff: first, new business models were not part of the pilot projects which focused on radical innovation; second, business models were developed in demonstration projects with user interactions; and, third, business models were evaluated, and in this case rejected, in a deployment project aiming to transform the existing socio-technical system.[8]

An implementation of ERS will affect the business models within the transport sector. The business ecosystem for the transport sector when ERS has been adopted will contain familiar actors, e.g. goods owners (industries), haulage contractors and road operators. But there will also be new actors, especially from the energy sector that will handle power distribution, as well as new roles for existing actors such as road operators and government on local, regional and national levels.[2]

The hourly electricity demand related to implementing an electric road system (ERS) on five Swedish roads with the highest traffic flows that connect the three largest cities in Sweden. The results show that applying an ERS to the five Swedish roads with the highest traffic flows can reduce by $\sim 20\%$ the levels of CO2 emissions from the road transport sector, while increasing by less than 4% the hourly electricity demand on the peak dimensioning hour. Extending the ERS to all E- and N-roads would electrify almost half of the vehicle kilometers driven annually in Sweden, while increasing the load of the hourly peak electricity demand by only $\sim 10\%$ on average. [7]

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The interviews and workshops with representatives from the Swedish transport sector (as described in the previous section about the method) have resulted in the following findings: A general positive opinion regarding electric roads has been expressed several times. However, the representatives from the transport sector have in particular emphasized the importance of declaration of intents from large goods owners (e.g., industries) and transport buyers to order transports utilizing electric roads. The transport sector seems to be willing to pay a fee to use an electric road, provided that it does not eliminate the potential for cost reductions and better margins. The total cost of operations is key and investments in new trucks and add-on power collector devices are subordinate to a considerable extent or even negligible.[19]

There is tough competition among forwarders and hauliers, as well as pressure from transport buyers. ERS could therefore provide opportunities to positively influence the situation for forwarders and hauliers that are apt for utilizing innovative technology and business models. Novel kinds of partnerships could also occur with, for example, electricity companies. The willingness among forwarders and hauliers to make investments include new vehicles and add-on technology, but they are unwilling to finance the largescale investments needed for the ERS infrastructure. This is expected to be financed by other actors such as the government or large business actors.[12]

Sweden is a pioneer when it comes to ERS, with four different test sites on public roads. The next step on the Swedish ERS roadmap is to build a 25-30km pilot – the country's first permanent ERS. The projects are primarily funded by the Swedish Transport Administration as one of the possible solutions to the government's goals to reduce greenhouse gas emissions from domestic transportation by 70 per cent by 2030.[16]

An increased proportion of vehicles utilizing an ERS would demand new infrastructure to supply the electricity. Computer models have therefore been made by the Lund University to simulate the energy demand for a technical solution and thus being able to estimate cost of the extending infrastructure required. Vattenfall has also analysed and proposed a solution for the distribution grid connection of a "Slide-in road" between Stockholm and Gothenburg and together with the project partners estimated the total investment cost for the required grid infrastructure. KTH has furthermore studied how business models and stakeholders are affected by the ERS.[17]

Reports and articles were then collected from various different sources which included administrative authorities, ERS companies, and stakeholders within the ERS field just to name a few. Collecting information from different stakeholders in the field was done in order to capture different views and aspects of ERS technology. A number of interviews, both in person or through a communication medium i.e., telephone, were performed with relevant stakeholders. Open questions were mainly used to ensure that the responses were formulated by the interviewee him-/herself which promoted unbiasedness. Naturally, the questions were varied depending on the field of expertise of the person being interviewed. Both qualitative and quantitative data was acquired from these interviews. However, literature in the form academic reports, articles, web pages of companies, administrative authorities, etc., were mainly used as sources of information for the data used in the modelling process.[13]

The central government is mulling over the concept of an 'electric highway', to be built between the national capital of Delhi and Jaipur in Rajasthan. Union minister of road transport and highways Nitin Gadkari said on Friday said the government is already in talks with a foreign company to build the electric highway – his "dream" project – between these two cities and that the construction work might start very soon if the discussions come through. Hindustan Times' sister publication HT Auto reports that in addition to the Delhi-Jaipur stretch, another electric highway may also be constructed between Delhi and Mumbai, and talks are on with a Swedish firm regarding that.[15]

According to Union minister Nitin Gadkari, electric vehicles are not just limited to small road vehicles. Buses, trucks, and railway engines may also eventually be powered by electricity. The minister said that it was his

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dream to build an electric highway, but the project is still in the proposal stage. The Evolution Road project has been commissioned by the Swedish Transport Administration to build a demonstration site for electric roads on a public road in the city of Lund, Sweden. The goal is to test and gain more knowledge about ERS, a climate-smart technology that allows electric vehicles to be charged from the road while driving, using fewer batteries. Evolution Road is a private-public partnership with partners from industry, academia and the public sector. The technology is developed by the Swedish company Elonroad AB together with the Faculty of Engineering at Lund University. Other partners are Innovation Skåne AB, Kraftringen Energi AB, Lund municipality, Ramboll, Santalike, Solaris Sverige AB and the Swedish National Road and Transport Research Institute, VTI. The Evolution Road project started in 2019 and will continue until 2022.[14]

"Vehicle electrification is developing quickly" Scania's view is that it will not be very long until the tipping point is reached where electrification for heavy transport will become a sound investment for transport operators. But as the company continues to invest in and develop electrified solutions, Scania is also pursuing other and more immediate paths to reach sustainable transcortical Erixon, Scania's Executive Vice President Research and Development, says the company sees electric roads as one of several promising technologies that can make long-haul transport a sustainable future.[18]

3. METHODOLOGY

The entire system can be divided into two parts – one being the transmitter part which includes:

- BATTERY
- CONTROL
- ➢ INDUCTIVE COIL
- > POWER SUPPLY
- RCC ROAD

Overview

Inductive power transfer has many applications that range from electric vehicle charging to robotics. In dynamic applications, it is required that the segmented transmitter coil transfer power to a moving receiver coil. There are several methods to achieve this that require precise receiver position feedback. One proposed method to achieve this is using the reflexive field containment approach where the field strength in coupled sections of the system automatically increases based on the reactance reflected by the receiver. This enables efficient power transfer without position sensors and is in compliance with electromagnetic emission standards without complex shielding circuits. A key feature of this system is the use of a single inverter to power the segmented transmitting coils.

Power supply

An inductor, also called a coil, choke, or reactor, is a passive two-terminal electrical component that stores energy in a magnetic field when electric current flows through it. An inductor typically consists of an insulated wire wound into a coil.

An induction coil consists of two coils of insulated wire wound around a common iron core (M). One coil, called the primary winding (P), is made from relatively few (tens or hundreds) turns of coarse wire. The other coil, the secondary winding, (S) typically consists of up to a million turns of fine wire (up to 40 gauge).

An electric current is passed through the primary, creating a magnetic field. Because of the common core, most of the primary's magnetic field couples with the secondary winding.[citation needed] The primary behaves as an inductor, storing energy in the associated magnetic field. When the primary current is suddenly interrupted, the magnetic field rapidly collapses. This causes a high voltage pulse to be developed across the secondary terminals through electromagnetic induction. Because of the large number of turns in the secondary coil, the secondary voltage pulse is typically many thousands of volts. This voltage is often sufficient to cause an electric spark, to jump across an air gap (G) separating the secondary's output terminals. For this reason, induction coils were called spark coils.

An induction coil is traditionally characterised by the length of spark it can produce; a '4 inch' (10 cm) induction coil could produce a 4-inch spark. Until the development of the cathode ray oscilloscope, this was the most reliable measurement of peak voltage of such asymmetric waveforms. The relationship between spark length and voltage is linear within a wide range.



FIG.1 BLOCK DIAGRAM OF FLOW OF WORKING

RCC Road Construction Process

First step for the RCC road construction process is surface dressing and providing the proper level and slopes and earth cutting and filling according to drawing.

Second step is rolling of the surface with the help of vibro roller or tendon roller but we recommend you to use vibro roller as it gets the best compaction result. Kerbs to be laid over the edge of concrete pavement.

Third step is GSB/ PCC as mentioned in the drawing.

Fourth step is the reinforcement steel shall be as per the drawing.

Fifth Step is dividing the road in form of panels with the help of channels. The road / pavement to be cast with or without alternate panels as per drawings not exceeding 3.5 M in width and 6.0 M in length with uniform or staggered joints shall be laid in required line, level maintaining necessary slope as per drawing.

Sixth Step is the grooves of construction / expansion joints shall be filled with granular sand till these filled with the joint filler.

Accelerometer

Accelerometer is a 3-axis acceleration measurement device with +-3g range. This device is made by using polysilicon surface sensor and signal conditioning circuit to measure acceleration. The output of this device is Analog in nature and proportional to the acceleration. This device measures the static acceleration of gravity when we tilt it. And gives a result in form of motion or vibration. According to the datasheet of ADXL335 polysilicon surface-micro-machined structure placed on top of silicon wafer. Polysilicon springs suspend the structure over the surface of the wafer and provide a resistance against acceleration forces.

Deflection of the structure is measured using a differential capacitor which incorporate independent fixed plates and plates attached to the moving mass. The fixed plates are 35 driven by 180° out-of-phase square waves. Acceleration deflects the moving mass and unbalances the differential capacitor resulting in a sensor output whose amplitude is proportional to acceleration. Phase sensitive demodulation techniques are then used to determine the magnitude and direction of acceleration.



FIG.2 ADXL335 ACCELEROMETER

PIN NO.	SYMBOL	FUNCTION
1	VCC	5-volt supply should connect at this pin.
2	X-OUT	This pin gives an analog output in a X direction.
3	Y-OUT	This pin gives an analog output in a Y direction.
4	Z-OUT	This pin gives an analog output in a Z direction.
5	GND	Ground.
6	ST	This pin used for set sensitivity of sensor.

Table.1 PIN DESCRIPTION OF ADXL335 ACCELEROMETER

Solar Panel



FIG.3 SOLAR PANEL

Solar panels are comprised of several individual solar cells which are themselves composed of layers of silicon, phosphorous (which provides the negative charge), and boron (which provides the positive charge). Solar panels absorb the photons and in doing so initiate an electric current.

Call it Utopian but the idea of having solar-powered roads in India is a truly appealing one. The reason is simple. The country, which has the second-largest road network in the world, is blessed with about 300 days of sunny weather and a government that is convinced about the potential of solar power and electric cars. In 2014, India's Prime Minister Narendra Modi announced a goal to increase solar power capacity to 100 gigawatts (GW) by 2022. Moreover, it is encouraging the sale of electric cars in the country.

On the flip side, India does not have enough electricity to even power all its cities, towns and villages. So even powering electric cars at charging stations is bound to pose a very big challenge. In this context, a solar-powered road that charges electric vehicles on the go does sound like a good idea.

Explanation

In this process initially the power is supplied to the inductive coil due to which an electromagnetic field will be created due to which the transmitter will send signals to the receiver. When the receiver will receive the signals, it will be transferred in an AC/DC rectifier from which the current will be converted into DC from AC and then the current will be supplied to the energy management system where the voltage of the current will be reduced to 75 kW charging power. After that the current will be supplied to the battery which will start the process of charging as well as combustion if the battery is full charged.

Working Of ERS

This process is based on electromagnetic induction. In this method primary coil will be placed under the roads which will give an electric charge. The secondary coil will be placed in the vehicle. When the electric current is passed through primary coil electromagnetic induction is created due to which current will be transfer to the secondary coil. It can produce up to 75 kw charging power.

STEPS TO INSTALL THE COILS:

- A. Digging up the roads.
- B. Installation of coil.
- C. Repaving of roads

Inductive Power Transfer From Road

Here power transfer takes place between coils embedded in the road and coils in the vehicle without any wires. The power from the grid is converted into high frequency AC power to create a magnetic field which is then picked up by the coils under the vehicle to produce voltage. When a car or truck is travelling on a road equipped with any one of these technologies, the energy will go directly into the propulsion system or be used to charge on-board batteries. But once the vehicle is on a normal road, it will switch to an electric or hybrid motor or a combustion engine both.

Circuit Diagram



FIG.4 CIRCUIT DIAGRAM OF A CAR CHARGING THROUGH ERS

ERS Potential

ERS technology is not intended to be installed on all roads or along the whole road stretch, but rather work as a range extender between charging points. Vehicles using the ERS therefore need to be able to drive outside the electrified road network. This can be achieved either by using a rechargeable battery or a hybrid solution where the vehicle uses some other kind of fuel or energy carrier. The combination of battery and vehicle size along with availability of additional charging possibilities determines the driving range outside the ERS.

Focus for ERS has so far been on the heavy goods transport sector, but in-ground installed ERS could be an alternative suitable for passenger cars as well. It could also potentially offer stationary charging of distribution trucks while loading or unloading goods at depot.

When it comes to costs of the ERS, the installation costs vary between concepts and assessments remain uncertain until a large-scale implementation has been performed. Estimates range between 1.7 and 3.1 Million EUR/km, including costs for installation, infrastructure, connection with the electricity grid, etc. The high costs for the system could become a potential barrier towards a large-scale implementation of ERS.

Another difficulty associated with ERS technologies concerns standardization. There are many interfaces of the system where standards are needed but not always applied. The interface between vehicles and infrastructure is one and the payment system another. Some standards have already been agreed upon at a European level while decisions on others remain.

Comparison

Comparison Petroleum-Based Road Transport against ERS and EV Combination

The cost of a conventional petroleum-based vehicle is estimated to be the same as for an electric vehicle without the battery and the pick arm apparatus that connects to the electrified roads. This has been computed by comparing the current vehicle prices.

As a result, the yearly cost of an ERS based transport sector is assumed to be the annual cost based on life expectancy of the electrified roads, the new batteries, the new pick-up arms and the electricity consumption from all the electric vehicles.

The total yearly cost of the current petroleum-based transport system was assumed to be the cost of fuel used by the vehicles.

Comparison – Pure Battery Electric Car Fleet against ERS and Electric Car Combination

In this model, only the passenger cars were examined. Thus, only the conductive road and inductive road electric road technologies are considered.

It was assumed that the cost of electric passenger cars without the battery is always the same, regardless of the size of the battery.

The yearly cost of a pure battery electric car-based fleet was assumed to be the yearly battery plus the infrastructure costs.

The cost of the two ERS technologies was assumed to be 1/5 of the normal price, due to the fact that the ERS would be dimensioned for only passenger cars and thus would require lower loads. This estimation was made by Elaws.

The acceptable driving range that an electric car needs to travel to be a viable competitor against conventional vehicle was assumed to be a bit lower than the average driving distance for conventional vehicle, which is roughly 600 kilometers. Therefore, for this model, the minimum acceptable driving range for an electric passenger car was assumed to be 500 kilometers.

It was assumed that the only infrastructure investment for a pure battery electric car fleet would be fast chargers.

The Road

Implementing an ERS can be done in two different ways; either build a completely new road and incorporate an ERS, or modify an existing road, with both options having different advantages and drawbacks. Constructing a completely new road with ERS is naturally more expensive than modifying an existing one if looking at the total cost of the construction.

However, the specific cost of the ERS will be reduced since about a third of the total cost of implementation of an ERS is tied to installation (RISE, 2017a), which is absorbed by the construction of the road.

However, building a completely new road with an ERS is not seen as likely since there are no plans to build new highways in Sweden for the foreseeable future (RISE, 2017b). Therefore, all existing 19 estimations on costs etc. for ERS implementation are based on modification with existing roads. If the opportunity arises that construction of a new highway in Sweden is proposed where it would affect a considerable portion of traffic volumes, the ability to incorporate an ERS into the road should be considered.

The choice of power transfer technology will affect the road differently. Overhead lines will cause little to no altercations to the road itself since it is mounted on pillars on the roadside, with the option available to skip one or two pillars in the row if complications arise (RISE, 2017b).

The conductive rail approach is expected have a minimal impact on the road in terms of function and maintenance, as rational solutions for installation and maintenance have already been developed by the Swedish company NCC (RISE, 2017b). Bombardier has so far tested the inductive approach in concrete roads, but an adapted solution for asphalt roads has not yet been developed (RISE, 2017b). As Sweden currently legally requires asphalt roads, the impact of this option becomes hard to evaluate. There is a risk with ERS of increased wear and tear of the road, as the electrification technology of the road will alter the way vehicles are driven and the amount of traffic on the road.

For example, if the power transfer technology is only installed in one lane of the road, this might lead to increased traffic, and thus wear and tear in this lane in particular. Installing an ERS might also lead to an increased number of vehicles choosing to travel upon that road in particular, especially if the price of electricity (fuel) is low.

This could lead to more overall traffic, and thus increased wear to the road. More concrete information about this issue is expected to come from continued testing of ERS power transfer technology on current and future test sites.

Road Operation

Operating and maintaining an ERS will look rather different compared to a conventional road. For the ERS there is an increased need of data collection and monitoring of the road and how it interacts with the vehicles travelling upon it since there is now a continuous interactive aspect between electric vehicles and the road.

One important factor is for the ability of the vehicles to measure their energy consumption and relay this information back to a system operator of the ERS. This information link is crucial in establishing a payment and revenue system for the ERS, and is currently based on sensors in the vehicles measuring distance travelled (Viktoria, 2015).

The need for flexibility stems from the increased amount of stakeholders in ERS compared to the current transport system and the complexities that come with that change. Since there will most likely be an established data link between the driver and the system operator of the ERS, there are possibilities to utilize that link to share other relevant data between these two actors.

Such information may include traffic management solutions, weather and road conditions, flexible pricing options etc. If this data link is established it also enables a more flexible energy supply situation for the vehicle and the surrounding energy supply actors.

A 20 situational example is that for a moment there is an abundance of energy in one sector of the grid where the road is located, while there is a deficit in another. Information about this between the vehicle and system operator thus enables the vehicle to run on its battery for the part of the road where energy currently is in high demand, and run on the ERS and charge its battery where the energy supply is adequate.

Furthermore, there is a possibility for energy stored in vehicle batteries to be harnessed in sectors where there is a high energy demand, meaning that EV drivers will have the option to be actors in managing the electrical grid for a steady and effective energy supply network, while simultaneously decreasing their own transportation costs.

4. **RESULTS AND CONCLUSION**

This study indicates that there is a general positive opinion regarding ERS among people. ERS can be the future of road engineering, as is it environment friendly, sustainable and energy efficient. If ERS is given more importance the rate of pollution can be decreased and we can use more conventional resources, this will be also time efficient as there is no need to charge the Ev's. Innovative technology such as ERS and related novel business models could provide opportunities for actors in the transport sector and influence their ability for competition. This will also help for boosting the business sector as transportation charges will be reduced.

While there is clearly a significant capital cost in electrifying the road network, it is surprisingly cheap when compared to the alternatives. Elonroad estimate the installation cost of electrifying two lanes of a road at \$1.7 million per mile. For the UK's 7,330 miles of trunk roads, this comes to approximately USD\$14.2 billion (EUR£13 billion). When compared to the \$180 billion required for the additional electricity capacity that hydrogen would require, that really isn't very much. Even this stark comparison doesn't fully capture the benefit of using electric road systems since it only considers the energy savings for heavy vehicles. If an electric road system is used that is also compatible with private cars, then smaller batteries can be used. This would significantly reduce the cost of purchasing electric cars, accelerating uptake, reducing the critical metals used to produce them and saving consumers money. A small increase in road tax could, therefore, easily pay for an electric road system while still leaving the taxpayer much better off overall.An additional benefit of reduced battery capacity is that alternative battery chemistries can be selected that have far lower critical metal content. This will make ramping-up electric vehicle production much easier.

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CFD ANALYSIS OF SUPERSONIC RETRO PROPULSION

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ABSTRACT

This electronic document is a "live" template and already defines the components of your paper [title, text, heads, etc.] in its style sheet The future of rocket reusability and space democratisation currently relies in the effective use of Supersonic Retropropulsion to return rocket stages to Earth. This new form of Entry Descent Landing has the potential to help increase the allowable payload mass currently constraining many science instruments and operations. Additional benefits of this approach include potentially enhanced landing accuracy. This analysis makes a specific study of compressible flows applied to a spacecraft's re-entry burn into Earth's atmosphere. Due to SRP complex flow structure, an accurate study is performed by means of Computational Fluid Dynamics. Furthermore, the potential of the open source software Open foam is tested and compared to the existing validation results from Computational Fluid Dynamics simulation of a 60° sphere cone geometry, running a sweep of five different thrust values is performed. It has been found that Open foam by means of its solver is capable to simulate the physics involving Supersonic Retropropulsion. With a very inexpensive grid, flow structures and pressure field are captured with marginal accuracy, however, to enhance and fully validate its use for applications, further research has to be performed due to the significant inaccuracies

Keywords—Computational Fluid Dynamics (CFD), Entry descent and landing (EDL), Supersonic Retropropulsion (SRP)

I. INTRODUCTION

This Entry, descent, and landing (EDL) systems is a critical technology that enables many of NASA's landmark missions, including Earth re-entry, manned Moon-landings, and robotic landings on Mars. Entry, Descent and Landing area series of events necessary to safely land into a surface of a celestial body with atmosphere. Current private space companies (remarking SpaceX achievements) are performing a series of manoeuvres to safely land an orbital class booster on Earth. Depending on the mission's requirements, these landings occur back on the launch complex on land, or on a mobile drone ship on the Pacific Ocean. After rocket's launch and first stage decoupling, a series of 3 burns are performed to achieve landing. The first burn or boost back burn, is executed shortly after Main Engine Cut-Off (MECO). The second burnor re-entry burn, is a high-altitude burn performed in the upper atmosphere to reduce aerodynamic stresses on the vehicle and heating due to re-entry; in addition to increase vehicle's control and stability. Finally, the third burn is commonly known as a suicide burn or hover burn. This last burn is a high thrust burn executed as close as possible to the surface in order to save propellant. Subsequently, the vehicle is correctly positioned and, by means of thrust vectoring and intensity, its vertical velocity is stabilised and the stage finally lands [SpaceX, 2018]. Previous EDL techniques such as sphere- cone aeroshells and supersonic parachutes are currently being used but are not sufficient for future payload requirements. In order to land these larger masses, the propulsive capability currently used during subsonic descent needs to be extended to supersonic initiation velocities.

II. SRP OVERVIEW

A. Selecting a Template (Heading 2)

First EDL of reusable spacecraft perform a retropropulsive burn in the upper atmosphere to reduce their velocity prior toland. However, the execution of a burn with these conditions generates a complex flow behaviour in the surroundings. This behaviour is due to the vehicle's descent from space, generating an opposing supersonic or hypersonic air flow from the atmosphere. This flow is generally desirable in order to decelerate the spacecraft, nevertheless, it is necessary to further decelerate the spacecraft concerning the vehicle's control, stability and aerodynamic stresses. In cases where atmospheric drag is not sufficient to achieve that deceleration, supersonic retropropulsion (SRP) conditions are required. SRP descent requires rocket engine thrust to decelerate a lander from supersonic to subsonic conditions by increasing the total drag. There are three main advantages of SRP, the first being a decrease in design complexity since there are less aerodynamic decelerators and vehicle transitions used (Edquist, 2007). This also eases the packing and deployment systems as the aerodynamic decelerators are small. The third advantage is the additional control as well as the ability to land larger payload masses.SRP analysis began in the 1960s to 1970s, but was abandoned until recently because of the need for landing bigger payloads in Mars atmosphere. Most of the earlier work was focused on subscale wind-tunnel
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testing while recently it's been focused on CFD analysis and experimental testing. Early studies were done mainly on shockboundary and the effects of nozzle flow on boundary layer. The aerodynamic drag reduction in SRP was first observed by Jarvinen but was later validated through different experiments (Jarvinen, 1970). Experimental studies by Langey Research Center (LRC) and Ames Research Center (ARC) proved that the use of peripheral nozzles enhances the deceleration without disrupting the freestream's drag on the body as much as the use of a single central nozzle. Furthermore, studies performed by [Daso et al., 2009] indicate that the use of retrorockets in vehicles during planetary entry and re-entry reduces the risk associated with thermal exposure, enhancing passive thermal protection; where at high jet flow rates, the SRP concept is indeed useful at decelerating vehicles.

III. COMPRESSIBLE FLOWS

When a fluid flow is compressible, the fluid density varies with its pressure. Compressible flows are usually high speedflows with Mach numbers greater than about 0.3. Despite the high complexity of most of the rocket propulsion methods, general fluid approximations and assumptions can be applied yielding satisfactory results.

Furthermore, for this study, the compressible flow follows the assumption of a calorically perfect gas (Cp = constant), therefore, the following equation of state is given $p = \rho RT$. Where p is the pressure, R is the specific gas constant and T is the temperature. While incompressible flows are determined by the variables u and p and the equations of conservation of mass and momentum, compressible flows require the determination of u, p, ρ and T and the equations of conservation of mass, momentum, energy and equations of state. This occurs since Bernoulli's equation no longer holds due to significant density changes in the fluid. Therefore, for a compressible flow the following expression is fulfilled

$$p + \frac{1}{2}\rho u^2 + \rho gh \neq constant$$

 $c^2 = \frac{\partial p}{\partial \rho}$

When the processes in a flow are consider to be adiabatic and reversible, the flow is denominated isentropic. Hence, it is desirable to study gases without work nor body forces applied assuming isentropic flow of onedimensional gas. To perform this study two main concepts have to be understood: Mach number and stagnation state

Mach Number

In fluid mechanics, the speed of sound is the speed of propagation of a disturbance through a fluid due to the relationship between pressure and density. Therefore, for an isentropic process, the speed of sound squared is given by

$$c2 = \frac{\partial p}{\partial \rho}$$

A. Stagnation State

Furthermore, for a perfect gas, the speed of sound is only a function of the temperature, given by

 $c = \sqrt{\gamma RT}$

Where $\gamma = cp / cv$ is the specific heat ratio. In order to quantify the compressibility effects, it is convenient to define a strong indicator of compressibility: the Mach number

$$Ma = \frac{u}{c}$$

This dimensionless number relates the local flow velocity u to the local speed of sound of the fluid c. Moreover, the Mach number is an indicator of the sonic flow regimes, which greatly condition the behaviour of compressible flows. As a general rule, the following ranges define the different regimesFollowing the procedure described in previous chapters, the solutions of the simulations are therefore shown. However, due to the limited time and computational resources for this project, not all simulations have achieved convergence. Thus, the meshed simulations for CT = 0.47, 2 and 4.04 are shown below.

IV. SRP CFD SIMULATIONS

The 60° sphere cone geometry for a nozzle with an area ratio of 13.95 is generated and the SRP dynamics are solved by OpenFOAM for different thrust coefficient values. The values of the coefficients are chosen according to the given experimental data by [Jarvinen and Adams, 1970] and computational data by [Cordell et al., 2011].

The flow conditions simulated for the freestream are a Machnumber of 2.0, a stagnation pressure of 2 psi and a freestream temperature of 294 K. Regarding the jet temperature, its value is not specified in the experimental report, however, the most notable computational SRP efforts define a jet temperature value of 294 K, which is used in this analysis.

Meshing is the process in which the continuous geometric space of an object is broken down into thousands or more of shapes like Quadrilaterals, Triangles, Hexagons, Tetrahedrons, etc. to properly define the physical shape of the object.Structured mesh approach is used for meshing. Using the blockMesh utility, different computational domains havebeen generated. Each computational domain has been meshed with two definitions: a coarse and a refined mesh. Although due to the computational limitations both definitions can be considered coarse since the number of cells do not surpass 300k cells for any of the grids. Nevertheless, the generated mesh and computational domain have been optimised for SRP and despite the low number of elements, all SRP flow structures are visible in the solution. The simulated meshes areviewed in paraview software.



Figure .1 (a): 3D visualisation of the meshed geometry.



Figure 1.2 (b): 3D visualisation of the meshed geometry.

CheckMesh utility is used to check whether mesh is ok or not. checkMesh is a utility which analyses and evaluates mesh statistics and quality parameters. Fig shows the mesh quality for CT = 0.47

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Figure 4.2: Mesh checking using checkMesh utility

V. RESULTS

In this section, the contour plot results of the simulations for meshes are displayed. Note that since the computational domain is axi-symmetric, the results are mirrored to give a better comprehensive view of the results.



Figure 1.3 (a): Static pressure contours for the CT = 0.47







Figure 1.3 (c): Temperature contour for CT = 0.47



Figure 1.4 (a): Static pressure contour for CT = 2



Figure 1.5 (b): Mach number contour for CT = 2



Figure 1.6 (c): Temperature contour for CT = 2



Figure 4.5 (a): Static pressure contours for the CT = 4.04



Figure 1.7 (b): Mach number contour for CT = 4.04



Figure 1.8 (c): Temperature contour for CT = 4.04

VI. CONCLUSION

The results yielded in CT = 0.47, 2, 4:04, the position of particular flow structures, the pressure and drag coefficients on the aeroshell are determined and compared with experimental and computational results.

The position of flow structures to evaluate are the jet terminal shock, stagnation point and bow shock on the x-axis. To determine these locations the available Schlieren images from the contour results will be used, the shock locations can be easily defined, however, there is not a clear and reported method to locate the stagnation regions from these images. The CFD determination of stagnation point locations is done by the visualisation of the velocity magnitude (u \square 0). Furthermore, the locations of these points are defined by a normalised standoff distance. This standoff is performed measuring the point of interest from the nozzle exit plane and normalising that distance by dividing that magnitude by the total aeroshell diameter (Dm = 101.6 mm).

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ADAPTIVE COMBAT AND SURVEILLANCE ROVER

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ABSTRACT

The "Adaptive Combat and Surveillance Rover "or ACSR provides the necessary enhancements to the Rover in order to use it for surveillance and military purposes. The Rover is designed to work on landscape surfaces where our regular Defence Rover can't go and where a few components limit its operational capabilities as a surveillance rover, thus the focus of our research is to overcome those constraints and make it capable for the needed outcomes. Our investigation into the Rover issue was led by our group, and it was specifically focused on the alteration of the Rover that can be directly used for combative surveillance, as well as the other issues that were discovered through literature review and studies. As a result, research was led on the most effective method to overcome that. The base plate was made up of plywood and the brackets and mounts for the nurf gun were made up of metal and the Rover is manufactured entirely of PVC to increase its capacity to tolerate mechanical shock, vibrations, and mechanical failures caused by the terrain surfaces on which its miles worked. The Rocker bogie mechanism Rover's structure was created using solid works. All of the upgrades and capabilities have been included into the Rover by using the model and staying on top of it. The project's outcome was the implementation of a surveillance camera and a Nurf gun. Various modifications, such as a live-streaming camera, a remote-control device with trigger mechanism, a separation Measuring framework with an adequate mechanical structure to hold the gun and camera, and mechanical attainability, were developed under this approach..

Keywords: Camera, Nurfgun, remote control surveillance, Rover.

INTRODUCTION

The rocker-bogie system is the suspension arrangement developed in 1988 for use in NASA's Mars rover ,and which has since become NASA's favoured design for rovers. It has been used in the 2003 Mars Exploration Rover mission.[2]

The "rocker" part of the suspension comes from the rocking aspect of the larger, body-mounted linkage on each side of the rover. These rockers are connected to each other and the vehicle chassis through a differential. Relative to the chassis, the rockers will rotate in opposite directions to maintain approximately equal wheel contact. The chassis maintains the average pitch angle of both rockers. One end of a rocker is fitted with a drive wheel, and the other end is pivoted to the bogie.[3]

The "bogie" part of the suspension refers to the smaller linkage that pivots to the rocker in the middle and which has a drive wheel at each end. Bogies were commonly used as load wheels in the tracks of army tanks as idlers distributing the load over the terrain, and were also quite commonly used in trailers of semi-trailer trucks. Both tanks and semi-trailers now prefer trailing arm suspensions.[2]

METHODOLOGY

Making a rover using the rocker-bogie mechanism (consisting of 6 wheels). The way Nasa has developed the rocker-bogie suspension system for their rovers and was implemented in the Mars Pathfinder's and Sojourner rover. The rocker-bogie suspension system passively keeps all six wheels on the robot in contact with the ground even on uneven surfaces. This creates for great traction and manoeuvrability (Harrington & Voorhees)[3].

Using durable and hollow material for manufacturing will make it lightweight and rigid. The Rover is fully made of

PVC in order to maximise its ability to withstand mechanical shock, vibrations, and mechanical failures caused by the terrain surfaces on which it travelled.[1]

Designing a base plate that will be housing the gun, camera, and entire circuitry. The base plate is designed in such a way that it house the components such as the gun and the camera mount but also houses the cables and wires while keeping the centre of gravity low.[6]

Designing mounts and clamps to hold the camera and gun along with the trigger mechanism. The mounts and clamps will be designed in such way that it provides adequate strength and stability to the components.[6]

CALCULATIONS

The size of the links must be appropriate to achieve legitimate stair climbing. Accept the 150 mm and 370 mm stair tops and lengths separately. To climb stairs with greater strength, the least complex one pair of wheels must be in a rising job at the same time. To determine the size of bogie linkages, the first set of wheels must be placed in an even location at the top of the ascending route.[1].

The second pair should be placed just when the first pair has begun to rise. There must be a significant distance between the vertical edge of the stairwell and the second pair of wheels for wheel placement.

LENGTH OF FRONT ARMS	135 MM
LENGTH OF LINK JOINING FRONT PIVOT TO BASE PLATE	210 MM
DISTANCE BETWEEN POINT B & E	420 MM
DISTANCE BETWEEN CENTER OF 2 LEFTFRONT WHEELS	270 MM



Table 1: Dimensions of arms and linkages.

Figure 1: length of arms of rocker

Presently, need to acquire the separation among first and second wheel (270 mm). Considering the privilege calculated triangle ABC,

Utilizing Pythagoras in triangle ABC expect lengths AB and BC is x,

 $AC^2 = AB^2 + BC^2$

 $270^2 = x^2 + x^2$

 $270^2 = 2x^2$

x = 135 mm

Subsequently, AB = BC = 135 mm

Likewise, to find measurements for rocker linkages initial two-wheel sets should be situated at even position. Unnecessary extra person wheel pair should practically finish its ascending before the start of ascending of the first pair of wheels. By placing the wheel in such a manner, the element of linkage BE (420 mm) was acquired.

Presently consider BDE

 $420^2 = BD^2 + DE^2$

 $420^{\mathbf{2}} = 2y^{\mathbf{2}}$

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y = 210

Henceforth, BD = DE = 210



Figure 2: length of linkages from baseplate to wheels



Figure 3: length between centre of wheel and arm joining baseplate

EXPECTED OUTCOMES

The Rover could be used for surveying larger areas and can cover a lot of land[8].

It will help us to observe and detect hostiles and can be used to shoot at it remotely.

The main purpose of this rover is to reach places where human reach is not possible thus eliminating the risk of life threatening events.[8][7]

It's other Characteristic is that it can climb mountain and function effectively on rough surfaces[5].

The four wheel rovers cannot sustain greater tilt and have less stability compared to 6 wheel rover designed using rocker bogie mechanism.[5]

The rover can be controlled remotely upto a few metres distance and can be used in patrolling the borders.

In commercial mining or to explore an underground cave the use of a human being can be eliminated by using a rover. And also fitted with camera it can be used for underground mapping.[5]

CONCLUSION

With increasing advancements in Rover technologies for extra-terrestrial exploration, this robotic technology can also be seen as a potential application on earth. Its real time video surveillance and feedback feature helps in detecting various threats in places where human reach is not possible. It can also be used in military and defence field because of its compact design. Rovers in near future may replace the need of human requirement for recon, surveying, threat handing and so on. There is unlimited potential in this technology to be used in various applications.

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A SYSTEMATIC REVIEW ON MECANUM WHEEL

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ABSTRACT

A dynamic model is presented for omni-directional wheeled mobile robots, including wheel/motion surface slip. We derive the dynamics model, experimentally measure friction coefficients, and measure the force to cause slip (to validate our friction model). Dynamic simulation examples are presented to demonstrate omni-directional motion with slip. After developing an improved friction model, compared to our initial model, the simulation results agree well with experimentally measured trajectory data with slip. Initially we thought that only high robot velocity and acceleration governed the resulting slipping motion. However, we learned that the rigid material existing in the discontinuities between omni-directional wheel rollers plays an equally important role in determining omnidirectional mobile robot dynamic slip motion, even at low rates and accelerations.

INTRODUCTION

This Research interest in mobile robots has been tremendous in the past few years, as evidenced by review articles (e.g. [1] and [2]). Some researchers have considered slipping motion between the wheels and motion surface in mobile robots and vehicles. Choi and Sreenivasan have designed articulated wheeled vehicles with variable-length axles to eliminate kinematic wheel-surface slipping [3]. Hamdy and Badreddin developed a tenth-order nonlinear dynamic model for a wheeled mobile robot that includes slip between the driven wheels and the ground [4].

Rajagopalan developed an expression for the angular velocity of wheel slip for wheeled mobile robots with different combinations of steering and driving wheels, considering kinematics only [5]. Shekhar derives a dynamic model for mobile robots with wheel slip using accessibility and controllability in nonlinear control theory [6]. Balakrishna and Ghosal present a traction model accounting for slip in nonholonomic wheeled mobile robots [7]. Scheding et al. present experimental evaluation of a navigation system that handles autonomous vehicle wheel slip via multi-sensor feedback [8].

Several research groups are developing omni-directional mobile robots and vehicles due to inherent agility benefits. Jung et al. developed an omni-directional mobile robot base for the RoboCup competition [9]. RoboCup (www.robocup.org) is an international competition wherein teams of autonomous mobile robots compete in the game of soccer. Moore et al. present a control algorithm for an omni-directional six-wheeled vehicle; each wheel is steered and driven independently [10]. Watanabe et al. present a controller for an autonomous omni-directional mobile robot for service applications [11]. Witus investigates the mobility of a 6-wheeled omni-directional vehicle with tire inflation control [12]. A recent article in these transactions presented a clever design plus experimental results for a spherical rolling robot [13]; however, this mobile robot is not omni-directional and a no-slip condition was assumed. Our literature search revealed only two papers which mentioned slip in omni-directional motion base decouples steering and driving [14]. Dickerson and Lapin present a controller for omni-directional Mecanum-wheeled vehicles, that includes wheel slip detection and compensation [15].

The current paper presents a dynamic model for omnidirectional mobile robots that includes slipping between the wheels and the motion surface. This paper was motivated by a need in the Ohio University crossdisciplinary RoboCup team: in preliminary hardware testing of our omni-directional three-wheeled player robot, significant slipping occurred which necessitated development of a dynamic model with slip. Though our work is motivated by RoboCup, the result is a general dynamic model for omni-directional wheeled vehicles including slip. Our model includes both friction in the wheel rolling direction and in the transverse direction (normal to the first). One important issue turned out to be differing frictional characteristics due to the rigid material discontinuities between rollers in the omni-directional wheels.

This article does not focus on real-time control since our objective was to model and understand the sliding dynamics problem in simulation and experimentally. Based on our dynamic model, we will develop real-time control in the future, including a means to measure the slipping for feedback control. This paper first presents our omni-directional robot design, followed by dynamic modeling including slip, a method to experimentally determine the coefficients of friction and validate our friction model, and then simulation and experimental results to demonstrate omni-directional robot dynamics considering slip.

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BASIC Properties Of the Omni wheel

Especially the Mecanum wheel and orthogonal wheel designs are based on a concept that activates traction in one direction and allow passive motion in another, thus allowing greater flexibility in congested environments. In this research the Mecanum wheel, which is most frequently utilized in industrial fields, is selected to achieve omni-directionality of the mobile robot (Figure 2. (a)) [7]. Due to holonomic characteristics to generate instantaneous omni- directional motion, the mobile platform with omni- directional wheels can make flexible 3-DOF motion including instantaneous forward, backward, lateral and rotational movement in planar space and realize a simple control system through intuitive operating method. The Mecanum wheel is commonly composed of several sub-rollers which are mounted around the rim wheel circumference at a specific angle to the wheel.



(c) Spherical wheel (d) Active castor wheel

Fig. 1: shows a photograph of the prototype hardware

MOBILE ROBOT MOTION MECHANISM BASED

In the Mecanum Wheels The suggested mobile robot has a squared platform with four Mecanum wheels at each edge in order to simplify the mathematical model and the motion control. Using four of these wheels provides omni-directional movement for a vehicle without needing a conventional steering system. The sub-roller angled at 450 about the rim wheel divides the force driven by the wheel rotation into one portion in the rotational direction of the sub roller and the other portion in the axial direction of the sub-roller. The rotational force portion is dissipated by rolling of the sub-roller. Combination of the individual direction and velocity of each Mecanum wheel generates the total resultant force vector in any desired direction. Then, the mobile robot moves to the direction of the force vector without changing the direction of the mobile platform. Figure 4. shows the overview of the motion mechanism of the 4-wheeled omni-directional mobile robot. Figure 1 shows the CAD model for the three-wheeled omnidirectional mobile robot and Fig. 2 shows a photograph of the prototype hardware. Figure 3 shows the top view of our general three-wheeled omnidirectional mobile robot model. The variables, used in the dynamic model of the next section, are explained below. The inertially-fixed frame is $\{0\}$ and the moving Cartesian reference frame is $\{M\}$. The rear wheel is aligned in the X M direction; the front two wheels are symmetrically-placed, aligned by constant angle δ from the YM axis (shown only for the left wheel in Fig. 3). We assume the center of mass for the robot is located at the center of the robot circle, which is the origin of $\{M\}$. This was one of our guiding principles in design. The robot mass is m and the robot mass moment of inertia about the ZM axis through the center of mass is I. Each wheel center position is given by position vector, from the origin of {M} to the center of the wheel. The unit vector i r in this direction is also the direction of each wheel's angular velocity vector (i.e. i r[^] is the axle direction). The unit vector i s[^] is normal to r[^], giving the instantaneous direction of each wheel. The Cartesian variables for omni-directional motion are $\{\}$ x y ϕ T X = . As seen in Fig. 3, the translational vector giving the position of the origin of $\{M\}$ with respect to the origin of $\{0\}$ is $\{\}$ x y T (expressed in the coordinates of $\{0\}$); also, the angle φ gives the orientation of the robot with respect to the inertial frame horizontal direction X0. Headings, or heads, are organizational devices that guide the reader through your paper.

There are two types: component heads and text heads. Component heads identify the different components of your paper and are not topically subordinate to each other. Examples include Acknowledgments and References and, for these, the correct style to use is "Heading 5". Use "figure caption" for your Figure captions, and "table head" for your table title. Run- note that these wheels were not intended for omni-directional mobile robots; rather, they were developed for material handling applications. For a good discussion on omni-directional

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wheels for mobile robots, see [16]. Our application dictated economical, commercially-available wheels, which led to our choice of wheel. As seen in Fig. 4, the axle is mounted normal to the wheel's circle as in a standard wheel. However, the contact with the ground is via rollers that are free to spin about an axis in-line with the circle circumference, normal to the wheel axle. This enables omnidirectional motion.

OMNI-DIRECTIONAL ROBOT DYNAMICS MODELING

This section presents omni-directional mobile robot modeling with slip included between the wheels and motion surface. The first subsection presents the model, plus the friction model and experimental measurement of the friction coefficients; the second subsection presents a method to experimentally validate our theoretical friction model and measured friction coefficient Dynamics Model with Slip. The dynamics model is developed in this subsection for a three wheeled omni-directional robot, but it applies to any omnidirectional robot with three or more wheels. The dynamic model is shown in the top view of Fig. 3 above, and is described in Section 2. Figure 5 shows modeling details for the wheel from a side view. Figure 5 shows that our omni-directional wheel contains n=8 rollers; further, the fixed angle $\Delta\theta'$ covers each roller sector and the fixed angle $\Delta\theta''$ covers each sector between rollers. The current paper presents a dynamic model for omni.

This article does not focus on real-time control since our research is very use full directional mobile robots that includes slipping between the wheels and the motion surface. This paper was motivated by a need in the Ohio University cross-disciplinary RoboCup team: in preliminary hardware testing of our omni-directional three-wheeled player robot, significant slipping occurred which necessitated development of a dynamic model with slip. Though our work is motivated by RoboCup, the result is a general dynamic model for omni-directional wheeled vehicles including slip. Our model includes both friction in the wheel rolling direction and in the transverse direction (normal to the first). One important issue turned out to be differing frictional characteristics due to the rigid material discontinuities between rollers in the omni-directional wheels.st few years, as evidenced by review articles (e.g. [1] and [2]). this is use full in all the ways Some researchers have considered slipping motion between the wheeled vehicles with variable-length axles to eliminate kinematic wheel-surface slipping [3]. Hamdy and Badreddin developed a tenth-order nonlinear dynamic model for a wheeled mobile robot that includes slip between the driven wheels and the ground [4].



Fig 3: Wheel Diagram

CONTROLLING A VEHICLE WITH MECANUM WHEEL

For a vehicle using Mecanum wheels to achieve omni directional movement, the wheels are arranged on the platform in a configuration as shown in Figure 4: Mecanum wheel configuration for omni directional vehicle Depending on the direction of the motors, the wheels always produce both a forward or reverse force, as well as an inward or outward force, caused by the angled peripheral rollers. Depending on the resulting combination of these forces, the platform can be controlled to move in any direction, as seen in Table 1. A variety of other motions are possible by varying the direction and speeds of the wheel. Though incredibly versatile, the standard Mecanum wheel has an unfortunate side effect which reduces its efficiency considerably. Its wide range of mobility is due to the fact that the peripheral rollers translate a portion of the motor force into a force perpendicular or at an angle to that produced by the motor. This means that are large portion of the force in one direction is lost though the translation into a resulting force by the rollers. As an extreme example of this inefficiency, when the platform travels diagonally, only a front and rear opposing wheels are spinning whilst the rollers on the other two wheels cause direct drag that the motors must fight against. Alakshendra [10] implemented a higher-order sliding mode control method for an adaptive robust trajectory tracking of a mecanum wheeled robot. Chu [11] developed a position compensation algorithm to minimize the position error

between the desired and current positions caused by the slip of the mecanum wheels. Jeong et al. [12] proposed a method to save energy for an inverse ball drive robot with mecanum wheels. They found the torque pattern of the slippage caused by the mecanum wheels and implemented a trajectory planning algorithm to minimize the slippage. Tian et al. [13] presented a study related to an omni-directional mobile platform with six mecanum wheels for better load capacity and flexibility. Qian eal. [14] developed an omni-directional mobile robot for the purpose of mapping is possible through which the important component passes and the electric circuit is also help full in the use.



Figure 4: Mecanum wheel configuration for omni

Directional Vehicle.



Fig 5: Mecanum wheel outside structure.

Losses of efficiency when traveling in a straight line are due to energy lost in a direction normal to that of travel number of the rollers is enough to cover the wheel's curve, in this case, a circumference. Besides, there are a certain number of rollers that makes the ideal proportion between having a small number of large rollers per wheel, and having a large number of small rollers per wheel [2]. In order to calculate the moving continuity, which is more applicable is many ways through the peripheral rollers which bleed off available. With the objective of determining the best silhouette for the roller, a program was created using the software MATLAB. In order to get the best result, 1000 interactions were made, with the number of rollers set between 6 and 10, and the width of the wheel and the moving continuity coefficient randomly chosen in a set of values.

The width range is from 4 to 12 centimeters and the moving continuity coefficient was set from energy as they rotate. Through the addition of a simple mechanical device that allows us to lock the peripheral rollers, we now have a wheel, which when traveling straight has its peripheral rollers locked, thus effectively forming a normal tire, but when traveling sideways has the rollers unlocked thus allowing for the flexibility of the Mecanum sideways screw motion. This is illustrated in Figure 5. A simple actuator is used to rotate the brake activation disc enough to raise the brake pins until they make contact with the rollers, thus preventing their rotation.

The effect of the locked rollers is similar to that of a tire with a heavy tread. This method is effective in reducing any lost forces in the forward direction to zero, but does not improve the losses in any other directions. The second method is more effective, but mechanically slightly more complex. Refer to figure 6. The peripheral rollers are split and centrally mounted on an axle which can be pivoted through 135°. This allows the rollers to be adjusted from a straight position, (in which they are also locked so the rollers cannot rotate on their axles) thus effectively forming an almost normal treaded tire, to an angle of 45° in which case they act as a traditional Mecanum wheels, or to an angle of 135° making diagonal travel easier as it overcomes the resistance given be the traditionally immobile wheels. Then, in order to get a circular silhouette for the roller having the best possible efficiency, it is used the roller's surface equation and after determined the maximum and minimum radius of the roller. In this paper, this as also helped us to overcome our new design proposed is using a circular shape for the rollers, and the modification happen in the way how the rollers are connected to the hub and the materials used.

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The real meaning of this is that the contact line and the represented by ε , i (1), five parameters are shown. Those parameters are used to design the rollers for the so in order to complete this task we have undertaken some of time. In this study, the effects of contact forces on the rollers of a mecanum wheeled robot are investigated. Modeling structures are constructed for the cases of single and multiple contact forces. A simulation environment is developed to examine these two cases. A theoretical model is proposed in order to reflect reality in the simulation environment. It is shown that single contact force assumption generates vertical vibration in a mecanum wheeled robot which is never desired in a real application. It is also demonstrated that adding more contact forces on a roller of a mecanum wheele's model decreases the transition distance between the rollers and thus creates smaller is the concept which is trying to figure out the separate ways of the task.



Fir 6: Circuit diagram

The diagram below shows a comparison of a conventional Mecanum wheel design with the improved design. The large central green arrows show the direction of travel. The smaller red arrows show the force produced by the peripheral rollers. The outer circular arrows show the wheel spinning direction and thus also represent the force direction caused by the motor direction.

ROLLER

When designing a new drive system, circular wheels parts (R, N, ε , y, θ 0). R is the overall radius of the wheel; N is the desired number of rollers, y is the angle of the helical line rotated around the wheel's z-axis, as can be seen in the Figure 3; and θ 0 is the initial value of the angle between the starting motion of point C moving along the helical line (Fig. 7).



Fig 7: Rollers Scheme Configuration

INITIAL SIMULATION AND EXPERIMENTAL RESULTS

This section presents simulated and experimental results to demonstrate omni-directional mobile robot motion considering slip. Simulation results are presented first using the initial friction model; next, the experimental procedure and results are presented and compared with the simulation results. For both of the following subsections (simulation and experimental results), the same motion condition is used: w command straight-line motion from initial point 0.0 0.0 0 T X0 =to final point T F 0.4 0.0 0 X =(m) in a specific time of tF = 3.5 sec. We consider only X motion since, due to robot symmetry, Y motion is inherently less affected by slip. φ motion could have significant slip behavior; this will be the subject of future experimental work. Figure 3 shows our robot hardware geometry (our design has δ =150: we were driven to this choice by RoboCup size constraints; δ = 300 is preferable for robot symmetry).

The motion is commanded in the inertial frame, $\{0\}$ in Fig. 3. Robot orientation φ is also important in slip dynamics, but the pure X motion will also demonstrate (unwanted) orientation slip motion. Robot orientation is commanded as zero for the motion example. Since we wish to demonstrate slipping, we make no attempt to smooth the commanded velocity motion from rest or ending at rest. Hence, the simulated commanded wheel acceleration is infinite at the start and the deceleration is infinite at the end of the time period. Of course, neither the real or simulated robot can achieve infinite acceleration or deceleration, but the high accelerations at the start and end are sufficient to cause slip. Constant velocity is commanded in between the start and end. Clearly for omnidirectional mobile robot applications we need smoother trajectory generation, perhaps using 5th-order polynomials for wheel displacements. For this motion example, the required constant wheel angular speeds are $\theta \& 1 = \theta \& 2 = +1.16$ and $\theta \& 3 = -4.50$ (rad/s); note the wheel numbering convention is given in Fig. 3. With this motion example, we consider two motion surfaces to include different levels of friction: a smooth paper surface and a rough carpet surface. The experimentally-measured friction coefficients for use in simulation (15) were presented in Section 3.A.2.

INITIAL SIMULATION RESULTS

We developed a Matlab Simulink model to simulate omni directional mobile robot dynamic motion considering slip. In this subsection we present simulated dynamics results using the initial friction model of Section 3.A.1. The simulated motion condition, surfaces, and friction coefficients are described above. To save space, we only show the simulated case with the paper motion surface. Figure 6a shows the Cartesian displacements and Fig. 6b shows the associated sliding speeds in the wheel directions for each wheel, for the simulated motion. In Fig. 6b, the simulated sliding speeds for wheels one and two are identical due to symmetry. As seen in (16) simple control system structure. Unfortunately, this assumption does not reflect reality. In this study, it is shown that when a single contact force assumption is used, a mecanum wheeled vehicle cannot trace a reference trajectory without a pre-defined tracking error band. This means that the vehicle model created using single contact force assumption is not enough to catch up with reality. It is proposed that multiple contact forces should be used for creating models for the mecanum wheels in order to get results close to the responses obtained in real applications. These proposals are verified by performing simulations obtained in a simulation environment developed by the connection of SolidWorks CAD program and Simscape toolbox of Matlab-Simulink. A four wheeled mecanum robot is also designed and built.

It is suited with actuators, motion drivers, microprocessors, communication modules, etc. The simulation results are experimentally verified using this experimental platform. The simulation and experimental results are presented together so as to show the behavior of the mecanum wheeled robot in different test scenarios, in which single and multiple force assumptions are used. The outline of this paper is constructed as follows: the next section is about the literature studies. Third section is prepared for presenting the problem statement. The next section gives the modeling structures. Kinematic and dynamic models of a mecanum wheeled vehicle are presented in this section. Fifth section introduced the simulation.





CONCLUSION

Though an ingenious system, the traditional Mecanum wheel is somewhat inefficient in its use of energy. The addition of the ability to lock the Mecanum wheels peripheral rollers increases this efficiency when traveling in a forward direction. The addition of the ability to dynamically adjust the angle of the peripheral rollers to best suit the direction of travel to a large extent resolves the inefficiencies inherently present in the traditional design. The AGV is able to move and perform complex tasks within a congested factory environment, while having the ability of rapid movement over rough terrain. This ability is invaluable during material transfer and handling.

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ANALYTICAL INVESTIGATION OF HEAT TRANSFER COEFFICIENT OF DISC BRAKE USING CFD

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ABSTRACT

One of a vehicle's most crucial duties is braking. It is critical to design the braking system in such a way that the vehicle remains safe when braking. Disc brakes are included in almost all cars. When the brakes are applied, the disc brakes lose a large quantity of energy. The braking system's safety is determined by the efficiency of the brakes dissipation. This is dependent on a number of factors, including the material, ambient temperature, braking power and the heat transfer coefficient of the air on the disc brake's surface. To investigate the heat dissipation characteristics of the developed disc brake, a computational fluid analysis and thermal analysis are done on it. The ANSYS FLUENT solver is used to investigate the disc brake's surface heat transfer coefficient, velocity, and the structural-thermal analysis is carried out in the ANSYS Workbench, where deformation and final temperature are determined.

Keywords— CFD, FLUENT, Heat Transfer Coefficient, Steady State Thermal, Static Structural

INTRODUCTION

A vehicle's braking system is an essential component. The brakes are used to control the vehicle's speed as well as to stop the vehicle from moving. To stop or control the vehicle's motion, the braking system relies on frictional force. To stop or control the vehicle's motion, the braking system relies on frictional force. Hydraulic brakes use an enclosed fluid to stop the car by passing pedal force through the fluid. The squeezing action of the brake pads is utilised to stop the vehicle by friction between the rotating disc and the stationary brake pads. Drum brakes or disc brakes can be used.

The vehicle's braking system is determined by a number of parameters, including the vehicle's mass, braking force, and torque requirements. In the braking circuit, a master cylinder with the specified diameter is employed to generate the necessary pressure. To impart force to the master cylinder, utilise a brake pedal with an optimal pedal ratio. [1]

The friction brakes convert kinetic energy into heat during a braking operation. This heat is created on the braking disc's and pad's contact surface.

EASE OF USE

The most popular type of brake is the disc brake, which works by creating friction between the brake pad and the disc when the brakes are applied. Disc brakes are one form of hydraulic brake. [2] The disc brake is located between the caliper and the wheel hub. The squeezing action occurs when the brakes are applied and the vehicle comes to a complete stop. Front-wheel disc brakes are more common than rear-wheel disc brakes. For the vehicle with the front and rear wheels illustrated in the diagram, the X-split braking circuit is employed.



Fig. 1. X –Split braking Circuit

Maintaining the Integrity of the Specifications

The brakes system is critical with respect to vehicle safety. One situation during which the brake system is put to the test is an Alpine descent. Such a descent causes very high brake system temperatures and may even

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induce brake fluid vaporization. In following report an In-Vehicle Brake System Temperature Model is developed and tested. [3] This model makes use of the information that is available on the vehicle CAN-bus in order to estimate the temperature of the brake system and detect the risk of brake fluid vaporization. Implementing such a model in production vehicles would improve vehicle safety and in the long run allow downsizing of the brake system without giving in on any safety margins. Firstly, possible approaches for estimating the amount of kinetic energy that is converted into heat by the brake system are investigated. A Feed-Forward model is developed that uses the pressure in the primary hydraulic circuit as input. The problem with such a Feed-Forward Model is that the friction coefficient is variable. A Feed-Back model that uses the vehicle deceleration as input gives better results. The challenge in this approach lies in the fact that not all required inputs for the Feed-Back Model are known. Secondly, the Temperature Estimation Model is developed. [4] This is composed of models of different parts of the brake system which are combined and matched to the measurements. The brake disc is modeled as a lumped mass. The brake pad is modeled as a Finite Difference Thermal Model.[5] The fluid and surrounding caliper are modeled as one lumped mass which receives its heat through conduction from the brake pad and spreads the heat into the surroundings by means of convection.[6]

Disc Heat Input

The heat that is absorbed by the brake disc is spread throughout the disc by means of conduction and causes the disc temperature to increase. The temperature increase of the disc lumped mass model is calculated by:

 $\mathbf{Q} = \mathbf{h}\mathbf{A} \left(\mathbf{T}\mathbf{s} - \mathbf{T}\boldsymbol{\infty} \right)$

Where:

Q - Rate of heat transfer (J/s)

h- Convective heat transfer coefficient depends upon the thermodynamics and fluid temp

A - Surface area of the rotor in m2

Ts- Surface temperature of the brake rotor (°C) T∞- Ambient air temperature (°C)

The thermal capacity of a brake disc is temperature dependent. In Figure 3 below temperature dependency of the thermal capacity of iron. The importance of this was mentioned in a linear cp-Temperature dependency was assumed. In the operating range of the disc (0 degrees Celsius

-700 degrees Celsius) this assumption is justified, as can be seen in Figure 2 below. This variable value for cp is included into the disc lumped mass model.

MATERIAL USED

Stainless steel is the material used for the disc brake. Disc brakes are typically manufactured of Grey Cast Iron, composites, and other materials. Because of its great corrosion resistance, low wear, good strength, low coefficient of friction, and outstanding thermal efficiency, stainless steel is employed despite its high cost. The qualities of stainless steel are as follows:

Description	Value
Density, g/cc	8.85
Ultimate Tensile Strength , MPa	1570
Ultimate Yield Strength , MPa	1000
Thermal Conductivity, W/m-0K	28
Coefficient of thermal expansion, µm/m/°C	9.8

Table -I: Properties of Gray Cast Iron

Specific Heat capacity ,J/kg-0K 440

DESIGN OF DISC BRAKE

The disc brake is built and analysed with the vehicle's many parameters in mind. The disc brake design is determined by the vehicle's mass, braking force, Dynamic Weight Transfer, acceleration, and disc brake assembly to the wheel hub, among other factors. [7]

A. CAD Model of the disc brake

The disc brake's CAD model is created using CATIA v5 software. The thermal, structural, and wheel assembly components are used to develop the disc brake. Because slots are supplied for good heat transfer and weight

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reduction, this type of disc brake is also known as slotted disc brake. Both the front and rear wheels of the vehicle are designed in a similar manner. The proportions of the disc brake are determined by the best heat transfer and the disc brake's minimum weight. The disc brake's ultimate dimensions are as follows.

Outer Diameter - 200 mm Inner Diameter - 130 mm Thickness - 4 mm



Fig. 2: Flow chart of CFD analysis procedure

STRUCTURAL – THERMAL ANALYSIS

The method of studying the static structural and thermal behaviour of a model by linking static structural and steady state thermal analysis is known as structural-thermal analysis. This is done using the ANSYS 18.1 software. This approach

is used to determine the disc brake's maximum temperature as well as the deformation induced by the thermal load. [5]

RESULTS & DISCUSSION

The disc brake's CAD model is imported into the ANSYS Design Modeler. Based on the application of forces, the disc brake's surface is separated into different portions.

The heat energy input to the disc brake is represented by the heat flux into the disc brake and the initial temperature on the disc brake's surface. The surface heat transfer is calculated using the results of a CFD analysis, which is used as an input for convection. The heat transmission and final temperature of the disc brake are calculated using boundary conditions.

The result of the Steady State Thermal Analysis is transferred to a static structural analysis programme. In order to execute the static structural analysis, the final temperatures imported are employed as thermal load. The fixed disc brake supports are provided, and the analysis is completed. This method determines the deformation of the disc brake under these conditions as well as the safety factor.



Fig. 3. Surface Heat Transfer Coefficient

The thermal analysis and the CFD yielded the following results. The following are the final ANSYS Fluent and ANSYS Mechanical results. After 1000 iterations, the CFD solution converges.

CONCLUSION

The CFD and thermal analysis is performed on the disc brake using ANSYS Fluent and ANSYS Workbench. The surface heat transfer coefficient is obtained from the ANSYS and with the output from the CFD analysis thermal analysis is performed in the ANSYS Mechanical. The temperature distribution of the disc brake is studied in the ANSYS. The results obtained from the solver prove can be conclude that that the disc brake is good to use in the vehicle of the corresponding parameters.

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DESIGN AND ANALYSIS OF PROPELLER SHAFT OF BOLERO BS6

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ABSTRACT

The current work represents design of propeller shaft of Bolero BS6 with the help of the robust tool Ansys 2021. Propeller shaft is the key unit in the transmission system of the Automobile. Substitution of composite material over the conventional steel material for propeller shaft has increased the advantage of design due to weight reduction and less fuel consumption. Use of conventional steel for manufacturing of propeller shaft has many dis-advantages such as high weight, low specific strength, more fuel consumption, etc. Many methods are available to design the problem, but current is based on practical approach which clearly defines the strength, weight and deformation. Here, in the paper defined a real approach of replacing and analyzing conventional material by composites.

Keywords—Ansys, Propeller shaft, composite etc.

INTRODUCTION

The propeller shaft also known as drive shaft or cardan shaft connects the transmission shaft to the differential at the wheel axle. The main function of the propeller shaft is to transmit rotary motion of the transmission shaft(gear box shaft) to the differential. From differential the motion is transmitted to the wheels with the help of axle shaft. It transfers motion at a constantly changing angle. It adjust the change in length between gear box and rear axle.

Generally, the shaft is made of steel tube or hollow shaft and two type of flexible joint, namely a spline sleeve (also called slip joint) and two universal joint at each end. The thickness usually ranges from 1.5 to 7.5 mm depending upon the type of application. Tubular section are comparatively lighter and stronger than a solid shaft of the same size. It is also less costly. They also allow motion to be delivered from the gear box shaft to the differential's bevel pinion shaft at all times, regardless of the propeller shaft's inclination.

The slip joint adjusts the length of the propeller shaft on the basis of movement of the rear axle. The slip joint is formed by the internal splines on the sleeve attached to the universal joint at left and external spline on propeller shaft. In the case of trucks and long chassis vehicles, where the distance between the transmission shaft and the pinion shaft of differential is more, one or more intermediate propeller shaft is connected to the gear box output shaft and other end to the main propeller shaft. The intermediate propeller shaft is supported by a frame-mounted bearing unit. This configuration prevents sagging and whirling of the propeller shaft at critical whirling speeds.

We have chosen propeller shaft of Mahindra Bolero BS6 model which has 210Nm torque and 1600 rpm. The shaft is made of mild steel and weighs 8.4kg. We replaced the steel shaft with various composite materials and analysed stresses and weight reduction of shaft.

Composite Materials

Composite materials are mixtures of two or more materials to increase the strength to weight ratio. These constituent materials have significantly different chemical or physical properties and are merged to produce a material with properties unlike the individual elements. A matrix phase and a reinforcement phase are both present in composite materials. The matrix and reinforcing materials are combined with good material properties to produce composite materials with better performance. In general, various reinforcing materials are added to the composite matrix to increase strength and rigidity. The role of the matrix in fiber-reinforced composites is to protect the surface of the fibers from mechanical wear by transferring stresses between the fibers and providing a barrier against harsh environments.

LITERATURE REVIEW

Neelam Khandelwal, et.al. [1] worked on Design, Analysis and Comparison of Propeller Drive Shaft of an Automobile. This paper deals with FEM analysis of various composite materials and they analysed and compared the design of composite materials. After comparing some composite materials and considering lot of factors in mind they concluded that the Kevlar 49 has performed better in weight reduction indeed, considering cost carbon epoxy worked great. They also researched that for epoxy reinforced carbon, torsional buckling capacity showed best result.

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Harimaheswaran, et.al. [2] carried out Design Optimization and Analysis of Propeller Shaft. This paper illustrates the substitution of convectional steel with low alloy steel. Low alloy steel has many advantages such as higher specific stiffness and strength of alloy materials. They have used AISI 8750 alloy material for replacing the convectional steel shaft. They optimized the design parameters in order to reduce the weight of the drive shaft and the result showed significant potential improvement in the performance of the drive shaft. Also, the fuel consumption of the automobiles gets reduced due to the reduction in weight of the drive shaft. To predict the deformation of the shaft, they used finite element analysis.

Mohanraj K S [3] performed Design and analysis of composite drive shaft. In this paper he studied physical and mechanical properties of various materials then analysed some materials before production. This helps to endure the design life and to sustain the product life promises. He analysed the drive shaft using Ansys with same material and boundary conditions. Furthermore, he modified the convectional shaft with composite material and analysed under same boundary condition. After analysing different composite materials, he concluded that E glass has less stress induced in it as compared to other composite materials. Also, the E glass material has the maximum load carrying capacity.

Mr. Mali Sandip R, et. al [4] came up with Design and Optimization of Composite Propeller Shaft for Light Motor Vehicle. Their main aim was to reduce the weight of the propeller shaft by replacing two piece propeller shafts with single piece. They designed the propeller shaft with glass fibre and compared the results with steel shaft. To calculate the torque transmission capacity they did torsion test for both shafts. Using FEA software they determined natural frequency, mode shape and predicted failure of composite propeller shaft. They concluded that the glass fibre shaft was able to transmit the designed torque and it is 55.87% lighter than steel shaft.

Sweety P. Mhaske and Nitin P. Doshi [5] worked on Failure Analysis and Design Modification of Propeller Shaft of Bus. Their aim was to reduce the mass and buckling load of propeller shaft and to find out maximum deformation and stress. For this purpose, they used nickel chromium steel SAE 3145 to reduce natural frequency, torsional buckling and critical stresses developed on propeller shaft. They designed and analysed nickel chromium steel for the above stresses. Due to the external factors like road condition, different driving situations, different road adhesion, traffic condition vibration and Sudden Jerks are set up in propeller shaft; they studied design modification and analysis of propeller shaft of bus. They concluded that Nickel Chromium SAE 3145 material gives less deformation for the same loading condition and it gives higher factor of safety for the same loading conditions.

DESIGN AND SPECIFICATION OF DRIVE

Shaft modeling of Propeller Shaft In Ansys Workbench:

The propeller shaft is designed by required dimensions into the modeling software Ansys Workbench. The geometry of the propeller shaft is designed in Space Claim is imported to the analysis software in the scdoc format. The designed propeller shaft is below



Fig. Propeller Shaft

Propeller Shaft Model and Mesh :

The modeling of propeller shaft using Ansys Workbench and the same is used for structural analysis. Then the meshing is generated in Design modeler. The finite element mesh of the propeller shaft model is shown in Figure



Fig. Finite element mesh of the propeller shaft

Structural analysis in steel propeller shaft



Fig. Deformation



Fig. Equivalent (von mises) Stress



Fig. Equivalent elastic Strain



Fig. Maximum Shear stress

Structural analysis in aluminium alloy propeller shaft







Fig. Equivalent (von mises) Stress



Fig. Equivalent elastic Strain



Fig. Maximum Shear stress

Structural analysis in Carbon Fiber propeller shaft



Fig. Deformation



Fig. Equivalent (Von Mises) Stress



Fig. Equivalent elastic Strain



Fig. Maximum Shear stress

Structural analysis in Epoxy Carbon propeller shaft



Fig. Deformation



Fig Equivalent (von mises) Stress



Fig. Equivalent elastic Strain



Fig. Maximum Shear stress

Structural analysis in E-glass propeller shaft



Fig. Deformation



Fig. Equivalent (von mises) Stress



Fig. Equivalent elastic Strain



Fig. Maximum Shear stress

Structural analysis in S-glass propeller shaft



Fig. Deformation



Fig. Equivalent (von mises) Stress



Fig. Equivalent elastic Strain



Fig. Maximum Shear stress

Design Calculations

Dimensions:

Sr. No.	Parameters	Values
1	Outer Radius (Ro)	0.0625 m
2	Inner Radius (Ri)	0.0602 m
3	Length (L)	1.2 m

Material Properties for carbon fiber:

Density = 1800 kg/m3, Poisson's Ratio = 0.2 Young's Modulus = 230 Gpa

DESIGN CONSIDERATION FOR A PROPELLER SHAFT

Propeller Shaft Design Formulae for Calculations:

Deflection:

 $Ymax = \frac{ML^2}{2EI}$

E = Young's Modulus of Aluminium

L = Length of the shaft

I = Moment of inertia

Maximum Shear Stress:

 $\tau = \frac{T \ x \ Ro}{J}$

T = Torque

Ro = Outer Radius

 τ max = Shear Stress

T = Torque

Design Calculations

For the hollow shaft,

Let Ro = 0.0625 m; Ri = 0.0602 m; L = 1.2 m; E = 230GPa and Torque=242 Nm

where,

Ro = Outer Radius

Ri = Inner Radius

l = Length of the shaft

E = Young's Modulus of Aluminium

T = Applied Torque

Deflection = Ymax = $\frac{ML^2}{2EI} = \frac{242 \text{ x} (1.2^2)}{2 \text{ x} 230 \text{ x} 10^9 \text{ x} 1.178 \text{ x} 10^{-7}}$

= 0.000454 m

Then,

Maximum Shear Stress: $\tau = \frac{T \times Ro}{I}$

 $=\frac{242 \times 0.0625}{\frac{\pi}{2}(\mathrm{Ro}^4 - \mathrm{Ri}^4)}$

 $= 4.53 \times 10^{6} \text{ Pa}$

Results

The results of analysis of propeller shaft are shown in the following table.

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Material	Weight (kg)	Weight reduction	Total Deformation (mm)	Equivalent stress (MPa)	Equivalent Elastic strain	Max Shear stress (MPa)
Steel	8.5	-	0.034	7.73	3.86 e-5	4.46
Aluminium alloy	3.01	65%	0.099	7.72	0.000108	4.46
Carbon Fiber	1.96	78%	0.31	7.79	0.000457	4.49
Epoxy carbon	1.62	81%	0.72	8.02	0.0012	4.66
E-glass	2.83	67%	0.089	7.73	0.00010	4.46
S-glass	2.7	68%	0.072	7.73	8.58 e-5	4.46

Graphs

Weight reduction



Total Deformation vs Strain Energy



Weight vs Deformation



CONCLUSION

Reducing the weight of the various components of a vehicle has been a challenging topic for most researchers over the past few decades, and it has a direct impact on the vehicle's performance and fuel consumption. This has been overcome by various alternative means, such as exchanging materials and reducing the weight of existing components, without compromising the efficiency of the vehicle. In this regard, this study focuses on the design of a composite propeller shaft of Bolero BS6 Model, which saves 67% to 81% of the weight of the shaft material and Aluminium alloy reduces 65% of the weight. A stress analysis was performed by the Ansys 2021 simulation package for verification and the stress values were confirmed to be safe.

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TECHNOLOGICAL DEVELOPMENT OF E-BIKE FORCOMMERCIAL PURPOSE

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ABSTRACT

Mobility(transportation) is an integral part of today's fast-moving life. For human beings, travelling has become vital in order to sustain. Petroleum (petrol, diesel) based automobiles have significantly increased since their developments. They are economical, readily available, and are convenient to use. But they are nonrenewable resources which are depleting rapidly, and they cause environmental problems during internal combustion due to emissions of Carbon Dioxide. Hence, these problems cannot be overlooked for its advantages. Therefore, a significant shift from these conventional resources to more environment-friendly resources is necessary and is of utmost importance in mobility. Due to these alarming situations, development in Science and Technology and increased awareness among the masses regarding the environment, various alternative fuels have been developed that can be used in bikes and cars. Ethanol, Natural Gas, Hydrogen, Biodiesel, Electricity, etc. are some of the alternative fuels that have been developed. But all these alternative fuels have some shortcomings like high cost, emission of methane (a greenhouse gas) during the production of ethanol or natural gas, etc. But when it comes to mobility, electric powered vehicles are still the best alternatives available. They are pollution free and cost effective as compared to petroleum-based vehicles. But one of the shortcomings in using electric powered vehicles is the distance that it can travel in a single charge. Therefore, it becomes necessary to increase the distance that a vehicle can travel in a single charge. This can be done by using a battery with more voltage, but this will increase the weight of the vehicle well as the cost. Therefore, this limits the use of electric vehicles in developing nations like India due to lesser availability of charging stations. Thus, in our proposed project, we intend to increase the distance a two-wheeler can travel in a single charge without significantly increasing the load on the vehicle.

*CRITICAL: Do Not Use Symbols, Special Characters, Footnotes, or Math in Paper Title or Abstract. (Abstract)

Keywords—component, formatting, style, styling, insert (key words)

I. INTRODUCTION

This template, modified in MS Word 2007 and saved as a "Word 97-2003 Document" for the PC, provides authors with most of the formatting specifications needed for preparing electronic versions of their papers. All standard paper components have been specified for three reasons: (1) ease of use when formatting individual papers, (2) automatic compliance to electronic requirements that facilitate the concurrent or later production of electronic products, and (3) conformity of style throughout a conference proceedings. Margins, column widths, line spacing, and type styles are built-in; examples of the type styles are provided throughout this document and are identified in italic type, within parentheses, following the example. Some components, such as multi-leveled equations, graphics, and tables are not prescribed, although the various table text styles are provided. The formatter will need to create these components, incorporating the applicable criteria that follow. This project presents a review on self-charging Electric Bike. The first electric bike was developed in 1890's in U.S. On 31st December,

1895 Ogden Bolton designed a battery powered cycle, later in 1990's torque sensors and power controls were developed including some modified version of bike with NiMH, NiCadand Li-ion batteries which offered lighter weight capacity battery. But these bikes faced decrease in production when petrol and diesel resources came in existence.

Taking consideration of recent events of lack of resources and facilities at their disposal, over increasing traffic, problems of parking and need to make more environment friendly we have studied and designed self-charging E-Bike.

The present type of E-Bikes is modified day by day but also has some limitations. If the battery discharges in travelling it creates problem such as low mileage. So, some modification is required in the design of E-Bike. Recent developments on electric bikes which are pedal operated are tremendously increasing all over the World market.

As it is seen that energy crisis is one of the major concerns intoday's world due to fast depleting resources of petrol, diesel and natural gas. In combination with this, environmental decay is an additional factor which is contributing to the depletion of resources which is an alarming notification. Our project purposes solution for this problem. The system which we innovated is the Electric Bike. This project has various benefits both to the members of the team and also external benefits thereby making awareness of using alternative modes of transport. The Electric Bike which works on the battery that is powered by the motor is the general mode of transport for a local trip. The recharging circuit (dynamo/ DC generator) can be alternative source for this by adding it to the system. The Electric bike which will be running onbattery, the power is supplied by the motor, thereby supplying this power to drive the other gear components.

The main purpose of using this E-bike is that it is user friendly, economical and relatively cheap. The efficiency of this system undeniable compared to conventional modes of transport.

In China 9/10 electric bikes are sold, thereby proving that they are not only energy efficient but also relatively cheaper than other electric automobiles. It enables to ride in hilly areas and also in windy areas with much less human effort.

II. IMPOTANCE OF E BIKE

Due to rapidly growing population, industrialization and the world moving at a faster rate, need for transportation (mobility) or more precisely, need for personal mobility has increased. It is very important that time taken for travelling should be reduced, while considering its economic and environmental aspects.

With the fast depleting resources of conventional fuels like petrol and diesel and also their prices increasing rapidly, there is a need to find an alternative. Taking this into account, a shiftaway from conventional based fuel to using renewable source of energy is the need of the hour.

Electric bike is such an example which is widely used for personal mobility. They are pollution free and cost effective as compared to petroleum-based vehicles. But one of the shortcomings in using electric powered vehicles is the distance that it can travel in a single charge. Therefore, it becomes necessary to increase the range that a vehicle can travel in a single charge. This can be done by using a battery with more voltage, but this will increase the weight of the vehicle as well as the cost.

In today's world most of the vehicles runs on non-renewable energy sources like petrol and diesel, but nonrenewable sources are limited. As we know that vehicles which runs on non-renewable sources are not environment friendly as they cause pollution. So, E-bike is one of the best solutions for personal mobility. But normal E-bike is not comfortable for long distance travelling due to charging problems. Therefore, the precise requirement is self-charging electrical bike in which the bike charges battery without any external energy. So, this makes it more efficient as well as it is pollution free.

III. LITERARATURE REVIEW

In various reports they have made BLDC / PMDC Electric- Bikes and have used dynamo[1], D.C. generators or solar cells for self-charging purposes. In the solar cell concept, they have used solar panels but that added to the overall weight. In the dynamo setup, the principle of working of BLDC motor will run the E-bike and the dynamo attached to the rear wheel willcharge the battery.

In our project we have economized this by charging the battery by both dynamo and motor. For braking system, Regenerative braking will be used, hence both the motor and generator will charge the battery. Also, we have added the option of pedaling, in this case too battery will be charged through both motor and generator. In order to comprehend this system, we made use of 2 set of batteries one attached to each generator and motor.

In this paper they have presented an experimental and numerical study on E-bikes. The aim of this paper is to showthat the normal bi-cycle can be upgraded to electric one by some means– that including the development of non-hub drive system, brushed DC motor for high performance. Because of some weaknesses in the existence system, the idea of a solar bicycle is implemented. The idea used is to make the bicycle last longer and can be automatically recharged when the bicycle is not in use by the renewable solar energy.

In this project they have used a 220V AC, 50Hz, and 3.0A Charger with the following specifications: INPUT - 180-250VAC,50-60HZ OUTPUT - 12-15V DC 3.0AMP.

In charger circuit a 220/12v step down transformer attach with a rectifier circuit and a low battery indicator circuit is used. Atop speed of 20 km/h is obtained.

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This paper is based on charging arrangement on the e-bike. The motor uses the electric energy from battery and battery can receive electric energy from dynamo, this energy is stored in the battery. Today available e-bike are use 3-4 no's of 12v batteries. But in this paper, we use only one 12v battery, so battery cost is reduced. Then these batteries are charged by dynamo. So electric supply cost also reduced. As a conclusion, comparing this project electric vehicle with the commercial electric vehicle. This vehicle is efficient to run doubled the distance of ordinary electric vehicles.

This paper is concerned with producing and making use of E-bike with such a mechanism that the power source (battery) gets charged efficiently without frequent charging. Along with regular E- bike components (Motor, Battery, Generator, brakes etc.) they have made use of Flywheel which store energy due to rotation and helps in charging the battery. The most important feature of this bicycle is that it does not consume valuable fossil fuels thereby saving the money. It is eco-friendly & pollution free, as it does not have any emissions. Moreover, it is noiseless and can be recharged withthe AC adapter in case of emergency and cloudy weather. In this project, they have used a DC motor/generator attached to the rear wheel of the bicycle. Two sets of batteries are connected to the setup such as A and B. When one of the batteries gets discharged another battery will provide the power required. During that time, the rotation of the wheel rotates the shaft of the dc motor/generator which produces an output of voltage. This voltage helps in the charging of the battery thus by increasing the mileage of the electric bike.

This review focuses on the concept that Present rendition of Electric bike accessible in business sector is not self-charging and this bike endures with more weight. Such bicycles utilized for short separation. The expression "SOLAIR" (Self charging electric bike) is utilized to depict "electric-engine controlled bikes," including both completely and incompletely engine fueled bikes. This anticipate is comprise six separate parts: The Battery, Dynamo as a wind generator, the BLDC engine, controller, charging framework and sun-oriented board. Utilization of disentangled Mechanical outline and less weighted dry cell batteries to defeat the above issues. Wind- sunlight based blend is utilized for self-charging. Because of that bike get to be brilliant and pace is expanded. Charging time required for battery of this bike is less and releasing time is more.

The main aim of this review paper[2] is to present the idea of harnessing the various energy and use it in today's existence of human life. For human being travelling has become vital inorder to sustain in this fast-forward world. Taking all this intoaccount, a shift away from conventional based fuels to using a renewable source of energy is a must. Electric bi-cycle which will be driven with the help of battery and thus provide required voltage to the motor. The focus of this report is to system design of this electric bi-cycle. Therefore, the manufacturing of such bi-cycle is indispensable. Electric bicycle is an alteration of the current cycle by utilizing electric vitality and furthermore sunlight-based vitality if sun powered boards (Solar panels) are given, that would aggregate up to increment in vitality generation. Since it is vitality proficient, electric bicycle is less expensive and reasonable to anybody. Here the charging time is estimated to be around 2 hrs. throughcharger and 3.6 hrs. via. Solar charging.

Increasing demand for non-polluting mechanized transportation has revived the interest in the use of electric power for personal transportation and also reduced reliance on automobiles. Electric bike is a low-cost alternative to an automobile. The project is based on the fabrication of an electric bike that will help to commute the last mile. The system consists of a battery power source. Objectives here arecompactness, light-weight, fast & reliable. The Urban Electric Bike is driven by BLDC Hub Motor fitted in the front axle and is operated by battery power. The speed of the E-Bike is controlled by means of twist throttle which will vary the amount of current passing through the controller and hence to the hub motor. The key feature of the E-Bike is that it can befolded by means of folding arms which helps it to be accommodated in situations where it is not in use. The bike can further be improved by using: Solar panels and piezoelectric materials on the front and the rear frames of themudguards or other places which would be responsible for trapping energy & converting the same into electric energy thereby improving the battery's efficiency[3].

Present version of Electric bicycle available in market is not self-charging and this bicycle suffers with more weight. Such bikes used for short distance. Use of simplified Mechanical design and less weighted dry cell batteries to overcome the above problems. Wind-solar combination is used for self- charging. Due to that bicycle become smart and speed is increased. Charging time required for battery of this bicycle is less and discharging time is more. Some components such as motor, controller, battery, governor was installed in common bicycle, it is called electric bicycle. The speed of electric bicycle is controlled by controller, which ensure the electric bicycle safety and it is also the core component. The driving force of traditional electric bicycle completely come from motor; it not only reduces battery life greatly but also waste more electricity energy. The design is very efficient, cost- effective, and one day mass-manufactured, especially in developing countries where automotive transportation is an impossible. Here, the self-charging electric bicycle market

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would benefit from further research both on the battery and on the drive technology and their use with electric bicycles. A self-charging electric bicycle based on a brushless dc motor drive which has high efficiency, zero pollution, clean and convenient, is then designed and implemented in this project. This paper first explored the barriers to bicycle adoption, in particular for a tropical university campus environment, and hence propose technological means to overcome these barriers by defining and testing a range of electric bicycle alternatives to converge on a suitable solution. The electric bicycles inquestion use a pedelec sensor to control 200 to 250 W electric motors in a rider-assist configuration (chosen to be in Sustainable and practical personal mobility solutions for campus environments have traditionally revolved around the use of bicycles, or provision of pedestrian facilities. However, many campus environments also experience traffic congestion, parking difficulties and pollution from fossil-fueled vehicles. It appears that pedal power alone has not been sufficient to supplant the use of petrol and diesel vehicles todate, and therefore it is opportune to investigate both the reasons behind the continual use of environmentally unfriendly transport, and consider potential solutions compliance with Singaporean or European laws). The rider must pedal, causing the motor to contribute to the motion. The main aim in this environment being to ensure that whether the rider is going uphill, down, or riding on the flat, their rate of energy expenditure can be maintained low enough to prevent excessive perspiration. These electric bicycles, of many types, have been evaluated in practice in a semi-public hire scheme on the Nanyang Technological University campus in Singapore. The results of the study, including insights into the scheme and various findings are presented here in this paper. Aim of present study is to learn about different types of alternative energy sources to run a bicycle & try to find some new idea in improving electric bicycle. In this paper it is stated that the problem of traffic and pollution due to fossil fuels is increasing in the whole world. Due to gases like carbondioxide, carbon monoxide and other gases rate of global warming effect is increasing, that will directly affect upon ambient temperature. The sources of conventional fuels are decreasing therefore increasing in the cost of fuels in India and all over the world, we need to do some research on converse of another source of energy. As we can see that the people in India use personal two-wheeler vehicles to travel smalldistances, therefore the traffic problems in India is increasing very fast. To avoid they have made very compact and environment friendly vehicle. A power assisted bicycle is form of transport system that attempts to merge both healthand environmental benefit. Cleaner technology as well aslesser dependency on oils. It is very important that the time taken for travelling should be less, also it should be economical & easily available. This feature performs better than gasoline.

This paper[4] discusses the suitability of BLDC hub motor based electric propulsion system in an electric bicycle to achieve better dynamic response. The results illustrated in this paper can help in designing an electric bicycle to the ratings of one's requirement & can be extendable to tricycle application for physically challenged society. The Power- Assisted bicycle is a form of transportation system that attempts to merge both health and environmental benefits. It offers cleaner and eco-friendly alternative to travel short-to- moderate distances. These features prove their performance better than gasoline powered vehicles. This paper discusses the suitability of BLDC hub motor based electric propulsion system in an electric bicycle to achieve better dynamic response.

Here suitability of BLDC motor with smooth running operation is shown & in future sensor less operation can be adopted to overcome limitations & expenses of sensors. The system performance can be improved if renewable energy sources or fuel cell technology is integrated as a source of power.

Now days the automobile industry become more competitive the vehicles can get the energy from petrol or diesel engine for its drive. the recent years e-bike became more attractive and less maintenance cost. But only drawback of e-bike is it requires frequent charging form EB supply. In this paper is based charging arrangement on the e-bike. The motor is using the electric energy from battery and battery can receive electric energy from dynamo. this energy is stored in battery. Market available ebike batteries are designed to spent 6-8 hours/charge by using EB supply. This e-bikes running cost is very low, when compare to other sources of energy. Today available e-bike are use 34 no's of 12v batteries. But in this paper, we use only one 12v battery, so battery cost is reduced. Then these batteries are charged by dynamo. So electric supply cost also reduced. Comparing this project of electric vehicle with the commercial electric vehicle. This vehicle is efficient to run double the distance of ordinary electric vehicles. As a result, electric vehicle not only used for short range transportation, it can also be used long range transportation's too. Though this electric bike is independent from external power supply it may be used for charger free transportation's and it payees' better path towards pollution free atmosphere for our nation. In the coming future, it is forethought that all the petrol bikes need to be replaced by the E-bikes as there is fuel energy crisis and also to save our mother earth. And also, it made a low cost of transportation for the human being's. This vehicle also gives' safety driving for human being's because of it's limited speed.
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A shift away from conventionally-fueled land transportation vehicles towards greater use of renewable energy fuel sources is needed to manage increasing vehicle usage and associated adverse environmental and human health impacts. Power assisted electric bicycles (PAEBs) provide a means to reduce vehicle emissions within urban areas. PAEBs can utilize electrical power generation from solar energy, reducing the demand from power generating stations using non-renewable fuel sources. While applications of solar energy charging stations for electric vehicles exist, the use of onboard solar power generation on a PAEB has received little focus and warrants further design and experimentation. An analysis of solar power generation from an on-board solar panel in various bicycle riding conditions was conducted. On-board solar power generation using the Elora Research Station solarirradiance data supplied only 13% of the required power for typical city riding conditions excluding the effects of wind and uneven riding terrain. Riding conditions that provided greater than 25% of the required power through on-board solar power generation were primarily limited to ground speeds (Vg) muchslower than typical city riding speeds. The use of on-board solar power generation is a viable option for recharging the system battery. One full day of solar charging replenishes

138.20 Wh (approximately 42% of battery capacity), which issufficient to supply 100% of total for trip distances up to 30 km. The main aim of this review paper is to present the idea of harnessing the various energy and use it in today's existence of human life. For human being travelling has become vital.in order to sustain in this fast-forward world he must travel from place to place. It is very important that time taking for travelling should be less, also it should be economical and easily available. With the fast depleting resources of petrol and diesel, there is need to find intermittent choice. Taking allthis into account, a shift away from conventional based fuels to using a renewable source of energy is a must. Electric bi- cycle which will be driven with the help of battery and thus provide required voltage to the motor. The focus of this report is to system design of this electric bi-cycle. For counterbalancing ecological contamination utilizing of on – board Electric Bicycle is the most feasible arrangement. It can accused of the assistance of AC connector if there is a crisis.

The proposed [5] work deals with a fabrication and testing of a battery electric vehicle with self-charging system for 2 passengers and for weight up to 250kgs. An attempt has been made to fabricate a self-charging battery electric vehicle which utilizes the rotational energy of wheels to charge the batteries, thereby introducing a system which makes the vehicle pollution free. The fabrication of chassis is made for the similar dimensions of commercially available golf carts in market with some changes in its size and shape using C Channel type of Mild steel material.[6] The components likealternator, motor and DCDC converter was arranged in a manner to transfer the rotational energy being experienced by the MS bright rod to the alternator. The alternator here has the capacity to produce 12V to 14V, which is directed to DC-DC converter through a battery source. Here in DC-DC converter the voltage source is stepped up to 54V, which is enough to charge the 4 batteries in series which vields to 48V usage. Thus, the batteries which are used to provide the rotational energy to the shaft through a motor is receiving back the sufficient voltage source to recharge it. [7]The vehicle is tested for the supply of source to the batteries using multimeter, distance travelled with and without the recharging circuit is also studied and is found to be effective in its work. The work is defined to develop a battery electric vehicle for closed circuit areas like railway station platforms, Golf clubs, hospital corridors, industries etc. [8]The concept of plug in charging which is found in conventional battery electric vehicles was targeted to replace by the concept of self- charging in the defined work. The work started with the studyon technology, components utilization and the future of battery electric vehicles. Based on the study the outline of the electric vehicle was framed to carry 2 passengers or a weight of 250 kg.

The[9] emissions of CO2 caused by the transport sector can be reduced by the battery electric vehicle. The wellto-wheel CO2 emissions are reduced by approximately 50% compared to a similar internal combustion engine vehicle. The efficiency and energy use of a battery electric vehicle are very dependent on the source of the electricity. In this research the average electricity mix in Europe is used. The best efficiency is achieved by the Nissan Leaf with a W-T-W efficiency of 27.1%. The Toyota Yaris has a W-T-W efficiency of 16.5%, the lowest efficiency of all the vehicles researched in this thesis. [10]The primary energy consumption of a battery electric vehicle compared to an internal combustion engine vehicle does not differ significantly. The Smart Fortwo diesel has a primary energy consumption of 1.40 MJ/km, the lowest of all the vehicles researched. The Smart Fortwo is followed by the Smart Fortwo electric, the Mitsubishi iMiev and the Nissan Leaf with a primary energy consumption of 1.48, 1.55 and 1.64 MJ/km respectively. The highest primary energy consumption is achieved by the Ford Focus petrol with 2.59MJ/km. The dependence on fossil fuels cannot simply be reduced by the introduction of the battery electric vehicle. Increasing the amount of renewable energy in the European electricity mix is utmost important for reducing the total use of fossil energy. The potential of the BEV in reducing the primary energy consumption and emissions caused by the road transport is very high. The potential of the BEV is dependent on the future source of electricity charged into the car.[11] A high percentage of renewable energy in theEuropean electricity mix will make the BEV a very clean and highly efficient alternative to the ICE vehicle. The BEV will most likely remain a niche market the next decade as the high retail price will hold back consumers.

IV. OBJECTIVE

Taking into consideration the recent events of depleting resources and their facilities at their disposal, increasing traffic, parking problems, and the need to make automobile more environment friendly, designers of vehicles are back on E-Bikes which has an advantage/ solution over above mentioned problems.

The objective of our proposed project is to develop a self- charging mechanism which will charge the battery while it is in motion to increase the distance travelled by the E-Bike in single charge (mileage). This will save the energy required for charging and thus reduced the charging frequency. This will thus give a boost for the use of Electric Bikes in a developing nation like India where availability of power stations is an issue.



V. DESIGN OF SPROCKET AND CHAIN FORELECTRIC BIKE:

 \therefore σ s is less then allowable so our shaft design is safe.

We know, Transmission ratio = $\frac{\text{Teeth on larger sprocket}}{\text{Teeth on smaller sprocket}} = \frac{Z_2}{Z_1} = \frac{44}{16} = 2.75 \approx 3$

TORQUE CALCULATIONS:

Here we have used permanent magnet self-generating motor with 250-watt power and 3000rpm. The motor runs on24volts and 2.2amps power source. This motor can reach a peak current during starting equal to 13.4 amps.

$$P = \frac{2 \times \pi \times N \times T}{60}$$

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 $\therefore \sigma_{\rm S} = \frac{16 \times 2387.31}{\pi \times 9^3} = 16.67 \,\,{\rm N/mm^2}$

. σs is less then allowable so our shaft design is safe.



VI. RESULTS AND CONCLUSION

Voltage rating for motor = 12-24 VRated speed = 1000 - 3000 rpm Current rating = 10.4 A

Power rating = 250 W

Li-ion battery = 24 V battery

Bike wheel to sprocket ratio is 26" diameter to 1.3" diameter

= 1:20

15 - 16 miles hours of speed is required to charge a battery of 24 volts.



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Each cell provides 4.2 V and 2.5 Ah 28 cells are used in series thus giving the resultant voltage of = 117.6 V This constitutes of one battery set, thus two such battery sets are connected in parallel thus giving a total current of 2×2.5 = 5 Ah Thus, specification of the entire battery is 117.6 v and 5Ah and 2A current charger will be used to charge the battery. Charging time of entire battery is $\frac{5Ah}{2A} = 2.5$ hrs. Discharging of battery: Since the motor is rated as 250W, therefore maximum power is obtained as 250W. Assuming ideal conditions, Power (P) = 250W We know that P = VI, Where P = 250W, V = 24VTherefore, current drawn from the battery is $\frac{P}{V} = \frac{250}{24} = 10.4 \text{ A}$ This implies that 10.4 A current will be drawn from the battery at maximum power (full throttle) at no load. Therefore, discharging time = $\frac{5Ah}{10A} = \frac{5\times60}{10} = 29$ minutes This means battery will discharge in 29 minutes at maximum power.

The path for electric two-wheelers makers is relatively easier compared to cars and buses. The components required are lower, designing and delivery of power are simpler. But the biggest reason is the huge demand and the lower relative costrequired to buy them.

India is a country that loves the two-wheeler concept. On onehand, there are those who use it daily as it is cheaper and easier to carry it with themselves and their goods. While on the other, there are those who ride two-wheelers because it is of the coolness factor and the fun it offers. Both the segments will find it easier to pay for and test the electric bikes which are new and unknown, as compared to putting hefty money and getting an electric car. Electric bikes are definitely a trend that seems like it's set to continue growing. This is partially because they can appeal to almost everybody. The battery technology is evolving so that most bikes can run anywhere from 25– 70 miles on a single charge, meaning many will be able to use the bikes for their commutes and can also help someone training without overexerting themselves. With such an upsurge of electric bikes in the market, the Electric Vehiclesegment of India is expected to get a boost. There is no doubtthat India will emerge as the driver of electric vehicles.

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EFFICIENT AND COST EFFECTIVE DRONE - NDVI SYSTEM FOR PRECISION FARMING

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ABSTRACT

The motive of the project is to develop a under budget system that automates the process of farming by interfacing cutting edge technologies like Drones and 'NDVI' to improve the level of productivity in Agriculture. Humans and satellites have a hard time beating a drone's eve for detail in scanning farming systems from above. Flying below the clouds, collecting and sending images in almost real-time, unmanned aerial vehicles (UAVs) gained ground quickly in agriculture in the last decade as part of so-called precision agriculture. Among their wide range of applications, they can help farmers check crops' health, track livestock, plan fertilization, assess damages, and map fields at high-resolution. But all this comes with a cost. Currently the models of drones used for such applications cost extensively higher, which makes it unfeasible for the small farmers, especially in India. The projects aims on designing a drone system that can work on both autonomous as well as manual mode and perform mapping, inspecting and spraying processes with efficiency accuracy and considerably good speed which can help boosting the profits of the farmers with large as well as small agricultural lands. As there are lots of restrictions on Drone flight in India. The project aims to follow and implements all the norms stated by the government. (e.g. Permission before flight). The project aims towards overcoming all the above mentioned problems by automating the procedure.

Keywords—NDVI, UAV, Arduino, STM32, GPS, gyroscope)

INTRODUCTION

Agriculture is the backbone of India's economy, which accounts for 18% of India's Gross Domestic Product (GDP) and hires about half of the countries workforce. More than 70% of rural families depend on agriculture for their livelihood. Housing about 17% of the total world population, India faces the challenge of fulfilling the demands of agricultural commodities for this ever-growing population. Smart farming concepts like precision agriculture can be aptly deployed to achieve this goal. Precision farming is an integrated crop management system which uses remote sensing (RS), GPS, and geographical information system (GIS) to monitor the crop field at ground level. The first step in precision farming is Monitoring of crops. The best method for automated Monitoring of the farmland is by using the concept of NDVI in integration with either satellite imagery or suitable UAV hardware.

Proposed design

ND

NDVI(Normalized Distribution Vegetation Index)

For tracking the health of crops in the field Crop Monitoring is a perfect tool. For the same purpose NDVI can be measured on the fly. Normalized Difference Vegetation Index (NDVI) is a dimensionless index which qualifies vegetation by measuring the difference between near infrared (which vegetation strongly reflects) and red light (which vegetation absorbs). In simple terms, NDVI is a measure of the state plant health based on how the plant reflects light at certain frequencies. The result of the NDVI calculation range from -1 to 1. The higher the NDVI value the greater is the crop heath. If the value of NDVI is 0.1 or below, it indicates that the area under observation is either barren, rock, sand or snow. While the values 0.2-0.3 represents grassland and shrubs. The high values 0.6 and above correspond to temperate and tropical rainforest.

NDVI = (NIR - RED) / (NIR + RED)



Fig [1] Concept of NDVI

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This concept can be implemented by using satellite imaging or by using Specialized Ndvi cameras with suitable hardware. The project focuses on using and improvising the second method that is using "UAV hardware with NDVI cameras " for generating NDVI images of the farm. The project aims at designing such a UAV that is cost effective, efficient and as user-friendly as possible.

HARDWARE DESIGN

Following are the specifications of the UAV hardware best suitable for the purpose. The configuration of drone used for the project is Quad X mode for better stability and optimum visibility of camera.

Part Name	Specification	
Body Frame	Material : Carbon fibreSize : 450mm diagonally	
• Motor(4 pcs)	 Bldc 1400kv motor Current draw : 12A/60S Thrust produce per motor : 750gm – 800gm 	
• Propeller (4 pieces)	Size :10 inchPitch : 4.5 mm	
1. Electronic Speed Controller (4 pieces)	 ESC 40A Use in Range : 2S – 4S Lithium Polymer Battery 	
• Battery	 Name : 4S lithium Polymer Battery Capacity : 3300mA Battery Efficiency: 80% 	
• Gimbals	• 2 Axis Servo Based Gimbals	
Landing gear	Material : Aluminium	

Table[1] Selection of Hardware and Specifications

LOAD CALCULATION

- Total estimated mass of drone along with pay load is 1.5KG
- Thrust produced by one motor is approximately 800gm
- Total thrust produced by 4 motor is (4×800gm) =3200gm =3.2KG
- Therefore power to weight ratio is around 2:1

FLIGHT TIME CALCULATION

- FPV drone flight times=(Battery Capacity * Battery Discharge /Average Amp Draw)*60
- Eg. Flight time = (3.3*0.8/5*4)*60 = 7.92 minute

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Fig[2] Quadcopter 'X' Configuration

Key cost optimizing factors.

Open source Flight controller

A flight controller (FC) is a small circuit board of varying complexity. Its function is to direct the RPM of each motor in response to input. A command from the pilot for the multi-rotor to move forward is fed into the flight controller, which determines how to manipulate the motors accordingly. It works on PID control system to maintain its position with maximum stability during the flight.

Generally the cost of customizable flight controller with such high configuration is quiet higher. This majorly adds to the costing of the drone. This can be avoided completely by building a flight controller with a open source micro-controller like Arduino, STM32 which can cut the cost of the project extensively. Moreover it can be customized to infinite level.

Components attached to the flight controllers

- Signal Receiver
- Accelerometer, Gyroscope, ultrasonic, barometer sensor modules
- GPS modules
- Telemetry Transmitter.
- Gimbal circuitry

Functions and Characteristics of the flight controller.

- Self balancing drone controller
- Autonomous flight control mode This mode enables the drone to move to specific coordinates as preprogrammed without any manual interactions.
- It allows switching between Manual as well as Autonomous mode whenever required.
- It enables Telemetry communications which helps to display the visuals captured by the on board camera at the remote station.
- It can be customized with different attachments for various applications.

Servo based 2 axis gimbal

The final result of the crop monitoring is represented in the form of a color distribution map. For this mapping purpose a very stabilized video footage of the field is must. Thus a Gimbal system is attached to the drone to get a smooth video. Gimbal is basically used to prevent the shaking of the camera. It damps around 80%-90% of the vibration occurred due to movement of drone, wind or other external factor. The Gimbal system consists of two brushless servomotor that aim to prevent vibration. It is based on the feedback generated from on board gyroscope and accelerometer. The whole logic of the system is to create a reverse motion in the opposite direction of the vibration so that the vibration can be resolved and a smooth footage of the field can be captured.



Fig[3] 2 Axis Servo based Gimbal

Modified Ndvi Camera

The cost of specialized NDVI camera is quiet higher, This can be optimized by using two methods

- 1. Modifying the currently available 15-20 megapixel video cameras by replacing the normal lens by NDVI lens. E.g.- Go pro Hero 4 with NDVI lens
- 2. By modifying the conventional camera to NIR camera by removing the infrared filter from the camera.

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Fig [4.(a)] Consumer camera – Canon A450, [4.(b)] Removal of infrared Filter, [4.(c)] Modified Camera Output

Open source supporting softwares

The software used for programming the flight controller is a open source software "Arduino.ide" which open ups a lot of possibilities of improvement and modification in the project.

A waypoint mapping software is needed to plan the autonomous flight of the UAV. This can be done either by developing a software in visual studio or by using a open source software such as Ground control station software. This method is highly efficient and cost effective for the project. Further for generation of NDVI images of the farmland a software is required that compiles the images shot by the on board camera and compile it into final NDVI map of the farm. This can be done using a open source software like PIX4D which gives quite accurate results.

IMPLEMENTATION

The monitoring of the farm is done with the help of Autonomous or manual mode. In Manual mode the operator skills is required in photo coverage of whole farm. Whereas in Autonomous mode The path of the drone is predesigned and can be fed to the drone by any open source software or self designed app. The live location of the drone can be tracked via GPS(Global Positioning System) signal transmitted by the on board GPS module and the location can be displayed on the Open source software like 'GCS' which has integrated map option in it.



Fig.[5] Waypoint path mapping on Ardupilot

The below figure clearly displays the precision of the NDVI image where the green color displays good quality crops (crops with high levels of chlorophyll) and the part in red color displays the discontinuity of plants or bad quality / spoilt plants.(due to lack of chlorophyll). The image displays the results of 2 different dates with a interval of 30 days performed by



Fig.[6] NDVI Output results of a between a period of 30 days

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EXPECTED OUTCOMES

- NDVI gives powerful insights and makes it easier to visualize crop health that the naked eye can't see. It shows you where the problem is in advance so you can fix it faster.
- NDVI technology does not replace humans, but it does help make your job easier. And with drone mapping software, it's becoming one of the most successful methods to easily and quickly assess plant and crop health and improve farm yields.
- The project might appear expensive for individual farmers in India, but It can be economically justified by using it as a government project adopting the whole village or can be contributed amongst several farmers and can also be rented. This is possible because of its faster operating speed and wide range.

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PLASTIC AND MICROPLASTIC COLLECTION SYSTEM

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ABSTRACT

Widespread contamination of plastic calls for management solutions. As a consequence of increasing plastic production and inefficient waste-management strategies, plastic debris contaminates many, if not living organisms, including human beings. The ill effects of plastic on living organisms is not an alien piece of information. Moreover, plastic does not biodegrade and can consequently travel long distances in the aquatic environment.

More recently, scientists have begun quantifying plastic debris in freshwater and plastic debris has now been reported on the beaches, lakes, and rivers and riverbanks. There are several sources of plastic debris and their entry into the environment may occur at all stages of the life cycle of the plastic product. These include both land-based and maritime sources.

Keywords—plastics, microplastics

INTRODUCTION

With the diversity and usability of plastics, it is not surprising that many products on the market are made of plastic. However, with the advent of this material, a huge amount of garbage has arrived that is now invading the environment. Plastic has a variety of purposes and is cheap to manufacture, so during the 100 years it was built, it has become the basis for many commercial products. In fact, over the past 75 years, plastic production has increased from 1.5 million tons to 322 million tons per year. As a result, universal availability and mass production of products means that many plastics are unnecessarily discarded to allow them to contaminate water near other residential areas. An estimated four million to 12 million tons of plastic are estimated to have fled to marine areas since 2010 only when sea urchins and other water bodies will be collected (Coppock et al, 2017). Those plastics can then be broken down into tiny plastic particles in seawater that make them difficult to remove from the environment.

[1] Analysis of the Ganga River by the NGO Toxics Link in Delhi reveals the contamination of small plastics, described as solid synthetic particles with a size ranging from 1 micrometer (μ m) to 5 millimeter (mm), insoluble in water.

The Ganga flows across five provinces and is in the middle of a major work being done by the Center, through the National Mission for Clean Ganga, to remove it from pollution.

Microplastic is considered a major source of pollution in the oceans. Neglected sewage from many coastal cities, industrial waste, and religious offerings wrapped in non-perishable plastic that piles up sewage as it flows through several densely populated cities. Plastic waste and waste products dumped or dumped into the river are demolished and eventually broken down into smaller particles and the river eventually carries large quantities downstream into the ocean, which is the main source of all human-used plastics.

PROBLEM DEFINITION

Definition of microplastics

Plastic trash comes in a wide range of sizes in the environment. In the early 1970s, researchers discovered microscopic beads and shards of plastic, particularly polystyrene, in the water. In the mid-2000s, the term "microplastics" was coined. It is now often used to define plastic particles with a maximum size of 5 mm [1].

Dangers of Microplastics

Microplastic can act as a catalyst for absorbing other pollutants that may cause further damage to wildlife and humans. Microplastics allow some impurities to be absorbed hundreds of times making the toxin even stronger. Studies have shown that microplastics are carriers of triclosan and polyvinyl chloride which is one of the most common pollutants that can act in a similar way to other pollutants. With a certain pH and high salt, the marketing power of microplastics is also increasing (Ma, Zhao, Zhu, Li, & Yu, 2019). This means that when microplastics reach the oceans, they can spread the toxins of other pollutants in the oceans. Due to the high absorption of toxins, when those pollutants are concentrated in microplastics, high-level trophic organisms suffer from high levels of toxins in their system.

Since the particles are tiny, small fish are likely to eat them. Most plastics can pass through the digestive system, but some pieces can be absorbed and placed in a fish fillet. This also applies to humans and the extent of the damage is less well known. However, when toxic to microplastic, organisms use a much more concentrated dose than microplastic. Plastics themselves can also accumulate in living organisms themselves. Species in the food chain can eat other organisms that have plastic particles already in their tissues. Over time, larger organisms can build up extra plastic in their internal organs. Organic tissue can become inflamed due to sharp pieces of plastic, and seafood suppliers can experience malnutrition and reproductive problems (Sun, Dai, Wang, Loosdrecht & Ni, 2018). Plastic can also block the digestive tract of an invading animal which can eventually lead to the animal's death

Microplastics may also act as a medium for invasive species, such as pathogenic organisms. In a study done by Inga

Kirstein (2016), there was a high diversity of organisms living in the microplastic and many produced bacteria containing pathogens [2]. Prior studies showed that there were even harmful algae species found on plastic debris. The algae were found in the biofilm that provided protection and collected nutrition for the bacteria growing in them. Other potentially dangerous bacteria were also found in the biofilm which can cause harm in other species in the ocean. They also can spread human pathogens from previous contact with humans. Because of the ease that plastics can enter the environment, many marine species are subjected to the consequences of human pollution.

Microplastics in the Environment

Improper dumping of plastics has led to their collection in the Pacific Ocean, known as the Great Pacific Garbage Patch. As a result of ocean currents, plastic particles from around the world are collected in the Pacific Ocean to form piles of plastic weighing an estimated 1.15 to 2.41million tons (The Great Pacific Garbage Patch, n.d) [3]. However, the Great Pacific Garbage Patch is not just a collection of plastic; some small spots are also present where the seawater collects. Plastic particles also accounted for 65% of the debris collected along the shores of the Tamar Estuary in the United Kingdom in 2010. The presence of plastics is growing, and its effects are evident in the ocean. The plastic pieces split into smaller pieces and form a pile of small plastics.

When the plastic gets old, like erosion, it often decomposes in the body and becomes very small pieces. Plastic is a durable material, so its molecular structure remains the same as it becomes physically thin. A study by Lisbeth Van Cauwenberghe (2013) found that even at a depth of 4,000 meters microplastics could be found [3]. Microplastics pollutants are not limited to the ocean surface and can be found underwater even on poles. The variety of plastics means that their different densities also cause some to sink deeper into the ocean. Drowning causes them to meet the ground beneath the sea.

Plastic waste as a source of microplastics

Second microplastics are formed when plastic materials disintegrate and disintegrate. The degree to which diffusion occurs depends largely on the environment, especially the temperature and the amount of UV light available. Any human activity based on the sea or on land can lead to waste disposal in the environment. Plastic debris may enter the sea directly, or find its way there through other wetlands or atmosphere. The key to preventing the flow of plastic waste to the sea is to prevent this waste from entering the surrounding area. Big things are much easier to see and may be more controllable than small ones.

About half the world's population live within 60 miles [100 km] of the coast, and population growth is significant. This means that the amount of plastic waste that enters the oceans from ground-based sources may increase unless significant changes are made to global waste management methods.

Microplastics in Sewage

Cosmetic products such as toothpaste and face cleansers with small amounts added, directly add microplastics to contaminated water. Along with synthetic fabrics made of polyester and nylon, the washing process results in thousands of spilled plastic strips accumulating in the sewage treatment plant. The water then flows into the wastewater treatment plant where it is filtered. Most of the water that enters the sewer in this way comes from houses and other municipal services such as laundry and textile services. Some products such as rope can remove plastic fibers from sewage.

Although 99.9% of microplastics can be filtered out of contaminated water, the extracted microplastic may eventually build up in the mud used for other purposes. Sewage has been found to be one of the main sources of microplastics entering the oceans and other bodies of water. Sludge can be used as a fertilizer and raw material.

As mud is restored to the environment, so microplastic is washed away after use and contaminates marine habitats.

Since the mass production of plastic began 60 years ago, mankind has produced more than eight billion tons of plastic. Only 9 percent were renewed, and another 12% were burned. Also, about 80 percent of the plastic that has ever been created, accumulates in landfills or ends up in a natural environment, eventually finding its way into rivers, streams, and oceans. Plastic accumulates in our oceans at an alarming rate - the mass of plastic sea creatures, the Great Pacific Garbage Patch between California and Hawaii, is estimated to be three times the size of France, while tragic images of animals are trapped in it. plastics are incredibly common. Plastic pollution has become a major problem - but one of the most insidious forms of pollution at sea is difficult to detect: microplastics. Plastic does not deteriorate, but it breaks down into smaller pieces, which lead to microplastics. It is smaller than 5mm in size, and much of the hundreds of millions of tons of plastic waste in our oceans are made of small plastic. How these tiny particles affect the environment is still a field of unprecedented research.

Sr.	Type of plastic	Production (in	Product and origin
No.		percentage)	
1.	Low Density Polyethylene (LDPE)	21%	Plastic bags, netting, drinking straws
2.	High Density Polyethylene (HDPE)	17%	Milk and juice jugs
3.	Polypropylene (PP)	24%	Rope, bottle caps, nettings
4.	Polystyrene (PS)	6%	Plastic utensils, cups, food containers
5.	Poly-Vinyl Chloride (PVC)	19%	Plastic films, pipe, cups
6.	Thermoplastic (PET)	7%	Plastic beverage bottles

Table 1: Plastic and production rates. [6]

CURRENT SYSTEM

The Ocean Cleanup

The Ocean Cleanup is a nonprofit engineering environmental organization based in the Netherlands, that develops technology to extract plastic pollution from the oceans and intercept it in rivers before it can reach the ocean. After initial testing and prototyping in the North Sea they deployed their first full-scale prototype in the Great Pacific Garbage Patch.

Their ocean system consists of a floating barrier at the surface of the water in the oceanic gyres, that collects marine debris as the system is pushed by wind, waves and current, and slowed down by a sea anchor. The project aims to launch a total of 60 such systems, and they predict this capability could clean up 50% of the debris in the Great Pacific Garbage Patch in five years from full scale deployment.

Interceptor 2.0

Interceptor 2.0 is an autonomous machine developed by The Ocean Cleanup to tackle the problem of plastic contamination in rivers. With integration of solar system the machine can drift in rivers for indefinite period, collecting plastic waste and ferrying the collected waste back to its base. A special barrier that occupies part of the river guides the waste to the tray in the Interceptor. The device automatically distributes collected garbage to several containers located on it. Thanks to this, its efficiency and effectiveness increase significantly. The Interceptor 2.0, can also be controlled remotely. For example, the level of containers' rubbish completion (max 50 m3) is checked without direct contact with the machine. Such information is necessary for the local team emptying and unloading it on land for further recycling.

System 001

System 001 is based on Interceptor 2.0 intended to solve plastic crisis in the Great Pacific Garbage Patch. It is a bigger version of Interceptor 2.0 first launched in September of 2018 for a short period of four months and was brought back to Hawaii due to inefficient plastic retention and a fatigue fracture in belt. All the errors were rectified and the system was reiterated as System 001/B and was deployed again in 2019. During both the deployment, the company gathered valuable data regarding collection and speed, which helped in optimizing

the machine even better. Even though both the iterations could not meet its expectations, the company is hopeful to achieve their set target with System 002.

PROPOSED SYSTEM

Taking inspiration from The Ocean Cleanup, we aim to build a system which will not only collect plastic but also microplastics from water bodies. Since, regular clean up protocols fail and the plastics end up in river bodies even after clean up, we aim to utilize the collected plastic in a manner so that it does not end up in landfills or in water bodies.

The system will consist of conveyors, pumps, mesh and fittings in order to trap plastics and filter out microplastics from water. The collected plastics will then be segregated depending upon their type and then will be sent for recycling and re-utilising in various applications.

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COMPARATIVE STUDY BETWEEN STRAIGHT TYPE AND PARTLY TAPERED STIRLING PULSE TUBE CRYOCOOLER

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ABSTRACT

Pulse tube refrigerators (PTR) have been notably studied in today's years. In evaluation with distinct cryocoolers, SPTR(Stirling Pulse Tube Refrigerator) has some superb advantages which may be inherent simplicity, immoderate reliability and espresso vibration at the cold end. For a pulse tube cryocooler, the increased overall performance of the pulse tube is crucial and is strongly related to the flow inside. Conventionally, flow straighteners are used at every end of the empty pulse tube to ensure a uniform flow. Numerical simulation of 2D viscous compressible oscillating flow changed into carried out for the uniform cross-segment and tapered pulse tube. Based on the numerical results, it modified into decided that for the taper pulse tube refrigerator can be drastically improved. It modified into decided that in evaluation with the uniform cross-section pulse tube, the fee of the secondary flow withinside the tapered pulse tube decreases while its distribution becomes a whole lot much less uniform, and is the purpose why the general overall performance of the tube can be improved in assessment with the uniform cross-section pulse tube can be improved in assessment with the uniform cross-section pulse tube can be improved in assessment with the uniform cross-section pulse tube can be improved in assessment with the uniform cross-section pulse tube can be improved in assessment with the uniform cross-section pulse tube can be improved in assessment with the uniform cross-section pulse tube can be improved in assessment with the uniform cross-section pulse tube can be improved in assessment with the uniform cross-section pulse tube can be improved in assessment with the uniform cross-section pulse tube can be improved in assessment with the uniform cross-section pulse tube.

Keywords—pulse tube cryocooler, flow straightener, efficiency

INTRODUCTION

The pros in using such a simple structure having minimum vibrations and no mechanical moving parts at the cold end basically make the Cryocoolers desirable in various application sectors. An empty pulse tube used in a cryocooler system can separate the cold and warm ends and transmit acoustic power across a temperature gradient, ideally with minimum power dissipation. However, the ramification occurs due to the internal gas flow and heat transfer, and different kinds of streaming may arise in the pulse tube and wither the system's performance. Common flow phenomena are known as streaming, which includes two kinds of streaming: Rayleigh and jet-driven streaming. Rayleigh streaming is a toroidal flow that is driven by the sidewall boundary layer effect. The presence of Rayleigh flow in the pipe increases the heat transfer between cold and warm ends, which will retard the performance of the system. Jet-driven streaming always occurs when fluid flows through the channel at the abrupt interface, such as the location between heat exchanger and pulse tube. In the pulse tube cryocooler, using a flow straightener in the two ends of the pulse tube is always necessary because a sudden change of the flow cross-sectional area easily occurs. Jet-driven streaming is usually reduced by putting a few screen meshes at the two interfaces between the end of the pulse tube and the heat exchanger. The application of a flow straightener in the pulse tube cryocooler also introduces some problems. To eliminate the need for the flow straightener, a smoothly tapered tube at the cold end of the pulse tube has been tested and proven to function well. However, in-depth analysis and comparison with other conventional configurations are yet to be done

LITERATURE REVIEW

Prof. Milind D.Atrey, Cryogenic Engineering: Lecture 26 Cryocoolers, IIT Kharagpur (2017).

In this lecture video, the author explained the working and classification of cryocoolers. a variety of cryocoolers were demonstrated using animation which created a base for the selection of the research topic.

Hassan Ahmed, Ahmad K Almajri, Saad Mahmoud, Raya Al-Dadah, Abdalqader Ahmad, CFD Modelling & parametric study of alpha type stirling cryocooler (2017). In this paper, a design was proposed and the further analysis of the alpha type stirling cryocooler was demonstrated. Also a bunch of process parameters were introduced in order to carry out the analysis.

Haizheng Dang , Dingli Bao , Tao Zhang , Jun Tan , Rui Zha , Jiaqi Li , Ning Li, Yongjiang Zhao , Bangjian Zhao, Theoretical and experimental investigation of the three-stage Stirling type pulse tube cryocooler using cryogenic phase-shifting approach and mixed regenerator matrices (2018).

In this experiment, the engineers used different approaches to enhance the efficiency of the pulse tube cryocooler. They implemented a cryogenic phase-shifting approach and mixed regenerator matrices together in a three stage Stirling type pulse tube cryocooler to get those results. They achieved a cryogenic temperature of 8K.

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Y.L. He*, C.F. Zhao, W.J. Ding, W.W. Yang, Two-dimensional numerical simulation and performance analysis of tapered pulse tube refrigerator (2007).

A new type of approach was proposed by the scientists introducing a tapered pulse tube which significantly changed the approach of increasing the cooling efficiency and overall performance. They analysed the results in 2D on Ansys Fluent.

Cungang Yan, Yibing Zhang, Jian Qiu, Xiaotao Wang, Wei Dai, Mingtao Ma, Haibing Li, Ercang Luo, Numerical and Experimental Study of Partly Tapered Pulse Tube in a Pulse Tube Cryocooler (2020).

This paper accompanies the comparison on tapered PT and a conventional PT. This experimental data was a base for this project. Those analyses and results are calculated on Ansys Fluent.

STATEMENT OF PROBLEM

It has continually been a studies hotspot to enhance the general performance of Stirling Pulse Tube Cryocooler (SPTC). Pulse tube is one of the important additives in SPTC. There are many issues related to this pulse tube, one in all that is the non-uniform waft of the gas. A waft straightener is delivered on the way to decrease the backflow and growth the uniformity of the waft. Since the issue is costly and tactics also are hard to perform, it may be decreased via way of means of optimising the operating parameters of the SPTC with the resource of CFD. This may be accomplished via way of means of analyzing and evaluating the Conventional SPTC and the Partly Tapered SPTC on ANSYS Fluent.

METHODOLOGY

ANALYSIS

Configuration



Fig.(a) shows a pulse tube cryocooler that uses a straight pulse tube with flow straightener, and Fig. (b) shows a pulse tube cryocooler that use a partly tapered pulse tube, which shows the fluid flow through the system illustrated by arrows. The cryocooler comprises a compressor, ambient-end heat exchanger, regenerator, cold-end heat exchanger, pulse td ambient displacers. The compressor uses dual-tube, flow straightener

Fig. (a), expansion volume, as opposed to pistons and displacer to reduce vibration; the pistons are supported by gas bearings, while the displacers are supported by flexure bearings.

Operating Parameters of the Cryocooler

Dimensions Of the Cryocooler:

Operating Parameters	Value
Working Gas	Helium
Mean Pressure (MPa)	3.5
Temperature of CHX (K)	77
Temperature of expansion space wall (K)	300

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Components	Diameter (mm)	Length (mm)
Cold end HE	32.5	10
Pulse Tube	15.4	73
Connect Tube	8.254	68
Flow Straightener	15.4	8
Partly tapered pulse tube	15.4 & 8.254	68
Expansion tube	40	10

Numerical Model



The temperature range of the models is taken from 300 K to 77 K; thus, the working fluid helium is treated as ideal gas. A pressure based solver is used to solve the compressible oscillating flow. A laminar flow model is used in the heat exchanger and flow straightener. An equilibrium model is adopted for internal heat transfer calculation. The conductivity

т

 $E^{\cdot} = 1 \oint P u Adt H^{\cdot} = 1 \oint u C T Adt$

 $S^{\cdot} = 1 \oint \Box u \ s \ Adt$

τ 1

and specific heat capacity of gas and solid material are the

function of temperature. Quadrilateral and triangle meshes are adopted in the models.

The total number of meshes is 10857 for the straight pulse tube with a flow straightener model, and 10600 for the partly tapered pulse tube without flow straightener model. The relationship between total power flow, acoustic power, and entropy flow is shown below.

 $\mathbf{H} = \mathbf{E}^{\cdot} + \mathbf{Tm} \mathbf{x} \mathbf{S}$

where E is the acoustic power; H is the enthalpy flow; S is the entropy flow; τ is the cycle time; and P¹,u¹, ρ , s,h² 1 are the oscillating pressure, velocity, density, specific entropy, and specific enthalpy, respectively. High-order terms are neglected in the above variables. The expansion efficiency of the pulse tube is defined as below.

 $\eta pt = H'/E$

Simulation results and analysis

Flow field distribution

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The flow field of the above types of pulse tube is compared. Fig. (a) and Fig (b) show the axial velocity distribution at the same moments of the straight pulse tube with flow straightener, and the partly tapered pulse tube without flow straightener, respectively. Fig. (a) shows that, the velocity of the gas in the connect tube is high, overthere jet-driven streaming does not occur in the pulse tube near the cold end because of the presence of flow straightener.

Fig. (b) shows that, although the gas velocity at the entrance of the tapered tube is high, the velocity decreases quickly and gradually becomes uniform as the cross area increases. Moreover, the influence distance is limited.

CONCLUSION

In this paper, to ensure a uniform internal flow in the pulse tube without using a flow straightener, a partly tapered pulse tube is suggested to replace the conventional straight pulse tube with flow straightener. The potency of the partly tapered pulse tube is investigated by using two ends of pulse tube— a straight pulse tube with flow straightener and a partly tapered pulse tube—in a simulation based on a pulse tube cryocooler with a flow straightener. The difference between the 2 kinds of pulse tube is the connect tube at the hot end of the pulse tube. The loss of acoustic power at the flow straightener can be eliminated by using a partly tapered pulse tube instead of a straight pulse tube without flow straightener. This paper focuses on the flow behavior of gas inside the pulse tube. In summary, a similar performance of the cryocooler can be achieved by using the partly tapered pulse tube extraight pulse tube with flow straightener. The partly tapered pulse tube can replace the straight pulse tube with flow straightener at the location of an obvious change in the cross-sectional area and provide a better option for pulse tube design.

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ESSENTIAL COMPETENCIES AMONGST THE STARTUPS PROMOTERS AND PROJECT MANAGERS: A REVIEW OF LITERATURE

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ABSTRACT

There has been a massive growth of start- up companies in India in the past 5-8 years. There is a lot of emphasis by these start-ups to provide products and/or services which add immense value to a consumer's life. With a focused approach and the fluid nature of how start-ups operate, there is a requirement of having good Project Management practices which consequently result in successful Projects, which eventually lead to Products or Services which can add value to consumer's life. There is vast literature available on what constitutes a "SuccessfulProject", and the author has noted several such success criteria in Literature Review. Based on the literature review, it has cometo light that one of the key considerations of a "Successful Project" is to have a competent Project Manager(s) leading the project. There are many noteworthy Project Management Space, but these frameworks and models suggested by several authors and experts in Project Management space, but these frameworks and models are generic in nature meant for organizations of a more mature state. The current paper is focused on identifying competencies which are expected by Start- up companies, in India with the focus on ensuring successful Projects and eventually leading to organization's success.

Keywords Project manager competencies, Startups inIndia, Project Success

INTRODUCTION

The long-term goal of the research is to develop a conceptual framework to identify essential competencies which are required for Project Managers in Startup organizations in India, which will be impactful for the success of startups. The Government of India defines startup, on its official Start-up platform (https://www.startupindia.gov.in/), as per G.S.R. 127 (E) DATED 19th February 2019 notified by DPIIT as follows,

- 1. Up to a period of ten years from the date of incorporation/ registration, if it is incorporated as a private limited company (as defined in the Companies Act, 2013) or registered as a partnership firm (registered under section 59 of the Partnership Act, 1932) or a limited liability partnership (under the Limited Liability Partnership Act, 2008) in India.
- 2. Turnover of the entity for any of the financial years since incorporation/ registration has not exceeded Rs 100 crore.
- 3. Entity is working towards innovation, development or improvement of products or processes or services, or if it is a scalable business model with a high potential of employment generation or wealth creation. Provided that an entity formed by splitting up or reconstruction of an existing business shall not be considered a 'Startup'.

Startups are new types of wealth creators in our country, Prime Minister Narendra Modi said in his Independence Day speech on 15 August, 2021, underscoring the need of the government to relentlessly work towards making India's Startups and the Startup Ecosystem the best in the whole world. India's IT Minister Shri Ashwini Vaishnaw, quotes "our society as we stand today requires lots of initiatives, new products and new services which will create a better life for the marginalized sections of the society and for those who are at bottom of pyramid and are living in remote parts of country, where mainstreamdevelopment has eluded them." (India Education Diary, 2021)

The Indian government is serious in promoting entrepreneurship at the startup level and has taken a number of initiatives to ensure appropriate support. In this aspect it is relevant to mention the 'Make in India' campaign introduced in September '2014 to attract foreign investments and encourage domestic companies to participate in the manufacturing sector. The government increased the foreign direct investment (FDI) limits for most of the sectors and strengthened intellectual property rights (IPRs) protection to instil confidence in the startups (Dr. G Suresh Babu and Dr. KSridevi, 2019).

In order to make the country as number one destination for startups, Government of India (GoI) has introduced a new campaign called 'Startup India' in 2015aimed at promoting

entrepreneurship among women and to help startups with bank funding. (G SureshBabu Suresh G. and Sridevi K. 2019).

An article in India's leading news daily - The Times of India - mentions the enormous scale of the startup ecosystem in India, which is now positioned third globally; behind US and China. India now boasts of 50+ unicorns (companies which have greater than United States Dollar USD 1 billion valuation), and is expected to witness YoY growth of a consistent annual growth of 12-15%.

Apart from unicorns, however, the number of future unicorns called "gazelles" and "cheetahs" in India is growing. Gazelles have an estimated valuation ranging from USD 500 million to USD 1 billion and the valuation of cheetahs range from USD 200million to USD 500 million. "Gazelle" is a startup founded after 2000 with the potential of becoming a unicorn in the next 2 years, while "cheetah" may go unicorn in the next four years.

Some interesting facts noted byStartupindia.gov.in:

- The pace of growth in the startup ecosystem has increased to 15% year-on-year in 2018, while the growth of the number of incubators and accelerators has grown to 11%
- Significantly, the number of women entrepreneurs stood at 14%, up from 10% and 11% in theprevious two years.
- Startups in the country have been able to create an estimated 40,000new jobs over the year, taking the
- total jobs in the start-up ecosystem to 1.6-1.7 lakh
- Bangalore has been listed within the world's 20 leading startup cities in the 2019 Startup Genome Project ranking. It is also ranked asone of the world's five fastest growing startup cities

An article emphasizing on the enormous potential of the startup ecosystem on Inc24.com, quotes "India is likely to see100 unicorns by 2023, much earlier than the earlier projection of 2025." Inc24.com, quotes "India is likely to see100 unicorns by 2023, much earlier than the earlier projection of 2025."

Inc24.com's "The state of Indian startupecosystem (2021)" notes the following split - industry wise for the total 38,815 active startups in India:

Industry	Percentage ofStart-ups
Enterprises Tech	18%
Ecommerce	12%
Fintech	11%
Consumer Services	11%
Health Tech	10%
Media and entertainment	8%
Deeptech	8%
EdTech	7%
Real Estate Tech	3%
Transport Tech	3%
Others	9%

 Table 1: The State Of Indian StartupEcosystem Report 2021

Source: Inc24.com

The Inc24.com report also suggests Bengaluru, Mumbai and NCR to be the 3 top locations for startups, whereas Ecommerce is the top sector as per fundingappeal.

As per Project Management Institute (PMI) which is the world's leading authority on project management - All projects are a temporary effort to create value through a unique product, service orresult.

Thus, for successfully providing new products and new services, it is of paramount importance that the underlyingproject(s) are successful.

Project Management Institute (PMI) defines Project management as the use of specific knowledge, skills, tools and techniques to deliver something of value topeople. The development of software for an improved business

process, the construction of a building, the relief effort after a natural disaster, the expansion of sales into a new geographic market—theseare all examples of projects.

When we look at literature on "Competence", Gruden, N. and Stare, A. (2018) based on their research state that "Competence" is an individual's ability to use and connect acquired knowledge and experience in complex, varied, and unpredictable situations. It has a broader meaning than skill: Competence is the ability to use knowledge and/or skills as well as personal characteristics, at work (IPMA, 2006); it is an individual's ability to mobilize and combine knowledge, skills, and attitudes in order to implement an activity in a situation, in a specific context.

Cartwright, C. and Yinger, M. (2007) state in their research that Competence can be defined as a cluster of related knowledge, attitude, skills, and other personal characteristics that affect a major part of one's job, correlates with performance on the job, can be measured against well- accepted standards, and can be improved via training and development.

Projects vary in complexity and customer expectations. Each project is unique in nature. Anantatmula (2010) states that it is obvious that global spending on projects is in the order of many billions of dollars annually; however, in spite of advances in the project management (PM) discipline, the common experience suggests that many projects fail. Consequently, many current research efforts are focused on improving project success.

Berger, M. E. (2010) suggests "Project success" is generally defined as project completion on schedule, within budget, with delivery of features and functionality as promised to the satisfaction of key project stakeholders. Several Studies quoted in Berger, M.E. (2010)'s study mention that the most common criteria of project success are completion measurements—on time, within budget, and delivering the specific results. These criteria are also known as the triple constraints of project management: cost, schedule, and quality.

Jugdev and Müller (2005) reviewed the literature on project success and concluded that four conditions are necessary, but not sufficient, for success:

- Success criteria should be agreed with stakeholders before and during the project.
- A collaborative working relationship should be maintained between project owner/sponsor and manager.
- A project manager should beempowered to deal flexibly with unforeseen circumstances.
- The project owner/sponsors should take an interest in theperformance of the project.

Baratta, A. (2006) notes the classical triple constraint of Projects to be scope, cost and time. The author also suggests that these constraints limit decision making and that the focus of projects should be on delivering value.

On the basis of literature available, and for the purpose of this concept paper, the study notes the four constraints or deciding factors for measuring Project success as:

- 1. Projects delivered as perrequirements (scope)
- 2. Projects delivered as perschedule (time)
- 3. Projects delivered withinallocated budget (cost)
- 4. Projects delivered as perwhat the customer wants(quality)

There are several frameworks and models available in order to identify, and guide organizations to find the right fit or a "competent" Project Manager, who can lead them to "Project Success". One such framework is The Project Manager Competency Development (PMCD) Framework – Third Edition by PMI, which provides a framework for the definition, assessment and development of project manager competence based on the premise that competencies have a direct effect on performance. The PMCD Framework provides an overall view of the skills and behaviours one would need to develop competence as a project manager. The PMCD framework suggests project manager competencies can be measured in terms of knowledge, performance, and personal competence.

Maqbool, R., Sudong, Y., Manzoor, N., and Rashid, Y. (2017) have noted in their research on how the International Project Management Association (IPMA) Competence Baseline (2006) classifies 46 competency elements into three groups: contextual, behavioural, and technical competencies.

Cartwright, C. and Yinger, M. (2007), however, inform that it is important to note that a "competent" project manager alone does not guarantee project success. A project manager may successfully balance the competing demands of scope, time, cost, quality, resources and risk, but the project success may be influenced by the organization's project management maturity and capability.

Thus, it is clear based on the available literature, that a Project Success is linked to Project Manager's success along with the organization's maturity and capability. For ensuring success, the company must have an outlook and understanding of the competency paradigm that can serve as a base for hiring Project Managers which possess the required competencies which are a best-fit to their way of working.

This is especially true for start-up companies which have more "unstructured" requirements than following a competency model, prescribed for more matured and "structured" companies.

The present study tries to addresses a gap in the available literature in the field of project management for startup companies and attempts to list the most important competencies of startup promoters and project managers for startups.

The current study is conceptual in nature based upon the secondary data with an objective is to provide a comprehensive review of literature around Competencies for Project Managers and identify 20 top competencies for startup promoters and Project Managers in start-ups.

The result of this study will be valuable to:

- 1. Hiring Managers and Promoters in startups trying to understand essential competencies required which are beyondthe conventional job description frameworks
- 2. Aspiring Project Managers who wish topursue a career in Project Management

LITERATURE REVIEW

A detailed literature review shows that past studies are primarily focused on identifying competencies and developing competency frameworks which are generic in nature and not focused on the startup space, and not focused on India as geography.

Most of the literature focuses on identifying behavioural and emotional characteristics such as leadership, teamwork, ability to motivate and coreproject management competencies as being critical to Project Manager successand thereby to Project Success.

Based on the literature review done, the following 20 competencies have been highlighted as being a consistent competency expectation of Project Managers.

The Project Management Competency Development (PMCD) Framework classifies competencies across 3 broad dimensions: Knowledge, Proven Experience and Personality traits. The author has attempted to classify derived competencies across these categories forease of reference on PMCD Framework.

The Project Manager Competency Development (PMCD) Framework – ThirdEdition provides a framework for the definition, assessment and development of project manager competence based on the premise that competencies have a direct effect on performance.

It is based on following dimensions forcompetencies:

- Knowledge: Demonstrated the required knowledge, skills, and experience to manage portfolios, programs, and projects;
- Passed an accredited portfolio/program/project management examination or certification (e.g., the Project Management Professional (PMP)® or equivalent from a recognized institute);
- Proven Experience
- Personality competencies

Table 2: Key Competencies for startup promoters and Project Managers: A Summary of Literature Review

Sr. No.	Competencies	Competency Dimension	Authors who recommend this competency
1	Leadership	Proven Experience	Udo, N. & Koppensteiner, S. (2004), Ferraro, J. (2014), Levin, G. (2014), Saladis, F. P. (2015),

Kumar, V. S. (2012), Kumar, V. S. (2009), Geoghegan, L. & Dulewicz, V. (2008), Gruden, N. & Stare, A. (2018), Magbool, R., Sudong, Y., Manzoor, N., & Rashid, Y. (2017), Anantatmula (2010), Aronson, Zvi & Shenhar, Aaron & Patanakul, Peerasit. (2015) Udo, N. & Koppensteiner, S. (2004), Saladis, F. P. 2 Communication **Proven Experience** (2015), Costa, A., Pinto, A., & Cota, M. (2013), Berger, M. E. (2010), Anantatmula (2010), Aronson, Zvi & Shenhar, Aaron & Patanakul, Peerasit. (2015), Chan Wai Kuen, Suhaiza Zailani* and Yudi Fernando (2008) 3 Ability to motivate Udo, N. & Koppensteiner, S. (2004), Berger, Personality M. E. (2010), Gruden, N. & Stare, A. (2018), Müller and Turner (2010), Dr. GSuresh Babu and Dr. K Sridevi (2019) Udo, N. & Koppensteiner, S. (2004), Telaro, 4 Scope Management Knowledge, ProvenExperience D. (1999), Costa, A., Pinto, A., & Cota, M. (2013), Maqbool, R., Sudong, Y., Manzoor, N., & Rashid, Y. (2017) 5 Time Management Knowledge, ProvenExperience Udo, N. & Koppensteiner, S. (2004), Telaro, D. (1999), Costa, A., Pinto, A., & Cota, M. (2013), Maqbool, R., Sudong, Y., Manzoor, N., & Rashid, Y. (2017) 6 Cost Management Knowledge, ProvenExperience Udo, N. & Koppensteiner, S. (2004), Telaro, D. (1999), Costa, A., Pinto, A., & Cota, M. (2013), Maqbool, R., Sudong, Y., Manzoor, N., & Rashid, Y. (2017) 7 **Team Building Proven Experience** Udo, N. & Koppensteiner, S. (2004), Davis, G. (2003), Saladis, F. P. (2015), Aronson, Zvi & Shenhar, Aaron & Patanakul, Peerasit. (2015) Articulate Vision Knowledge, ProvenExperience Aronson, Zvi & Shenhar, Aaron & 8 andMission Patanakul, Peerasit. (2015), Chan Wai Kuen, Suhaiza Zailani* and Yudi Fernando (2008) 9 Creativity Personality Levin, G. (2014), Davis, G. (2003), Kumar, V. S. (2012), Aronson, Zvi & Shenhar, Aaron & Patanakul, Peerasit. (2015) Udo, N. & Koppensteiner, S. (2004), Costa, A., 10 Ability to influence Proven Experience, Personality Pinto, A., & Cota, M. (2013), Müller and Turner (2010) Organizing/Manage Knowledge, ProvenExperience Davis, G. (2003), Saladis, F. P. (2015), 11 Costa, A., Pinto, A., & Cota, M. (2013), Mantilla, I. ment (2020)12 Saladis, F. P. (2015), Costa, A., Pinto, A., & Interpersonal skills **Proven Experience** Cota, M. (2013) Knowledge, Proven Levin, G. (2014), Dr. G Suresh Babu and 13 Strategic Management Experience Dr. K Sridevi (2019) Trust-based **Proven Experience** Ferraro, J. (2014), Telaro, D. (1999), 14 relationships Anantatmula (2010) Emotional Maqbool, R., Sudong, Y., Manzoor, N., & 15 Personality Intelligence Rashid, Y. (2017) 16 Adaptability Personality Udo, N. & Koppensteiner, S. (2004), Levin, G. (2014)

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17	Accountability	Personality	Telaro, D. (1999)
18	Can-do attitude	Personality	Udo, N. & Koppensteiner, S. (2004)
19	Enthusiasm	Personality	Udo, N. & Koppensteiner, S. (2004)
20	Critical Thinking	Proven Experience	Müller and Turner (2010)

Source: Prepared by the researcher

SUGGESTED FRAMEWORK

Based on the derived set of competencies for Promoters and Project Managers for startups, it is important to now understandhow each competency impacts the four project success criteria identified in this paper – time, cost, scope and quality.

Startups are advised to consider each competency and then identify which success criteria(s) a particular competency impacts most. The decision factor (f) here depends on organization's maturity (as identified by Cartwright, C. and Yinger,

M. (2007)) and also depends on thespecific nature of the projects.

This model will help organizations understand which success criteria may beimpacted (positively or negatively), by existing personnel and their current set of competencies. The existing competency gap may be filled by providing the required set of training so that the project success criterion have a solid set of competencies to achieve required project goals.

Example of such a model using the competency of Leadership is shownbelow.



Figure 1: Competency-Project Success model (Example Competency of Leadership)

CONCLUSION

The mentioned list of 20 key competencies will enable Promoters and Project managers to ensure a right mix of competencies required to create a positive impact in startups. Using this set of competencies, hiring managers can understand which competencies should be focussed on - as for startups, conventional technical competencies are not the only criteria for success. By doing so, young companies will minimize project failures and maximize their project's potential and organization's goals. Successful implementation of projects eventually leads to organization providing value- adding products and services to customers.

It is also of paramount importance to note that each organization functions uniquely which is also true for startups, although they might be at same level of maturity. Therefore, it is important for startups to understand which competencies will impact which success criteria of scope, cost, time and quality. Of course, the startups are free to add more success criteria (depending on the nature of the

project) such as risk, resources, customer satisfaction etc. and understand the competencies which will have an impact on these criteria.

The Decision factor (f) in the presented model thus becomes a key consideration for startups to create a relation between competencies and success criteria. Startups should also note, organization maturity is a key consideration. Maturity can be as per standards defined such as Organizational Project Management (OPM3) which is the alignment of an organization's projects to its strategic goals.

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ROLE OF WOMEN ENTREPRENEURS IN INDIA: A SWOT ANALYSIS

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ABSTACT

Woman constitutes the family, which leads to Society and Nation. Female entrepreneurs make significant contributions to economic growth and to poverty reduction. This conceptual paper indicates the role and emphasizes the women entrepreneurs as the potentially emerging human resource in the 21st century to overcome the economic challenges in global perspective.

This paper conducts a study that is categories into three sections: First section based on performance and role of women entrepreneurs and SWOT Analysis. Second section based on the aid and support provided by government nationally and internationally up gradation to women as Entrepreneurs. Third section focuses on the most dynamic and idealistic successful Women Entrepreneurs in India. These women leaders are assertive, persuasive and willing to take risks. They managed to survive and succeed in this competitive world and willing to apply their core competency with their hard work, diligence and perseverance.

The paper talks about the status of women entrepreneurs and the problems faced by them; simultaneously the paper gives an insight into the challenges faced by women entrepreneurs. Government of India has also introduced National Skill Development and Entrepreneurship policy of 2015 in order to provide skill training, vocational education and entrepreneurship development to the emerging work force. However, entrepreneurship development and skill training is not the only responsibility of Government and therefore other stakeholders need to shoulder the responsibility. And also much credit can be given to entrepreneurship for the unprecedented innovation and growth of mixed economy culture in developing country like India.

1. INTRODUCTION

Women entrepreneurs have been designated as the new engines for growth and the rising stars of the economies in developing countries to bring prosperity and welfare. Women Entrepreneurs may be defined as the women or a group of women who initiate, organize and operate a business enterprise. The Government of India has defined women entrepreneurs' as—an enterprise owned and controlled by women having a minimum financial interest of 51 per cent of the capital and giving at least 51 per cent of the employment generated in the enterprise to women. The growth of the proportion of women entrepreneurs in developing countries has drawn the attention of both the academic and the development sector.

Women entrepreneurs engaged in business due to push and pull factors which encourage women to have an independent occupation and stands on their own legs. A sense towards independent decision-making on their life and career is the motivational factor behind this urge. Under the influence of these factors the women entrepreneurs choose a profession as a challenge and as an urge to do something new. Such a situation is described as pull factors. While in push factors women engaged in business activities due to family compulsion and the responsibility is thrust upon them.

2. OBJECTIVES OF THE STUDY

 \Box To study the Government cooperation against the women entrepreneurs' development program in India.

□To study the SWOT Analysis of Women Entrepreneurs in India.

□To evaluate the factors responsible for encouraging women to become entrepreneurs

To identify the factors responsible for hindrance for women entrepreneurship

To make an evaluation of people's thought and opinion about women entrepreneurship in India

3. REVIEW OF LITERATURE

The Government of India has defined women entrepreneurs' as—an enterprise owned and controlled by women having a minimum financial interest of 51 per cent of the capital and giving at least 51 per cent of the employment generated in the enterprise to women. The growth of the proportion of women entrepreneurs in developing countries has drawn the attention of both the academic and the development sector.

The entrepreneur organizes and operates an enterprise for personal gain. He pays current prices for the materials consumed in the business, for the use of the land, for the personal services he employs, and for the capital he requires. He contributes his own initiative, skill, and ingenuity in planning, organizing, and administering the

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enterprise. He also assumes the chance of loss and gain consequent to unforeseen and uncontrollable circumstances. The net residue of the annual receipts of the enterprise after all costs have been paid, he retains for himself.

In the late 19th and early 20th centuries, entrepreneurs were frequently not distinguished from managers and were viewed mostly from an economic perspective.

4. RESEARCH METHODOLOGY

The study focuses on extensive study of Secondary data collected from various books, National & International Journals, published reports of RBI, NABARD, Census Surveys, SSI Reports, newspapers, publications from various websites which focused on various aspects of Women Entrepreneurship.

5. SUCCESSFUL WOMEN ENTREPRENEURS IN INDIA

- Arundhati Bhattacharya (SBI chief)
- Chanda Kochhar (ICICI bank head)
- Kiran Mazumdar-Shaw (Biocon founder)
- Shobhana Bhatia (HT Media chairperson)
- Indra Nooyi (PepsiCo Chief)
- Padmasree Warrior (Cisco Chief Technology and strategy officer).

SWOT Analysis: A parameter to examine the growth and performance of women entrepreneurs' development in India.

Strength

- Women entrepreneur can be defined as a confident, innovative and creative women capable of achieving self economic independence individually or in collaboration generate employment opportunities for others through initiating, establishing and running the enterprise by keeping pace with her personal, family and social life.
- Women prefer to work from their own residence, difficulty in getting suitable jobs and desire for social recognition motivates them self-employment.

Weaknesses

- Absence of proper support, cooperation and back-up for women by their own family members and the outside world people force them to drop the idea of excelling in the enterprise field.
- Women's family obligations also bar them from becoming successful entrepreneurs in both developed and developing nations.
- Achievement motivation of the women folk found less compared to male members.
- The greatest deterrent to women entrepreneurs is that they are women.

Opportunity

- Women inculcate entrepreneurial values and involve greatly in business dealings.
- Business opportunities that are approaching for women entrepreneurs are eco- friendly technology, Biotechnology, IT enabled enterprises, event management, tourist industry, Telecommunication, Plastic materials, Mineral water, Herbal & health care, Food, fruits and vegetables processing.
- Women entrepreneurs avail new opportunities in the rural areas such as Ice cream, channel products, papads and pickles and readymade garments.

Threats

- Fear of expansion and Lack of access to technology.
- Lack of self-confidence, will power, strong mental outlook and optimistic attitude amongst women creates a fear from committing mistakes while doing their piece of work.
- Credit discrimination and Non Cooperative officials.
- Insecure and poor infrastructure and Dealing with male laborers.
- Indian women give emphasis to family ties and relationships.

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6. STEPS TAKEN BY THE INDIAN GOVERNMENT

First Steps taken in Seventh Five-Year Plan: In the seventh five-year plan, a special chapter on the "Integration of women in development" was introduced by Government with following suggestion:

- Specific target group: It was suggested to treat women as a specific target groups in all major development programs of the country.
- Arranging training facilities: It is also suggested in the chapter to devise and diversify vocational training facilities for women to suit their changing needs and skills.
- Developing new equipments: Efforts should be made to increase their efficiency and productivity through appropriate technologies, equipments and practices.
- Marketing assistance: It was suggested to provide the required assistance for marketing the products produced by women entrepreneurs.
- Decision-making process: It was also suggested to involve the women in decision-making process.

Second steps taken by Government during Eight Five-Year Plans: The Government of India devised special programs to increases employment and income generating activities for women in rural areas. The following plans are lunched during the Eight-Five Year Plan:

- Prime Minister Rojgar Yojana and EDPs were introduced to develop entrepreneurial qualities among rural women.
- "Women in agriculture" scheme was introduced to train women farmers having small and marginal holdings in agriculture and allied activities.
- To generate more employment opportunities for women KVIC took special measures in remote areas.
- Women co-operatives schemes were formed to help women in agro-based industries like dairy farming, poultry, animal husbandry, horticulture etc. with full financial support from the Government.
- Several other schemes like integrated Rural Development Programs (IRDP), Training of Rural youth for Self employment (TRYSEM) etc. were started to alleviated poverty.30-40% reservation is provided to women under these schemes.

Third **Steps taken by Government during Ninth Five-Year Plan:** Economic development and growth is not achieved fully without the development of women entrepreneurs. The Government of India has introduced the following schemes for promoting women entrepreneurship because the future of small scale industries depends upon the women-entrepreneurs:

- Trade Related Entrepreneurship Assistance and Development (TREAD) scheme was launched by Ministry of Small Industries to develop women entrepreneurs in rural, semi-urban and urban areas by developing entrepreneurial qualities.
- Women Comkp0onent Plant, a special strategy adop0ted by Government to provide assistance to women entrepreneurs.
- Swarna Jayanti Gram Swarozgar Yojana and Swaran Jayanti Sekhari Rozgar Yojana were introduced by government to provide reservations for women and encouraging them to start their ventures.
- New schemes named Women Development Corporations were introduced by government to help women entrepreneurs in arranging credit and marketing facilities.
- State Industrial and Development Bank of India (SIDBI) has introduced following schemes to assist the women entrepreneurs. These schemes are:

(i)Mahila Udyam Nidhi

(ii)Micro Cordite Scheme for Women

(iii)Mahila Vikas Nidhi

- (iv)Women Entrepreneurial Development Programmes
- (v) Marketing Development Fund for Women.

Fourth Consortium of Women entrepreneurs of India provides a platform to assist the women entrepreneurs to develop new, creative and innovative techniques of production, finance and marketing. There are different bodies such as NGOs, voluntary organizations, Self-help groups, institutions and individual enterprises from rural and urban areas which collectively help the women entrepreneurs in their activities.

Fifth **Training programmers**: The following training schemes especially for the self employment of women are introduced by government:

- (i)Support for Training and Employment Programme of Women (STEP).
- (ii)Development of Women and Children in Rural Areas (DWCRA).
- (iii)Small Industry Service Institutes (SISIs)
- (iv)State Financial Corporations
- (v) National Small Industries Corporations
- (vi)District Industrial Centers (DICs)

Sixth Mahila Vikas Nidhi: SIDBI has developed this fund for the entrepreneurial development of women especially inrural areas. Under Mahila Vikas Nidhi grants loan to women are given to start their venture in the field like spinning, weaving, knitting, embroidery products, block printing, handlooms handicrafts, bamboo products etc.

Seventh Rashtriya Mahila Kosh: In 1993, Rashtriya Mahila Kosh was set up to grant micro credit to pore women at reasonable rates of interest with very low transaction costs and simple procedures.

7. CONCLUSIONS

India is a developing country and having mixed economy, male dominated society and women are assumed to be economically as well as socially dependent on male members. Women entrepreneurs are having basic indigenous knowledge, skill, potential and resources to establish and manage enterprise, but simultaneously women entrepreneurs faced lots of problems like lack of education, social barriers, legal formalities, high cost of production, male dominated society, limited managerial ability, lack of self confidence, harassment and not fulfillment of rules and regulation etc. Various factors like positive reinforcement and negative reinforcement influencing women entrepreneurs. Successful leading business women in India are ideal role model for our country. Government takes various steps for the upliftment of women entrepreneurs in 7th five year plan, 8th five year plan and in 9th five year plan. Women have the potential and determination to setup, uphold and supervise their own enterprise in a very systematic manner, appropriate support and encouragement from the society, family, government can make these women entrepreneur a part of mainstream of national economy and they can contribute to the economy progress of India.

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MILLENNIALS PREFER START-UPS OVER CORPORATES

*Adhithi Mudaliyar, Yugank Utta and Edric Fernandez

ABSTRACT

This paper aims at shedding light on why millennials are choosing start-ups over corporates. Start-ups and Corporates are two fields where Millennials have been investing for decades. But in recent years, we have noticed that start-ups have proven as a popular demand. Start-ups often develop innovative ideas, are flexible and agile, willing to take risks, and aspire to achieve high growth, but they tend to lack the required resources, capabilities, and knowledge due to their newness and smallness. Corporates have resources, routines, and experience that enable them to work efficiently but lack innovation capability. This article primarily focuses on what draws millennials towards start-ups despite the risks involved in it.

Keywords- Millennials, Start-ups, Corporates.

INTRODUCTION

A start-up is a company or project undertaken by an entrepreneur to seek, develop, and validate a scalable business model. These are young companies founded to build a unique product or service, bring it to market and make it irresistible and irreplaceable for customers. The number of start-ups has increased almost twice in the first six months of 2021. Not only do start-ups have a significant impact in the business world, but they also aid in boosting the economy and employment rates of a country. There are different types of start-ups that one can choose to develop,

Lifestyle start-ups, Small scale start-ups, Investigative start-ups, Social start-ups are a few examples that have been successful in the past years. Start-ups are a whole new world in themselves with a unique lingo. The frequent terms used are Angel investor, an individual who wishes to buy shares of a company at an early stage. Incubators are groups that support chosen entrepreneurs and their businesses with mentorship and funding. Lastly, going public, offering shares of the company for the public to purchase. Though start-ups come with excitement in growth, it has a few drawbacks. There is no guarantee of a steady income, the best test of patience, and requires a sense to overcome any loss that comes your way.

BACKGROUND

Huge companies like Google, Apple, Microsoft and Facebook were once a start-up. Most of these companies were started in a garage but managed to become a billion-dollar company. Start-ups have always been fascinating and kind of a getaway for people who think out of the box, have incredible ideas and possess all the qualities that are required to run a company successfully. The rise of technology has changed the world to an unimaginable extent. Resources are available for free, knowledge is easily accessible to anyone, anywhere, people from different parts of the world can communicate, connect with just a few hits on their smartphones, all because of the social network supporting companies like Google and Facebook. We sincerely believe that start-ups born from great ideas can bring meaningful changes to the world. Though start-ups bring the joy and pride of building something from scratch, there are higher chances of them failing than succeeding on the first go. Being a part of a start-up can be very stressful as one is under immense pressure to produce quality results. The new challenges faced by the company causes one to put in long hours and pick up jobs that are not in their job description. Unlike start-ups, working for large corporations provides more career opportunities. Corporations furnish their employees with a broader environment of work. Corporations maintain a disciplined work atmosphere; they provide their employees with a provident fund, medical insurance and other job securities. Yet boosting our curiosities, studies have shown that younger generations prefer start-ups over corporates.

METHODOLOGY

A total of 434 undergraduate students were required to answer a survey measuring several aspects of their experience of working at a start-up company. This study examined what makes interns in start-up companies satisfied. The conclusion drawn was that start-ups provide plenty of learning opportunities, supervisory support, and a positive organizational atmosphere. A new survey released by Bentley University suggests that millennials sense that career success will require them to be more nimble, independent and entrepreneurial than past generations. Only 13% of survey respondents said their career goal involves climbing the corporate ladder to become a CEO or president. By contrast, almost two-thirds (67%) said they aim to start their own business. The third annual First Citizens Bank Small Business Forecast reports forty- eight per cent of millennials want to be part of the start-up trend. First-Citizens Bank surveyed a pool of 300 small business owners with businesses located in North Carolina, South Carolina, California or Florida. These businesses all had fewer than 500

employees. Eighty-eight per cent of the millennials said starting their own business allows them to realize their dreams, thus proving that Millennials choose start-ups over 9 to 5 jobs.

INTERPRETATION

Millennials say that flexible work hours are a key to boosting productivity within their generation. Start-ups provide them with not only flexible hours but also with no discipline policy. Start-up culture is a workplace environment that values creative problem solving, open communication and a flat hierarchy. Employees of large corporations get attracted by prestige and big salaries; they lose sight of the company's vision and the success of their customers. Start-up employees form a close-knit community that shares passion, beliefs, and values. They must work together for the good of the company, its customers and the world at large. Start-ups celebrate the spirit of entrepreneurship, risk-taking and value creation. Millennials have a heightened take on risk-taking and thus prefer start-ups. The environment, flexibility, freedom and learning of start-up culture are key points why one out of three Millennials pick start-ups over corporate culture.

CONCLUSION

Millennials have always had their way of doing things. The world has seen many youngsters who decide to call it quits on their 9-5 jobs and trade them for start-ups instead. We are past those days when youngsters had to follow the same cycle every day. Millennials are focused and ambition-driven. They look beyond the risks of becoming entrepreneurs and focus only on delivering the best and building their success path. Although both start-ups and corporates have their pros and cons, Millennials favour start-ups because they are intelligent, passionate and in the running of fulfilling their dreams.

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VETERINARY AND WELFARE CENTRE FOR STRAY ANIMALS

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ABSTRACT

The process of urbanization is increasing day by day. The humans are becoming selfish and self-centered for their needs, they are becoming cruel towards the surrounding. Hence, the chain of livelihood is collapsing and the direct effect in on stray animals. The animals that are living on streets they have no place to go, they are only dependent on humans in an indirect way but in returns human are only cruel on them and hurt them for no such reason.

A few problems to be listed down caused by the human to animal in the form of animal cruelty, lab experiments etc. these problems are raising day-by-day, and the human are not realizing the pain they go through and the importance in the society. Human need to think of other lives too that their life is also important same as their life.

With the help of the architecture, we need to shape the world for the betterment of the surrounding. By building for such animals, shapes and educating people to value the animal life too.

Keywords—animal, animal love, interaction benefits, animals' behavior, shelter, veterinary, rescues.

I. INTRODUCTION

Animal cruelty is a worldwide issue. If we go to see the facts on animals' cruelty is disturbing the animal's survival is difficult and non-profit organization are working to stop animal cruelty, so more people should participate and inform others to do so. Following are some facts which says that people are becoming heartless towards animals.

Facts:

- One animal is abused every minute.
- Annually, over 10 million animals in the US are abused to death.
- o 97% of animal cruelty cases come from farms, where most of these creatures die.
- Laboratory testing uses 115 million animals in experiments every year.
- Dogs comprise 65% of all abused animals.
- Consumption is at fault for the yearly death of more than 100,000 horses in the US.
- Above 50% of the US's fur comes from China, where cats and dogs are bled and skinned to death.

Cruelty on animal is increasing day by day. People are forgetting the importance of animal in the ecosystem, as their equally important as the humans are [1].

This above article says that the animal faces problems are all around the world and they are rapidly increasing. In India it is also as same as other countries, as the condition of the stray animals is not good, and they have to face daily suffering.

Since time, India has been known to be a country where animals are not only considered as an important part of the universe but have also been worshiped. However, on one hand where we have people praying to deities and the animals associated with them in temples, on the other hand the same animals are also subject to cruelty in places.

According to a report compiled by the Federation of Indian Animal Protection Organization (FIAPO) and All Creatures Great and Small (ACGS), between 2010-2020, a total of 4,93,910 animals were victims of crimes committed by humans [2].

This numbers are increasing day by day in the country. This shows the sensitivity of people towards animals. Sometimes this act of cruelty not even been recorded because there's no importance left of stray animals in the society. People feel this is not a crime and they can do such things for fun and their entertainment.

Taking consideration of current condition i.e., covid-'19 pandemic which consequently resulted in a lockdown, humans have experienced depression. A couple of cases of cruelty towards animals have come to light in the past time in pandemic, which have enraged many and made one ponder as to whether the laws in existence are sufficient to protect animals.

The covid'19 lockdown has not only forced the entire world indoors but has put India's strays in extreme distress. Unavailability of food and water is impacting stray animals all over the country. With restaurants and eateries downing shutters, meat shop is closed, and no garbage production from shops, strays have been struggling to find food to kill their hunger. They have nothing to eat, not even leftovers that they always relied on. Hundreds of animals (pets) have been abandoned on the streets by their owners. The working having are also abandoned because their owners are unable to take care of them on account of rising unemployment in the mining, tourism & pilgrimage industry. The lockdown has impacted this sector, leaving the animals disproportionately affected. Animals have been left on the streets with no access to food, water, or shelter, they are being found in a pitiable state of neglect. Most of them are extremely dehydrated, starving and too weak to even walk to fend for themselves.

It becomes necessity that such animals are being provided by the shelter and all the basic needs. The research is about addressing this issue and finding the best possible solution by creating a center for stray and abandoned animals.

II. BACKGROUND STUDY

A. Background study

People in earlier time lived close to animals and people were more animal friendly. The bond they shared with each other is for the wellbeing of both human as well as animal. People says from years that animals are people's best friend and with the help of animal people find peace sometimes and feel fresh, if we go to see in today's era the quotes are same but with the fast-growing country somewhere we left our part behind and there is no importance given to stray animals as such that it should be. People are mistreating animals and feels nothing. People keep dogs, cat at their homes as a pet but when it comes for stray, they just have nothing to do with them. To avoid this mistreatment, we should have more shelters with better amenities as compared to the present condition of shelter because present condition is lacking in certain aspects i.e., infrastructure, financial conditions etc. the shelter should build near to the city so that the residential area will not be disturbed by the animal's noise and the recusing of animals becomes easy.

Urbanization should also include animal welfare or shelter but in today's world people don't consider animal shelter as urban requirement. As we are moving forward towards modernization, and the separation between city and landscape is quite difficult, as we can see in city development that there are very fewer open spaces left, as same as the relation between human life and animal life.

Increasing demand of housing in the city the undeveloped land and green area are decreasing or we can say is disappearing, so there is an 'Animal Aided Design (AAD)' concept which says as a methodology for the design of urban open spaces, to integrate conservation into open space planning. The basic idea of AAD is to include the presence of animals in the planning process, such that they are an integral part of the design. So, this help to fill the gaps that have been in human world and animal life by giving interaction between them [3].

B. Architecture Intervention

1) Need of topic

• Animal cruelty: Neglect, Hoarding, Shooting, Fighting, Beating, Mutilation, Throwing, Stabbing, Burning, Vehicular, rapes are most done crime on animals.

In five years, 19,028 animal cruelty cases were recorded. But there were no arrests or convictions, data compiled by the Bombay Society for Prevention of Cruelty to Animals (BSPCA) revealed. This data shows how the behavior and seriousness towards animals are there in the people this is because our law (Prevention of Cruelty to Animals Act, 1960) fine are up to only 10rs to 100rs. And this lends to carelessness and law is not acting as a deterrent [2].

The increasing case in Mumbai is because people are not aware of the laws and the vet clinic facilities are not sufficient, shelter are very poor.

- Abandonment: There are many cases in which animals get abandoned with their owners.
- Many pets run away when the doors are left open by mistake. In the absence of any protocol to reunite them with their families, many of them never meet their parents again.

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- Owners dumping their pets at such Centres by paying them a fee because the shelter are not much facilitated and many centres use these animals for breeding, almost like a factory, to make as much money as they can.
- Working animals like cows, buffalos, bulls, donkeys, horses after getting old the owner disown them because the income is stopped and, in their eye, they are useless for them.
- Animals are being bought because they are cute, as status symbols, or, as toys. This often ends in abandonment, neglect or abuse and end up leaving on road.
- In current situation, due to covid'19 lockdown working animal, pets are abandoned because of financial condition, and they ended up without food, shelter. Due to covid'19, the situation is getting worse in case of food, water etc.
- Misconception for stray animals
- Stray animal attack- if they feel they or their babies are threatened by humans or other animals. When they have young ones, they are too sensitive to even notice who is caring and who is not. The other reasons for an attack can be extreme hunger, and if they feel the person is an outsider, stranger and so they take the person as a threat.
- Stray animals get enough food-they don't. In garbage, there is just a lot of everything. Considering the number of cats, dogs, and all kinds of other living things who depends on the dump, nothing or no one gets a one-time meal.
- They'll get over with it-all depends on the injury happened to these animals. If it is minor, it could be healed, however, if it doesn't go away, it's not minor. Thus, these animals suffer, and sometimes a have painful death.
- Animals have shelters- Every day is a battle to them and among them. It is their survival skills that make them live long, so only those who are fit and strong manage to have shelter and food [4].
- Road accident
- Animal do have family, while driving we should look after animals too, same as we look after the humans. Just because animals can't say or fight back it does mean we have rights to hurt some living. People hit the animals with their vehicle and after that they blame animals for coming in front of their vehicle. Just imagine in the place of animal it was the human will it be a same situation? Will you blame the human for coming in front of car? The answer is NO because we only consider humans and not animals
- This also because our laws are not functioning properly, and People are taking animals for fun.
- 2) Aims
- Enhance the quality of veterinary facilities for animals.
- Create better accommodation facilities and which is safe and hygienic for animals.
- Provide a healthy environment that would be conducive to the physiological, social, environmental, behavioral, and psychological needs of the animal
- Enhance the standard of shelter in the society through designing
- Providing education and training centre for the people to know more about animal lifestyle and their sensitivity in our society.
- Creating space for interaction for human and animals.
- 3) Objectives
- to understand the animal behavior in the shelter
- to understand the human behavior towards animals
- to understand the meaning of animal shelter and its importance
- to understand the spaces design for animal wellbeing
4) Scope Of Topic

Planning an animal territory from the scope of architecture for benefits of animals and for humans around. Some people like animal and some don't, so let's have a sheltered space where animal can roam inside out and have their own space for survival. And when there will be separate space away from human, animal will feel safe in a space. Spaces that will be build will be animal friendly and will have some facilities for human who loves being around animals. Spaces like cuddling park, Dog Park, help people to interact with animal and promote animal welfare. If there will be an information Centre or area that can educate people about dealing with animal behavior etc this will add on the value of the space. The animal shelter typology aims to house animals until adoption by providing them with basic care and interaction. Services include veterinary, education for public, counseling, training of animals and adopters, adoption. The connection to surrounding neighborhood is very important for the shelter and the adoption area. An animal hospital will be an institution designed, built, equipped, and staffed to render modern veterinary care to animals.

An animal training facility will be designed, to provide training to people who are willing to help animals who need help.

This Centre will be designed wholly and for sole purpose for the betterment of animal and animal welfare.

III. LITERATURE REVIEW

A. Human/Animal behavior

1) Animal/human bond

According to the Human Animal Bond Research Institute (HABRI), the human-animal bond is "a mutually beneficial and dynamic relationship between people and animals that is influenced by behaviors that are essential to the health and well-being of both [5]".

Since years, human have their bond with animal in many ways. Hunter animal gatherer have dominated the human civilization in ancient times, promoting the human-animal bond and creating the opportunities with animal in environment. Later when human evolved the introduction of domestication came into picture. Where dogs being the very first domesticated animal. Then later after agricultural animal was also introduced to fulfilled utilitarian roles, providing work, service, and means of renewable food and materials. Since this all-domesticated animal benefited the human and their communities so human started taking care of them in a proper way.

But if we go to see the current scenario of the country, the sensitivity towards animal have gone. There are some groups of people feel the emotion of animals and they are ready to take the stand against the injustice happening with them, on other hand some of them are so cruel towards animal that they just harm them for no such reason and not even guilty for their deeds. So, we if go to see the bond from earlier age to todays have changed allot. People see more of benefits of themselves rather than affection towards animals [5].

2) Interaction benefits

Animal interaction with the human help them, mentally, physically and in all aspects. As society and humananimal relationships continue to evolve, there has been an increase of knowledge regarding the science of the human-animal bond. The animal can be any domesticated animal which will give you positive interaction irrespective of size shape colour etc. All domesticated animal's reaction on human can be different but the feeling and the chemical reaction would be same for all. Interacting with animals has been shown to decrease levels of cortisol (a stress-related hormone) and lower blood pressure. Other studies have found that animals can reduce loneliness, increase feelings of social support, and boost your mood and the chemical increases the pain threshold, lowers blood pressure, lowers cortisol levels, increases healing, facilitates learning, and reduces anxiety. There are therapies used for the people who are suffering from mental health and other problems.

B. History



Fig.1.Picture of Caroline Eaele White

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The first animal shelter was initiated in US by female pioneer Caroline Earle White along with group of other 30 female activists in 1869.white along with some other women started addressing the mistreatment of carriage horses in Philadelphia in the 1800s.Because during this the horses were not seen as pet, but as the means of transport. A year of addressing, educating people about carriage horse, women founded US first animal shelter. Later after they found The Women's Branch of the Pennsylvania Society for the Prevention of Cruelty to Animals in Philadelphia and took in both stray dogs and stray cats [6].

Till the time in India, there were no concept of shelter introduce but during 1860s when British India started doing animal experimentation for introducing new drugs to the colony. By the suffering and draught animal Colesworthey Grant founded the first Indian Society for the Prevention of Cruelty to Animals (SPCA) in 1861 in Calcutta [7].



Fig.2.S.P.C.A (Mumbai)

After Calcutta, during their extension period the SPCA also came in Mumbai, it was that part of time when Mumbai was called as Bombay .SPCA has got the land as a gift from Dinshaw Manokjee Petit as he was already running the hospital for animal, The Bai Sakarbai Dinshaw Petit Hospital founded in 1883.and now that hospital is called B.S.P.C.A i.e The Bombay society for the prevention of cruelty to animal. Till the date it is serving thousands of animals in India as well as in the world [8].

A. Animal welfare

In general terms animal welfare refers to, relationship of people with animal and their duty, responsibility towards animals. The concept of well-being and care towards animal is from at least 10000 years, Neolithic era.

Animal welfare role is to give basic facilities to animal and notletting animal to face any cruelty, neglect, and abuse. Animal welfare is always look after for to develop the programs and policies to improve the standard of care and wellbeing of animals.

Animal welfare centre is needed because in today's time people are becoming crueler towards animal, as strict laws and policies should be imposed to stop the crime on the animal. As animal are also part of our ecosystem and then also human are only thinking of themselves. Laws should be more in the favor of animal welfare and towards the animal for their betterment and for improving the life of animals to a better state as compared to today's stray animals.

1) Animal shelter

Animal shelters play an important role in the society where homeless stray or disown animal can get the place to live. Animal shelter is which provides the home to the animal until the adoption. Animal's shelter and interaction space with human should go hand in hand. Shelter should provide the interaction space for the betterment of both animal and human. This step can provide awareness towards animal so more animal can get their permanent home for their rest of lives. Because of poor design the animals over there feels caged and have the suffocated rooms. And this room or spaces are design irrespective of the animal size and height. All animals have different sets of requirements which is not fulfil in today's time. Designing shelter which fulfill today's requirement and give ease to the animal to live in.

2) Veterinary hospital

The place where animal will be treated for their disorder or their injury. It will have all advance facility under one roof. All the facilities under one roof can provide the ease because animal are sensitive and sometime animals do are aggressive because of their illness, so travelling with them from one place to another frequently could be difficult. It will be the place operated and maintained by licensed veterinarians. Animals can be admitted in the premises for treatment.

If we see the current scenario of hospitals, the situation is same as the shelter people are not looking towards the facilities for the animals, no hygiene maintained, not properly maintained etc. Designing hospital which fulfill today's requirement and give ease to the animal and human to use it.

B. Timeline of act and rules for animals

In India after looking on the state of animals in the country, some people who can't see the condition of suffering animal so they started taking stand for animal who can't speak for themselves. The laws were imposed after people started speaking up for them. Laws and rules are made for the betterment of animals and for wellbeing. But the people are not taking the laws seriously because the law imposed are very light and have the minimal punishment the prevention of cruelty to animals' act.

2001-animal birth control act.

2017- The prevention of cruelty to animals (care and maintenance of case property animals) rules.

2017-The prevention of cruelty to animals (dog breeding and marketing) rules

These are some acts which have been imposed. There are some more which have been imposed during 1960-2017.

C. Animal and Indian context

Indian culture and animals go hand in hand. Indian culture has great importance of animals in the history. To increase the importance of animals among human, animals was given the status of part of God or goddess. Not only India but all other country also assume that animals is the avatar or part of God. Most gods relate to the animals representing their vahana or mount, representing the central attributes of god or goddess. The animals as vehicle of God such as bull, the vehicle of lord Shiva, tiger the vehicle of Maa Durga, mouse the vehicle of lord Ganesh. Before the vahana or vehicle came to represent the quality, in puranic period- each deity represented one or more aspects of divinity and was thus accompanied by one or more animals to 'complete' the bonding of gods, humans and animals [9].

Also, the deity having the body of human and the face of animals, many lord having their face of animals such as lord Ganesh as elephant face, Narashima as a lion, horses-headed hayasiras and hayagriva, boar-headed varaha and hanuman, the monkey god [10].

In current scenario, the ancient animal, birds' importance has been decreased. There are some people who still have the same believe in animals and are still worshipping and taking care of them but on other hand people are worshipping animals and treating them wrong, torturing them in most ridiculous way.

D. Domestic animals

1) Pet animals

Pets are the part of the family. Pets are generally dogs, cats, rabbits, birds, fish etc. they provide us the companionship and emotional support and help us to release the stress level, sense of loneliness and help us in positive development. The pets are the most loyal creature that can help us in all aspects. They are the one who love their owner more than their own selves. In return they just accept proper care, their fitness and good basic facilities which are the owner responsibility to give them as their reward. Pets' help us in many ways especially dogs. If we trained the dog well it will help the person who are suffering from health or mental problems, dogs' therapies are conducted in many veterinaries, nursing home, and hospital for the disabled people for the better qualities of life. These therapies are new to India.

Pets can be any it's not always the dogs, but all other animals also have the same feeling it's just that all are not same in shapes size and needs are also different.

2) Farm animal

Farm and working animal include castles, sheep, horses, pigs, donkeys, goats. They are useful in different ways such as cows give milk, sheeps gives wool etc. Interacting with these animals can help us in increasing our knowledge and entertain us. Working animals are useful to us but because of the size more people don't refer these animals and end up giving up on them. Some people not even seen them working in the field and don't have the knowledge about them, they have only seen them in urbanscape or in the zoos or time of farm visit. For some people these animals are part of their career and their lifestyle.

E. Concepts and Therapy

1) Animals Assisted Therapy

Animal-assisted therapies (AAT) is an approach to mental health care that incorporate animals into the psychotherapy process, emphasizing the bond created during human-animal interactions. Emotional recovery and positive psychological transformation often occur when the relationship between an individual and the therapy animal grows. Professionals often advice for using animals in psychotherapy treatment because animals

can bring forth a vivid array of nurturing emotions, and many people seeking help respond positively to the idea of caring for another being [11].

In India, this type of therapy is not much popular or known to people. Currently in India people are trying to create awareness for the animals and the importance of pet or an animal in once life. here, people are coming with the concept like cuddling park, dog café but this is only limited to dogs still. We need to understand that the animal can be any but the therapy or the work that dog do, can be done with other domestic animals too.

2) Animal Aided- Design Concept-

This concept basic idea is to design of urban open spaces, to integrate conservation into open space planning. The basic idea of AAD is to include the presence of animals in the planning process, such that they are an integral part of the design. For AAD, the desired species are chosen at the beginning of a project. The requirements of the target species that not only set boundary conditions for the design, but also serve as an inspiration for the design itself. The aim of AAD is to establish a stable population at the project site or contribute to population growth of species with larger habitats. AAD thus allows a combination of good urban design with species conservation [3].

METHODOLOGY



Fig.2.process of methodology

A. Case study

1) The Bombay society for the prevention of cruelty to animals, Parel, Mumbai



Fig.3. S.P.C. A(Mumbai)

TABLE I	CASE STUDY 1 DETAILS
---------	-----------------------------

Location:	Parel, Mumbai
Area:	4 Acres
Year:	1874
Registered:	As a Charitable Organization (Public Trust)
Affiliation:	Royal Society for the Prevention of Cruelty to Animals, UK
Member:	World Society for the Protection of Animals, Animal Welfare Board of India
Past	Luminaries like JRD Tata, Ratan Tata, Sir Dinshaw Petit
Presidents:	

3) Animal Refuge Centre



Fig.4.Animal refuge centreTABLE IICASE STUDY 2 DETAILSLocation:AmsterdamArea:1.43 AcresYear:2007Architect:Arons En Gelauff

architect

3) Palm springs animal care facility



Fig.5.palm springs animal care facility Table Iii: Case Study 3 Details

Location:	Palm Spring, United
	States
Area:	3 Acres
Year:	2011
Architect:	Swatt Miers
	Architects

B. CONCLUSION

TABLE IVCASE STUDY FINDINGS

VI. RESEARCH AND FINDINGS

A. Human-animal behavior

		IN F	USPONSE TO HUM	N.		
ANIMALS	EMPATHY	1248	ATTACRMENT	AFFECTION	BTMANS DWELLING	THERAPIC
BULL.	YES	YES	YES	¥85	VERY STRESSFUL	50
00%	VES	DEPENDS	VES	VES	DEPENDS	SELECTIVE
EUFFALOES	725	DEPENDS	715	STS	DEPENDS	500
58821075	1125	DEPENDS	125	¥85	DEPENDS	NO
GOAT	125	DEPENDS	YES	V25	DEPENDS	SELECTIVE
BOCS	YES	NO	YES	722	NOT STRESSFUL	115
CARS	152	NO	YES	325	SOT STRESSPUL	TES
BORSE	125	DEPENDS	VES	525	DEPENDS	NO
DONKEY	185	DEPENDS	VES	VE8	DEPENDS	NO

Fig.6.human-animal behavior

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- This table conclude the animal behavior in respond to human with animals.
- safety of human and animal both
- This will help in designing the interaction spaces
- B. Relation between animal and color



Fig.6.color palette

- According to the architect heather lewis, dogs have dichromatic vision and can see most of the range of colors humans can see.
- Distinguish colors in the 510 to 590 nanometers, or wavelengths, range-between green to orange
- color palette is the fear free palette for animals [12].



C. Animal spaces requirement

TABLE V ANIMAL SPACES REQUIREMENT

TYPES OF ANIMALS	FLOOR SPACE REQUIREMENT (m ²)		
	Covered area	Open area	
bull	12.0	24.0	
Cow	3.5	7.0	
buffaloes	4.0	8.0	
Down - calver	12.0	12.0	
Young - calves	1.0	2.0	
Old - calves	2.0	4.0	
Sheeps and goat			
Ewe/nanny	1.0	-	
Lamb/kids	0.4	-	

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Ram/buck	3.4	-
Dog	s and cats	
Dog	5.5-11.0	-
cat	1.6 - 1.85	-
horse	Tie stall	
	4.2 sq.m	
	Box stall	-
	10 sq.m	

With the help space requirement will help in designing a comfortable space

D. Revenue earning option for the centre



Fig.7.revenue options

E. Selected sites



Fig.8.google image of kalyan



Fig.9.google image of Parel, Mumbai



Fig.10.google image of chunchale, Nasik

F. Site selection criteria

	Ideal	3 points	
Dointa	Acceptable	2 points	
Points System	Agreeable	1 point	
System	Not		
	Acceptable	0 points	

Fig.10.site selection criteria

V. CONCLUSION

This proposal is an attempt to encourage the architecture for the betterment of animals' life and considering them as a crucial part while designing. And fill the gap between human-animal, that have been made in today's time.

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REDEFINING PUBLIC LIBRARIES AS PLACEMAKERS AND WRITERS RETREAT CENTER

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ABSTRACT

A city or locality is not without its public spaces, and to have a healthy locality these public spaces need to fulfill the expectations of the public. But recently, these spaces have misplaced their significance due to the brutalism of planners, and media industry. Also the pandemic helped realized the importance of community and our dependency on each other. Hence, in such dire times there is an immense need of physical knowledge-sharing platforms and community centers. This would help to change the face of the entire city or locality by improving the literacy rates and employment. Writing as a profession is often overlooked due to their immense need for solace. As pandemic has forced loneliness upon them it is necessary to see to their needs as well. The environment which caters to their needs would help them greatly and also influence their output.

Keywords— public spaces, placemakers, digitization, writers block, healthy environment.

IV. INTRODUCTION

A. Description of the topic

Reading has been the source of our existence and the reason for our evolution and is undermined vastly. Reading is a vital part for the growth of the society and hence, needs to be recouped. Reading is the foundation of education and hence, would help increase the literacy rate of India which is at 74.04% [1]. Since the recent times books were authentic sources of information. This gave rise to the libraries which were like temples where the readers worshipped this source of knowledge. Libraries were then setup in various public spaces too in the early ages; this was impact of reading in the early ages. Until digitization happened, where the physical books lost their value and the soft copies took its place. This impacted our lifestyle turning us into couch potatoes. According to a survey on the digital lifestyles of Indians in May of 2019 the 71% of the respondent's preferred digital books or e-books whilst the 29% preferred purchase physical copies of the books [2]. The major impact was on the public libraries whose condition deteriorated as there weren't enough funds to maintain it.

The books that we try to finish reading in a day or two are the by- product of years of experience, hardships, knowledge, pain, etc. Writers toil themselves to just finish a book, while it falls in our lap. But they are often overlooked and the lack of infrastructure catering to their needs is a proof.

Writing camps do help but the places are not always feasible for every writer. But these are arranged according to the convenience of the host and hence, couldn't be convenient for the writer. Though majority of their life is in solace the pandemic has struck their mental health and given their creativity a halt with a forced stay home agenda. Hence, an infrastructure could help them with their creativity and maintain their relationship.

B. Need of the topic

As we are rapidly moving towards digitization we have lost the authenticity in the reading material. The internet can be enormous sea of knowledge hence, to provide authentic knowledge a library is require. A public library that meets the expectations of the millennial is needed. A community center with the power to exchange or share knowledge is a necessity of today. Public libraries as placemakers would help change the face of the entire town.

Writers have been ignored though they are the reason we are reading these books. Hence need for infrastructure to enhance their experience while writing these books is necessary. The solitude they seek could be given to them through such infrastructure. A writer's retreat center could also help the writers with their writing block, etc.

V. AIM, OBJECTIVES, SCOPE & LIMITATIONS

C. Aim

To redefine the state of public libraries to meet the expectations of the millennial, while creating meaningful public spaces where knowledge is at the grassroots. To provide the writers with infrastructure to produce effective output.

D. Objectives

• To give readers an undisturbed space, also to create meaningful public spaces that meet the expectations of the millennial.

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- To provide an authentic knowledge-sharing platform, such placemakers could benefit the entire town.
- To boost the literacy rate of India, so that the social issues faced by it can be eradicated which would help the nation grow.
- To help the writers get their recognition and space for writing, this would in turn help them with their writing process.

E. Scope

- Enhance the experience of the reader through books and various other features.
- A potential community center and a pacemaker that would change the façade of the entire town.
- To provide an atmosphere for writers, this can help their writing and with their writers block.

F. Limitations

A public library aims to provide authentic knowledge to everyone and hence, a national library would not be feasible as it is used by authorized personnel only.

VI. BACKGROUND

The history of public libraries dates back to the oldest civilization in the world. Public libraries are always considered placemakers in any locality. They have been a major part of the public spaces.

A. Evolution of libraries [4].

• Ancient libraries

These were generally for record keeping of the transaction. Clay tablets were a type of reading material. Cuneiform and Hieroglyphs dating back to the 3^{rd} and 2^{nd} millennium.

- Paper documents invention Libraries were built to house records, Alexandria and Greece in 3rd and 4th century B.C. Also, private libraries came up in Asia, Rome, and Constantinople in 5th century B.C.
- The middle age libraries and their connectivity to religion All the temples and cathedrals had their own libraries. Also, in 9th century individual libraries came up in Baghdad and Cairo. Universities in the 11th century escalated the importance of libraries. The invention of printing press (Gutenberg) increased collection in the 15th century.
- The existence of public libraries The 17th and 18th centuries paved the ways for the working class due to opening of public libraries around the U.S. and Europe. 1800s and 1900's public libraries became a trend.

B. Evolution of public space and the importance given to

Public libraries in them [3]

• Agora Founded- 6th century B.C. Period- Classical era. Library included in 4th century A.D. with rooms and stoas.



Figure 1: Plan of the Agora

• Roman Forum Founded - 753 B.C. Library on either side to give importance to columns



Figure 2: Roman Forum

- The Medieval Market Square Founded-11th century Library was a part of cathedrals, while market being the city center located in front of the cathedral.
- The Renaissance Plaza Founded- 14th and early 16th century Library in the plaza was only accessible to scholars.



Figure 3: Plan of Renaissance Plaza

- Public Space in Modern Era Founded- 19th century Library had grown in size and was accessible to public.
- Contemporary Public Spaces In these spaces libraries are in a cafe, etc.
- C. Libraries and their origin in India



There were various initiatives taken by the government of to help make the public libraries accessible and feasible for the working class.

D. Evolution of writing

- Tokens earliest form of coins and were the only form of transaction.
- Pictography- Earliest for of account keeping.
- Logography- Formation of names through shapes

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- Proto-Sinaitic Alphabet these were the earliest and closest to recent day alphabets [5].
- After these came the modern alphabets which were an adaption of Proto-Sinaitic alphabets
- Enheduanna the first writer who was known for the hymns of the Greek Gods [6].
- She speaks about long hours and also writer's block [6].

VII. LITERATURE REVIEW

This topic helps us understand the technicalities of the public libraries.

C. The role of public libraries in culture-led urban regeneration - by Dorte Skot-Hansen, Casper Hvenegaard Rasmussen and Henrik Jochumsen [6]

This paper describes the library as an urban catalyst and hence, has sorted 3 strategies to be the basis of this culture-led urban regeneration:

- Cultural icons Seattle library's shiny façade and Peckham library's inverted 'L' shape and their potential to become head turners.
- Library as placemakers The ability of the libraries to convert the dark- spots into the economy expansion area of the locality.
- Vitalization of a community through a library This looks upon building the community with the help of the library. Idea stores in London which have various functions in the library to cater to the community.
- Conclusion The different and new roles of libraries are portrayed here and how they can act as a community center. It also helps us to understand the role of placemaker and cultural icons in society today.

D. Public library revitalization in India: Hopes, challenges and new vision - Ajit Pyati

This article talks about the past, present, and future of Indian public libraries and their technicalities.

- State of public libraries in India The evolution of libraries and their expansion, challenges faced are explained briefly.
- Community information and library The importance of libraries in the community and the lacunas in India are revealed.
- Libraries and community technology related projects The importance of technology initiatives in the evolution of libraries are stated.
- Libraries and its partnerships The importance of partnerships and their dependance on libraries is stated.
- Challenges The major challenges faced by the library are corruption, maintenance, lack of funds, and disinterest in the youth.
- Conclusion while other countries have undertaken many initiatives to revitalize the public spaces, India has fallen short in taking initiatives. The importance of partnerships is a takeaway.

E. Briefing 9: Writing Residencies - Sarah Butler

This paper is a briefing on the writing residency, the challenges faced in it, the experience to cater, etc. Sarah Butler is an author and is interested in the relationship between the place and the writer and conducts workshops for writers.

Whilst the name may differ over the world but the basics remain the same. The major focus is on longevity, place, and flexibility. Its key ingredient is the benefit to the writers in terms of new audience, inspiration, opportunities, etc. It also serves us with the basics of the owning a residency and the challenges that would be faced. It deals with the technicalities of the residency too.

- Conclusion Technicalities and the relationship between the organization of the residency and the writer clear out the space issue.
- F. Library Usage Pattern among the Users of National Gallery of Modern Art, Mumbai Chanchal Gyanchandani & Amit Uraon

This paper is based on the usage pattern of a specific type of library. It basically looks upon the review of the users.

It came into existence in 1996, at M.G. Road, Fort Mumbai. Sir Cowasji Jehangir Hall houses this library. The library of NGMA presently has 1500 books and catalogs, 250 photo albums, 1000 CDs/DVDs, and 500 old journals and magazines. It looks upon the reviews in terms of use of resources, improvement of library service, average time spent, respondents according to the age group, library visit frequency, library Visit reasons. These are basic reviews in terms of forms.

• Conclusion this study gives a rather practical view of the library. Also, it gives a rough idea of Mumbai and its pattern of usage of the residents. This gives a tentative idea of the expected footfall in Mumbai.

G. Standards of public library

Basic standards to design each space are required. The standards are carefully curated by Information Sectional Committee and then adopted by the Bureau of Indian Standards.

The moral rules are mentioned here where the foundation is "open to all" and hence, these are the rules that are must and should be followed. Also, various design attributes relating to ventilation and sustainability, etc. are mentioned and need to be followed.

• Conclusion A set of guidelines helps to maintain the functioning of the library. It gives a clear vision of the spaces to cater to and about the Indian policies regarding libraries.

H. Learnings from literature review

The key learning is about the technicalities of the public libraries. The past, present and future proposals on how to cater to spaces. The various technicalities of partnerships and the maintenance are briefly understood. It gives a brief preview of the effect of such structures or public spaces on a society, and their potential to make or break the façade of the entire locality. It also gives a basic overview of the moral codes to be followed and the design attributed to be taken into consideration while proposing a library.

It also gives a basic understanding about the writing residency and its benefits to a writer. It provides a key understanding of the technicalities of owning a residency and how to cater to it.

VIII. METHODOLOGY

A. Asiatic library (town hall), Mumbai, India

Oldest standing library in Mumbai. Gives a sense of time, era, and vernacularity. Also, a placemaker for the entire locality.



Figure 4: Asiatic library

- Project details Year: 1833 Area: 3,123sq.m. User group: Public Climate: Hot and humid
- Project overview 4.5M plinth with Doric order columns on the western side becomes the socializing spot due to the steps created. Skylights are used to take in natural light though it does not reach the shelves. Separate wings for the library and museum make it easy to segregate the crowd. The central reading area visually connects the user with the entire space. Single washroom for the entire library isn't sufficient.

A. Kavi Namrad Central library, Surat, India

It's the first public library in Surat. Provided a source of entertainment for the common man. Constantly updated to cater to everyone.



Figure 5: Kavi Namrad library

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- Project details Year: 2008 Area: 7000 sq.m. User group: Public Climate: Hot and Humid
- Project overview All the openings are either taken from the north or tilted there. The atrium is the major source of natural light in the library. Transition space before every space. Spaces also opened or close as deemed necessary. Spaces for the senior citizens, differently-abled, and children on the ground floor for easy access. Ground floor toilet blocks entry from outside. Spaces for senior citizens are on the inner side hence, access would be an issue.

B. Nasushiobara library, Nasushiobara, Japan

Heavily inspired by forest it's a recent project and designed according to the needs of today.



Figure 6: Nasushiobara library

- Project details Year: 2020 Area: 4967 sq.m. User group: Public Climate: Hot and humid
- Project overview This structure has no walls and only shelves as barriers in-between spaces. Its major feature is its polyhedral roofing which is also called the leaf line which divides space by manipulating its height. Radiating material to see the stack of books in some areas also multiplies the space. Central spaces for movement create an undisturbed reading space on the sides. Glass facades provide an ample amount of natural light.
- C. Casa Ballena art center, San José Del Cabo, Mexico



Figure 7: Casa Ballena art center

• Project details Year: 2019 Area: 650 sq.m. User group: Artists Climate: Hot and dry

• Project overview This structure is ground-based and the material used creates the illusion that the structure has risen from the ground. Due to the contoured site, various terraces are created which act as socializing space, etc. The studios are given the northern light with huge openings, whereas the staff and dining are provided on the southern side with the view of the marina. The exhibition area has skylights to take in an ample amount of natural light. The shaded patios are a space for socializing and also pathways to take you to spaces. Elevation treatment to avoid the harsh light inside. These openings covered glass create interesting patterns inside.

Contont	Comparative analysis of case studies of public libraries			
Content	ntent Asiatic Kav Library l		Nasushiobara public library	
Location	Mumbai, Maharashtra	Surat, Gujarat	Nasushiobara, Tokyo	
Area	3,123sq.m.	7000sq.m.	4967sq.m.	

Architectural expression	Vernacular	Modern	Minimalist
Climate responsive	To some	Yes	Yes
	extent		
Spread	Horizontal	Vertical	Horizontal

E. Findings from methodology

This helps us place each space with a face and it gives an in-depth knowledge of the measurements of the spaces. It also helps us understand the connectivity of spaces. It gives a basic understanding of the common mistakes done which made the libraries unusable as of recent times. Whilst the recent projects also set a benchmark for the better understanding of millennials needs. It also highlights the key aspect of library i.e., light and ventilation and its importance.

It also provides a brief overview of spaces to be catered in a writer's retreat taking inspiration from the art centre. The interconnectivity and the ability to be in touch with nature is the key takeaway.

IX. FINDINGS AND ANALYSIS

A. Google form survey analysis

A survey was conducted and distributed via various social platforms. This was form was a questionnaire to record the responses of awareness about libraries. This helped in knowing the preferences of people who do not visit libraries.

• Are you an avid reader? (214 responses)



Figure 8: Survey graph

Analysis

The majority prefer not to read, this is due to the digitization and absence of functional libraries.

• What kind of books do you prefer? (214 responses)





Analysis

The majority prefer hard copies, hence the need for books is evident. Also, the need to cater other technologies in library.

• Have you ever visited any library? (214 responses)



Figure 10:Survey graph

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Analysis

The majority have visited the library. While some aren't sure as the library may be used for other purposes.

• If yes, then what kind of a library was it? (192 responses)

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Figure 11: Survey graph

Analysis

The majority have visited an academic library. While the public library is visited by very few respondents, this would be due to the quality of libraries in the country.

How often do you visit a library? (214 responses)



Figure 12: Survey graph

Analysis

The majority have visited the library as often as once in 3 months. This gives an overview of the expected footfall.

• Do you think we need a physical library in today's globalized world? (214 responses)



Figure 13: Survey graph

Analysis

The majority are leaning towards the need for a library in the modern world. This creates a strong base for the proposal.

• Would you visit a space solely dedicated to writers and curated according to their needs? (135 responses)



Figure 14: Survey graph

770

Analysis

The majority of people wouldn't visit such a place, this could be because of a lack of knowledge regarding such spaces. This provides a lens to create awareness regarding such spaces.

B. Findings from the survey

This survey helped immensely to gain practical knowledge about the topic. The opinions of people belonging to every age group gave a deep understanding of their preferences. The key discovery was the lack of proper use of the infrastructure, that made the people unsure whether to use it or not. It also helped to know the expectation of the millennials from their public spaces or library.

A major learning was the lack of awareness about the writer's retreat center. Some respondents who were writers themselves were unaware of the existence of such a space which could help them. It also helped to get to know about the expectations of the respondents from the retreat center which helped formulate the spaces accordingly.

C. Site criteria

Nahur Village Bhandup, Eastern Suburbs



Figure 15: Map of Nahur site

Bandra village, Western Suburbs



Figure 16: Map of Bandra site

Sewri village, Eastern suburbs



Figure 17: Map of Sewri site

TABLE II. COMPARATIVE ANALYSIS				
	Comparative analysis of potential sites			
Site	Bhandup, Eastern Suburbs	Bandra, Western Suburbs	Sewri, Eastern Suburbs	
Area	57216. 24sq.m. (14.1 acres)	50208.56sq.m. (12.4acres)	17226.78sq.m. (4 .25acres)	
Ward	S	H/W	F/S	
Population	691,227	1,76,708	3, 60,972	
Literacy rate (in %)	81.4%	83.74%	783.9%	
Major development around	Commercial	Residential	Industrial	

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Connectivity through	Connected to	Well, connected to western, central and harbour	Well connected
railways	central and	line	to
	harbour line		central and
			harbour line
Educational Institutes	6	11	9
Healthcare	8	12	5
Existing libraries in the area	7	8	-
Views and vistas	Saltpans and green fields	Reclamation	Industries

X. CONCLUSION

"Cultures and climate differ all over the world, but people are the same. They'll gather in public, if you give them a good place to do it" – Jan Gehl

As we are rapidly moving towards digitization the importance and investment for the public spaces. Also, meaningful public spaces should be fostered for the health of the society. Hence, proposing a public library where knowledge is at the grassroots would prove healthy to the society.

A writer's retreat center where the writers could find their creativity and get rid of the writer's block. This proposal would bond the writer to their surrounding helping them formulate a worthy output.

This research helps formulate the spaces to catered which would fit the expectations of the millennials.

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REKINDLING THE ESSENCE OF NATURE AND STRUCTURE

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ABSTRACT

The health condition is becoming an issue of concern, asnumber indicates India has maximum number of people suffering from many diseases. There are preventive as well curative ways solve it. Within this vast classification prevention and cure, more than one choice fitness care structures are reachable. Allopathy has got maximum share of this market, but alternatives like Naturopathy and Ayurvedic which are equally effective as well as are economic has not been highbrow.

A holistic middle is a special facility that helps fix the herbal stability of your mind, body, and spirit by way of combining cutting edge scientific advancements, historical scientific strategies and complementary treatment options used worldwide.

The bodily environment has a direct relationship with how a character reacts and behaves. The challenge objectives at developing structure that enhances recuperation by means of appearing as a medium between human thought and nature. The format strives to articulate an architectural language that serves as a catalyst for the constructed surroundings to lift its occupants to a increased existence.

The purpose of the project, to elevate up architectural marvels that reflect the surroundings and communities they are born from, a work of architectural excellence that grant the propersetting to current to people, a plethora of immersive and true experiences main them to growing wholeness and happiness.

Ayurveda, Naturopathy Yoga and Meditation

INTRODUCTION



Fig. 1. Amalgamation of thoughts

The reason behind selection of the topic is the individual with any kind of disease going through the medication do not get wholly fit. Health is the most important factor of any living being. It might be in healthy stag or during curative stag. When a person is in healing stag, he/she lack with positive and gets complete drained. The medication itself make him/her ill and dull.

Holistic standards of fitness and health view reaching and keeping excellent fitness as involving greater than just taking care of all a variety of aspects that make up the bodily body. Attention must be paid to factors such as emotional and religious well-being as well. The goal is a wellness center that encompasses the entire person.

The human being is always inextricably bounded with nature. The conscience that runs through nature is the same that inhabits the human body. If we were with nature, our body was heathy and gleeful. The moment we started to estrange with nature our misery and suffering started. But the way we are moving far from nature is fatal mistake. We ourselves got surrounded by various diseases and maladies.

For having the perfect health and natural life there are certain way of living with live food, fresh air, proper sanitation, sunshine. It is rare in today life's walk to have well-being in which every body function in perfect condition.

To have the healthy life it is necessary to live according to nature's law. Health is not something which can be purchased in a bottles and packets from a drug store, but it is a condition which we built within our own vital forces. To maintain the healthy life, it is necessary to balance body, mind, and spirit. They can be achieved by good food intake, pure air and water, regular exercise, and rest.

There is a false belief among people that the diseases can be cured only by the harmful and injurious chemical drugs. Not intentionally, but due to less knowledge we always aspire to suppresses the symptoms by the mean of destructive drugs. Instinctive method desire leads people to use any curative method that promises quickly recovers. It alleviates against the nature of body. These drugs are worse than the disease itself.

Background study

In modern period we pompously show a lifestyle, communication technology, business etc. made our living extremely easy, with various gadgets and machine. Despite of these comfort, life has become more complex and competitive. We find ourselves under more stress, tiredness and distorted than ever before.

We always give our priorities to our job, and it demands more. Such cycle goes round and round which has no end.

Several ailments have sprung up and are growing due tothe fundamental issue of stress and aggressiveness and arenow frequenting at an early age. In this rut of life, everyoneis left to cater to one's very own wants inflicting a vicious cycle of stress and distress, threatening one's very existence. Such unbalance on environment, had adversely on human. The many problems like stress, anxiety, obesity,dullness etc. which is faced by most and they have become part of our life. Our body is still tried after we awake up. It is not important how expensive our lifestyle is, but it is important how health it should be. Nature is not only about fresh air. It has given us many things, but we haven't explored yet.

History

- It is the oldest system in the world on self care and originated in India. It has been the traditional medicine system of our country.
- Irrespective of the religions, faith, the Indian tradition has many things to contribute to the health of a person indirectly. Either it may be a fasting, visiting holy place, taking dip in Ganges or Sea on holy occasions, ushapana, achamana etc.
- The term Naturopathy was brought ahead in 1895 by John Scheel and popularized by Benedict Lust. Dr Benedict Lust and spread the knowledge of naturopathy in the US in 1892.
- Our Ayurveda text contains the Swastha Vritta which is nothing but Naturopathy

Body typology:



Fig. 2. Types of dosha

Based on these typologies, treatments are done. In essence, the doshas are vigorous forces of nature, useful concepts that assist us higher recognize ourselves, and the world round us.

Pitta, Vatta, and kapha are every vital to physiology in some way, so no dosha is higher than, or optimum to, any other. Each of them has a very precise set of useful roles to play in the body. When doshas are out of balance, they can wreak havoc on our health.

It is not only that has the bad side but also have the better side. It is necessary to have the balance in the dosha when it gets into excess it will harm the person with the negative impact.

Dosha	Primary Functions
Pitta	Digestion and
	transformation
Vata	Movement and
	communication
Kapha	Cohesiveness, structureand
	lubrication

Fig. 3. Primary Fuctions of Dosha

There are 3 main factor that are the main cause of diseases and ailing heath:

- Faulty diet is the many causes, that weakens the body. Diseases are occurred due to the unhealthy nutrients of past intakes.
- By untruth analytical ling that bio-chemical drug is good, but they give immediate relief but not cut down the disease from its root.
- Civilised life ignores and violates of healthy, hygiene, nutrients, and sanitation.

	Do	osha	Qualities	
	Pitta		Hot, Sharp, Light, Liquid,	
			Spreading, Oily	
	Vata		Dry, Light, Cold, Rough,	
			Subtle, Mobile, Clear	
	Ka	pha	Heavy, Slow, Cool, Oily,	
		-	Smooth, Dense, Soft,	
			Stable, Gross, Cloudy	
			(Sticky)	
(FIRE The tanma Various fu element are transforma and		tra of fire element is <u>Rupa</u> , nctions carried out by this e penetration, digestion, and tion of thoughts, intelligence, perception of light.	
(AIR	ra of Air element is <i>Sparsha</i> . action is to do any kind of . The sensory organ related to skin.		
/	The terms for Earth -1			
(EARTH Gandha. Qualities of earth element are heavy, dull, dense hard and gross.			
				_
(WATER	The <u>tanmatra</u> of water element isRasa. The water element exhibits qualities like cool, liquid, <u>dull</u>		
	\smile			
(ETHER	The tanm <i>Shabda</i> (So to ether eler transmits th	atra of ether element is ound). Sensory organrelated ment is ear as itis hollow and te sound	

Fig. 4. Qualities of dosha

Treatment on basis of:



Fig. 5. Panchamahabhutha

Connectivity of therapy

Naturopathy and Ayurveda are choice medicines, each aretotally exclusive fields of find out about and practice. Naturopathy is an eclectic and holistic alternative medical structure that concentrates more on natural medications and the body's essential ability to cure and sustain itself. However, Ayurveda is a branch of medicine that amalgamatethe body, psyche, and spirit to prevent and cure various types of ailments.

Aim

Natural balance of your mind, body and spirit. Healing of health involves the judicious, rational, and intelligent use of natural elements i.e. Earth, water, sunlight, air, and ether.

Significance

Humans has lost the basic awareness of the fundamental of healthcare, especially the traditional health care methods. It appears that modern man fails to pay attention to our life and health until it is too late. It is not that the allopathy is the wrong medication but during his/her treatment the person food intake and other basic behaviour changes due to which the energy gets drain off and the level of patience and positivity also get lower.

Natural ways of living and natural methods of therapy, we can eliminate the morbidity that enables the development and multiplication of disease germs. The hap of chronic degenerative diseases is widespread and increasing. The cost of health care is proscriptive, and millions cannot afford health insurance. Modern medicine is not fully capable to keep us healthy and to help us heal entirely. Our food is your medicine, and all medicine is your food.

Limitation

- Allopathy seems to bring about immediate relief.
- The process takes a long period of time

Motive

The Naturopathy and Ayurveda is the way of cutting down the disease from roots with the help of nature and our body itself. It not only stops the symptoms, but it works positively in terms of mental health and physical health.

Different types of therapies are done with the help of ayurvedic and naturopathy. It removes the toxicity from the body with the help of different massages, enema, bath, fasting, conselling etc go with the connectivity of ayurvedic and naturopathy. Naturopathy and ayurvedic helps the individual to cure joint pain, blood circulation, eyes etc.

To keep peace of mind it people use to sing ragas, bajanas. Sound and dance therapy has the capacity to treat mental disorder. It also boost the mind, body and soul.

"For as long as people have used their voices and musical instruments for prayer and chanting, people have used sound to heal," says Valerie Oula,

"Numerous sounds and musical vibrations and ease are played to ease mind, body and spiritual healing, for instance the reduction of stress, promoting relaxation and balancing our body's energy centers, also known as chakras".

"The senses not only mediate information for the judgement of the intellectual, they are also a means of igniting the imagination and articulating sensory thought

- Juhani Pallasmaa

Different types of therapies are

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Colour

Fig. 7. Therapies

Massage Therapy

Naturopathy and Ayurveda has circumscribed a variety of treatment methods including:

Acupunctur

- Herbal Medicine to help prevent and treat various diseases and disorder.
- Dietary and Nutritional advice for restoration of stability, detoxification, and elimination of disease
- Lifestyle advice to promote health and to reduce stress
- Hydrotherapy using the healing power of water to energize the immune system and the body's natural protection.
- The use of compresses and packs to bracing organ function and to reduce pain

The main motive is to create center for wellness of the people wholly. They might be in medication or not. This center is not only for the individual who are in medication but also for the people who want to learn discipline in their daily routine, thefood they consume, educate them etc.

Architecture intervention

Typology of the space

The Healing Center will focus on the healing powers of nature. Nature is very important for this facility, so the program will be focused on this idea. There are four major parts to the program: a therapy area, a living area, an educational and cooking

The success of these therapies is dependent upon different levels of interaction between user has with the natural environment. Each therapy has some level of relationship with nature. This link ranges from seeing nature to tasting nature. This interconnection can be created a variety of ways. Some specific types of links are through the senses of the person participating in the therapy. This relation with nature will help the patients to heal faster and will also provide a healthy working environment for the doctors and staff. The design goals of this center are to create an environment in which nature is

Roles of intervention

- Role of Spaces
- Role of Nature
- Role of Light
- Role of Built form

Lifestyle changes

- Awareness
- Mental
- Physical
- Emotions

the focus.

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To make a similar connection with the Healing Centre. This interaction with nature must be considered will all the programmatic elements. Some elements like the yoga room, the bedrooms, and the dinning need direct access to an outdoor space. This approach will create an opportunity

- Architecture do affect human health through stimulation.
- Suitable stimulation, tolerance, setup, circulation, flexibility, control, and are key architectural factors.
- Inadequate spatial resources, inflexible spatial arrangements, and dearth of climatic controls, all threaten individual needs to effectively interact with the space.
- The physical surroundings have a direct relationship with how a individual reacts and behaves.
- The focus is to design spaces that will take the user through a journey and provide an involvement through the sequential relationship of the spaces.



Fig. 8. Combination of nature and structure

The curing is not possible in the box it should be **blend** with surrounding. Some therapy has the scope in exploring in openspaces.

More the positive environment there is the wider scope of healing in our mind.

Playful design with nature light and built for gives the better touch to the healing of the person.

or this pursuit to occur in an outdoor environment. However, the acupuncture rooms, the mud therapy area, the hydrotherapy pool, the offices, and the classrooms only need views to the outdoors.

METHODOLOGY

Aspiration of the centerTypology of the space Prerequisite elements

Interplay of between users

The user groups experience the building will be determined by the layout and vicinity of the programmatic elements. The interaction of doctor and patient is very important to the success of the Healing Center. This will create a greater trusting bond from which each the affected person and the health practitioner can benefit. The interplay with site visitors to the core is additionally very important. The site visitors will be drawn into the facility and inspired to take part in the cures that will be offered. The academic element of the software will additionally assist to enhance this connection due to the fact the neighborhood will be worried in lectures and instructions provided at the center. These programmatic factors will help to carry the neighborhood into the facility accordingly ensuing in a prosperous dialog between the humans of the facility and the human beings of the community. This interplay will additionally assist to heal. The academic component of the application consists of an auditorium and classrooms. The auditorium will residence lectures, whilst the lecture rooms will residence workshops and things to do at a smaller scale. This interaction of community and facility will help nourish and reinforce the facility. Therefore, substantial thought must be given to the site and the community that the facility will interact with.

The principles of healing and these three types of interaction: interaction with nature, interaction between the doctor and patient, and interaction with the community will really help to guide the architecture of this facility. Each of these ideas has a direct clue on the strategy and adjacencies of the programmatic elements. These concepts will begin to encourage in the design of this facility. The organization and design of the facility will welcome these types of interplay will respect what is public versus private.

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Revenue generation

The revenue is the main part of any structure. The income of this centre is generated by providing services to the patient. There are two types of patients one who stay till his/her recovery and second is the who just comes for medication. The one who stays pay for it the second income is generated by the people who stay there. Also, the income is generated by the herbal product or any other pharmaceutical product.

Ideology

Gandhi's Motto: Self-reliance (*Swawalambana*) is possible only when there is self-health-reliance (Swasthawalambana). Nature Cure provides self-health-reliance by teaching 'how to live healthy lives' without medicines and doctors.

Formation

In India, Naturopathy has received aid from more than one stakeholder. At the apex level, the authorities is attempting to mainstream it. The significance of it can be viewed by means of current initiatives like forming a separate ministry to seem to be after Complementary and choice medicine. National Institute of Naturopathy (NIN) is an self-reliant physique underneath Ministry of AYUSH, Govt. of India used to be mounted in 1986 with the goal to conduct, facilitate & motivate lookup things to do to improve naturopathy as a gadget of remedy and as a way of life.

	Nisargopchar Ashram,	Viveda wellness retreat	Soukya
	Pune		
		(Pune)	
	(Pune)		(Bangalore)
Function	Only naturopathy and Yoga	Only naturopathy	Naturopathy, Ayurveda, and
	center		Yoga
Spatialorientation	Structures are scattered and	Structures are close to	Scatteredstructure with wide
	connected	each other with pocket	landscape
		landscape in between	
No of Users	150-200	50	100
Method of construction	Basic	Traditional structure and	Traditional South
		local stone with clay pot	architecture with
		tileroof	hatch
			roof and

AYUSH



Fig. 9. Department under AYUSH

Fig. 10. Deparments under Naturopathy and Yoga

Came into fore

Came into spotlight during covid-2019 situation. Where people many focused on health food so that it improves their immune system.

Case Study

Shirgaon, Virar selected according to comparative analysis. and it is the best in term of other factor like climate, hydrology, neighborhood, transportation and connectivity etc.

			Mangalore tiles
Agriculture	Farmland but	Local	Medicinal
land	given on lease	farming	farm

- To understand different aspects in architecture for an individual.
 To study facilities provided in Education and Health Development center.
 Helps to identify architectural parameters used for designing and improve efficiency.
 Structures will be selected based on space
 - Structures will be selected based on space requirement, area of structure, etc.

Fig. 11. Comparative Analysis of Case Study

CONCLUSION DESIGN OBJECTIVES

Frank Lloyd right said that the mission of an architect is to help people understand how to make life more beautiful, theworld a better one for living in, and to give reason, rhyme and meaning to life.

Design aims to create architecture that enhances healing by creating bridge between human mind and nature. Architectural language that serves as a catalyst as the built environment can carry individual to a greater existence.

It only makes perception that such centers should be designed with architecture that not only becomes one with the earth but embraces and enhances it -a loving experience of wholeness and harmony, growing stability and feel of oneness.

The shapes, colours and incorporation of natural light and forms should be paid careful attention to because of the impact they have on people.

Consciously considering the site's context during designing the built environment, architecture will affect the people it holds.

The result not only aims at the well-being of people but also to promote architecture at a micro –level and macro level with respect to the site by using locally available materials and architecture styles which require to the site.

Such center attracts people from around the world and form a tourist attraction. This is turn boosts the economy of the state and the country.

This proposal is to encourage Architectural Space for betterment of human lifestyle

Selected site for the centre



Yewalewadi, Pune Shirgaon, Virar Bapane, Vasai

Acknowledgement

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REVITALIZING MUMBAI'S ETHNIC MARINE FRONTS

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ABSTRACT—

This literature raises concerns over, the walled off port commodity, commutations in a maximum city, Maritime logistics, the mobility patterns, the potential front for all strata of population & majorly, the stakeholders benefitting from this intervention. Mumbai is one of the maximum cities that is derived through its Land & Water relationship ever since its existence, the so called 'Land of seven Islands' which till date, tries to establishes its relationship through varied landscapes along the edge and is largely dependent on the port activities may it be fishing or import/export and the potentials of these lands aren't really known post its time and age. Mumbai is city-centric in nature with sparsely available land and in constant surge to spread its commercial footprints beyond boundaries, squeezing the original inhabitants such as fishing communities along the waterfronts and this is where the idea of revitalizing the ethnicity of areas 'along the edge' falls into place.

Keywords—commodity, maximum city, maritime, stakeholders, inhabitants, revitalization, ethnicity (key words)

I. INTRODUCTION

A. Context

About, 1/3rd. of Mumbai's large coastline is accessible to people here, while 1/3rd. portion of the eastern front still remains walled off and belongs to (MbPT). Waterfronts like (Marine Drive & Haji Ali) provide a greater sense of openness than the traditional open spaces. Whereas, major portions of the Eastern front functions on port operations which witnesses many dockyards established throughout the stretch, which are large parcel of lands under -utilized beyondits life span. Lot more restrictive due to the activities, the eastern waterfront also

deals with varied ethnic groups ranging from fishing communities, Ship breaking yards, slum dwellers rooted along the stretch who are the lesser eyed communities. So, the topic looks into wisely eyeing the potential of such less concerned operation into people's engagement.



Fig. 1. Hotspots along the Western & Eastern Fringes of Mumbai.

B. 'KOLIS of Mumbai & Mumbai of KOLIS'

If you are a Mumbaikar, or happen to visit here, you've likely encountered a fisher woman carrying her daily stock in the hustle of local trains. The luggage compartment evokes herpresence marked by loud chatters [1].

For over 500 years, Kolis in Mumbai have been living and working along this land of 7 islands till the present day [1]. Few well known localities in the vicinity are the origins to these Koli communities (like Worli, Dogri and Mazgaon). (Fig 2.)

Legend: (Bottom to top)

01. Colaba

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- 02. Little Colaba
- 03. Bombay
- 04. Mazgaon (on eastern front)
- 05. Parel
- 06. Mahim
- 07. Worli (on western front)



Fig. 2. Land of seven Islands - Conception.

Around 5,00,000 Kolis are estimated to still sustain in their own fashion, in a world that is rising up all around them. The Koli community even though a fast-fishing commerce today, is still surrounded by a multitude of sea creatures and fisher folks, which offer a 'heave of Activities' with fisher folks making a living from the fortune of the sea. Mumbai & Thane are major contributors to the bulk production of to these stats of fish production in Maharashtra.

However, in the past few decades the fish production rates areat decline due to varied trends, some find the urban flux in maximum cities or the ill - advised developments along the coast or the marine exploitation as the concern and some find the marine malpractices as the cause of decline.

C. Intent

(URBAN Context) - To identify the drivers of urban regeneration at different level /layers.

(LOCALS Context) - How does the proposal position itself in the regional context considering the current Setting.

- How it fits into the current mobility standards & aims to better the impacts.
- How Social, Economic & Cultural opportunities effectuatethrough Design Interventions.

II. RESEARCH GAP

A. Mumbai's Needless Settlement Plans

Mumbai is the past has experienced the redevelopment of 600 acres of textile - mills lands in Mumbai in its 90's. with the intention of creating equal quantity of Open spaces, publichousing & and real –estate developments.

This saw driving out Thousands of mill owners from the site and falsely involving planners & developers with their mighty dreams to commercialize the lands with offices, bars, commercial & recreational setups. This led to conflict of interests between the developers and the original settlers of the site.

B. The Urban Sprawl

The Mumbai's most valuable piece of sprawl the Eastern Waterfront spreads across 900 hectares of Mumbai Port Authorities (MbPT), 1/8th of the island city.

Largest stretch to have along the waterfront, 14kms (8.7 miles) straight involving fishing settlements, jetties, large defunct dockyard & a living, a Living of the original settlers of Mumbai, a living to which hopes of many 'the fisher folks' are attached.

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So, Mumbai's last big hope towards inclusive revival lied in the redevelopment proposal of Eastern– Waterfront (Project)"Sea Transport and Tourism Hub" (Dated: Year, late 2018)

Eastern waterfront revamp: New plan leaves just 74 hectares open space for Mumbai

> Plan for Mumbai's Eastern Waterfront uses public land to benefit the wealthy – and must be resisted

Mumbai mega makeover has big opportunities for both realtors and residents

Real estate companies say that if planned properly, the eastern corridor can rejuvenate Mumbai

The Docklands: Mumbai's last big hope before redevelopment

Mumbai's 'last big' hope lies in docklands' inclusive revival

> City's east coast revamp: First call of port gets 920 objections

Fig. 3. Digital News article Headlines - concerning the revamp of Mumbai's Eastern waterfront

III. AIM & OBJECTIVES

As, discussed the problems, many small-scale Fisheries critically need to be assured with occupational security and livelihood, especially in mega cities. The marine ecosystem is intensely and synergically affected by ill – practises within as well as outside the supply chain that adversely affects these occupations in large which calls for action, for supporting the marine life, feeding the fish folks and improving the consumer chain and exposing their domain of skill sets to people, with the focus of safeguarding the ethnicity of the community & newer public experiences

IV. LITERATURE REVIEW

A. Eastern – Waterfront development Schemes (Heading 2)

The Eastern waterfront offers a spatial arrangement under the (MbPT) that can mend or enhance the value of the ports and quality of urban fabric in Mumbai. But does the ground reality reflect upon the same idea??



Fig. 4. Mumbai's Eastern waterfront – stretch.



Fig. 5. Varied sectors along the Eastern Waterfront of Mumbai [2].

Under The development scheme,

- Port operations/Heritage Precinct (are conserved as per current standards.)
- Mangrove settlements (are reserved for conservation gardens underdevelopment.)
- Slums of working class involves 20,000 slumdwellings (are considered for rehabilitation schemes with lesserland areas.)

This literature studies (3 different examples of exploitation) that are a part of the Eastern Waterfront development Scheme.



(Dated: Year, 2015 -16)

JNPT OCT – Jawaharlal Nehru Port Trust – Offshore container terminal Project (PORT OPERATION SCHEME)

1) (EXPLOITATION) These traditional docks are a 100-acre land on south – east of Mumbai Waterfront, which are in a state of steep decline for years now and the port trust looks to transform the docks into a container terminal to serve JNPT, which won't benefit the waterfront in any sense. The Mumbai Port trust are looking into filling up with concrete and investing these defunct docks into a portion of the larger port operation of the 6000 acres JNPT container Terminal. i.e., 5000 container trucks would move per day, directly through the already struggling traffic congested streets of Mumbai contributing to larger polluting environments [3].

[Bombay Environmental Actions Group said, this attempt to convert a heritage dock into such use is a gross violation and pointed out that unused docks in other countries globally aren't simply filled up, rather are transformed into focal points and opened up to people improving the cultural life of that city/state/Country][3].

(Dated: Year, 2017) MARINA PROJECT

2) (EXPLOITATION) The Marina Project is a part of the eastern waterfront development. It is a proposal for 300 yacht boats for private owners.

This proposal is proposed at Princes Docks which was a reclaimed land shelved under the offshore terminal in the pastbut now demands this reclaimed land to be excavated again, which is an area of 2.25 lakh cu. Mtrs [4].

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Fig. 6. (Onsite) – Marina Proposal for excavation of reclaimed land.

(EAC) - Expert Appraisal Committee of Environment Ministry_ The expert panel in a hearing for the proposal of Marina Project where not fully convinced for the excavation of the already reclaimed land as they were concerned regarding the Migratory birds in that region and the expert panel expressed their desire to see the impact of these excavations on the 'Avian Fauna' and any other settling spotsfor these migratory species [4].

In past four years, in Mumbai around 10,000 birds and 36 species having gulls, shorebirds and flamingos were recorded on Maharashtra coast. The country has launched National action Plan for the flyway of 29 sites comprising of 20 major wetlands and 9 wetland – clusters.as critical sites for migratory water birds under CAF – NAP (Central Asian Flyway – National Action Plan) by BNHS (Bombay Natural History Society) [4].



Fig. 7. (Onsite) – Marina Proposal for excavation of reclaimed land.

CITIES

'₹360-cr SoBo marina will deprive 22 million of open waterfront'

Plans are to put in 360 Crores of public money to function and effectuate these private amenities in exchange the privateowners get the opportunity to park their yachts for a few thousands in return to the trust [5].

This brings us to the concern that _

- Who does this Marina proposal serve or benefit?
- How does investing these 360 crores question the ground reality of depleting amenities affordable housing and squeezed in public spaces that are alarming the city's standards?

An economic calculation shows, that the authorities plan to shell - out 1.2 crores of public money after every single private yacht, with no concrete plans to recover this money [5].



(Dated: Year, late 2018) EASTERN – WATERFRONT (Project)

Sea Transport and Tourism Hub

3) (EXPLOITATION) The Port trust look into developing the sprawl along the Eastern front the 900 hectares.But, the intentions are to completely westernize the eastern front with the lens of tourism & commercialization

,with lesser concern to the occupational hazard that would becreated for the existing troops along the edge.

The proposal neglects the social infrastructure in people's interest and provides lobby to private owners & developers considering them on the frontline of all schemes [6].

[The proposal plans to offer: (on paper)

- 25 % Commercial & Residential Buildings.
- 62% Gardens & Streets
- 13 % Leftover for open Air Activities]

But are these percentages the crux of this entiredevelopment?

Out of 900 hectares of the Stretch, (253 hectares) of land is allotted for the development strategies. (Preserving, the Portoperational area & Heritage Precincts as per current standards) [6].

As per, 2020 Revised Development Plans, following table shows the allotment of areas under the development scheme.

This table shows the areas, that might actually get realized aspublic open space, which accounts to only (6.4% of the 900 hectares of port land) [6].

TABLE I. I	LAND A	AVAILA	ABLILITY	(UNDER	DEVEL	.OPMENT	SCHEME)
------------	--------	--------	----------	--------	-------	----------------	---------

Infrastructure Plans	Land Availability (Statistics)		
(Under Development Schemes)	Availability (Of	Percentile	
	land)		
Approx. 60 hectares (of saleable Commercial Space) +	(190)253	75%/253(of allotted	
(some additional)	Hectares	landremains)	
(35%) Roads & Public Infrastructure	(82)253	32%/253 (of allotted	
	Hectares	landremains)	

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	(52)253	20% /253 (of allotted
Neglecting, Enclosed	Hectares (is the	land remains)
(semi public) pay-to-use Gardenamenities & open spaces	actual open	Only 6.4% (of 900
	considerable	hectares of Eastern
	space)	Front)

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V. METHODOLOGY

The Purpose is to enhance the potentials of lesser exposedCommunities to people, in this case, finding parallels with the Fishing Dock with newer informed landscapes, which makes these communities self-resilient and reduces the thresholds between the city & the waterfront.



Fig. 8. Analysis of activities & malpractises

VI. CASE - STUDIES 01 DIKKOWITA FISHING HARBOUR, FISHING DOCK, (SRILANKA) Land Area : 81,000 Sq. Mt /8.1 ha. · North of the capital Colombo, · The site is developed to its right potential understanding the user group & development pattern. · Also, the site is well developed on zoning the activities depending on the flood patterns (ON SITE). 02 SABARMATI RIVERFRONT DEV. URBAN RIVERFRONT, (AHMEDABAD) Area: 203 Hactares · This project aims to transform Ahmadabad's historic but neglected river into a vibrant and vital focus for the city 03 AUCKLAND WATERFRONT. MARITIME FRONT, (NEW ZEALAND) Area : 1.8 hectares · Retention and enhancing - of fishing and maritime industries form the focus of New public experiences. · Interpreting the site's peculiar patterns and materiality - to inform a new public landscape.

Fig. 9. Study of cases under varied Design Programs for Waterfront Proposals

VII. FINDINGS & DESIGN PROGRAM

A. (Fishing Season)

Earlier, the fishing season would last for 8-9 months of the year, shortening the period now up to 4-5 months eachyear. This affects the no. of catch drastically, idling the fishing craft for the remaining 3-4 months in their fishing period. So, the fishing period nowadays, remains from (August to December) owing to the decline in fish catch and fishermen's depending on economically non – viable options for the remaining period of the year i.e. (Jan to May) [7].

So, all these issues like, giving up on prime months of fishing, giving up on prime /rare fish catch species & changing compositions clearly indicate the state of overfishing in fishing. By recognizing the importance to fix this supply chain and by creating a model to profit the fisher folks, benefit the consumers by traceability of their seafood [7].

These measures shall largely benefit the oceans by monitoring unregulated fishing malpractices.



Fig. 10. Overlapping diagram – of activities during a calendar year (figure caption)

NOTE - Government has put strict laws on OVERFISHING

- (Western Coast India) receives a ban on fishingfrom (June 1 to July 31)
- (Eastern Coast India) receives a ban on fishingfrom (April 1 June 15)

B. (Adaptive Re – use Strategies)

Adaptive reuse strategies of fishing community, where changes go along according to the activities & functions, thefundamental question arises of 'how to include past while designing for future'.

TABLE II. DESIGN INTERVENTION STRATEGIES

Infrastructure Plans	Interventions	
(Under Development		
Schemes)		
Major Strategy and orientation	Reconstruction and extension of older areas and locations	
Key actors and stakeholders	Towards a greater balance of public sectors & Public experience	
Economic focus	Private sector with selective public Funds	
Social context	Community based self -help actionand greater empowerments.	
Physical emphasis	Replacement of inner areas and peripheral development	
Environmental approach	Selective improvement through self –aware practices	

VIII. POTENTIAL (SITE SELECTION)

TABLE III. SITE SELECTION CRITERIAS

Prominent	Selection Criteria	
Zones	Natural /Manmade Settlements	Possible Interventions
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	(Ferry terminals) It was then referred to as a passenger dock for people to traverse from one place to other.	Ma	ring Tuongnost	
	Ever Since, Navi Mumbai has been established (in 1971)Mumbai felt the need to connect to Navi Mumbai in terms of trade and business and since then marine transport was considered as a daily medium.	Fishing Infrastructure (ColdStorage)		
Bhau-Cha- Dhakka	(Fishing Ports) The Dock is a major contributor to fishing on the eastern waterfront	Fisł n	ning traffic nanagement.	
	along with Sassoon Dock.	М	aritime Dock	
(Passenger &				
Dock)		Ac In	laptive Reuse frastructural	
	Including,	-		
	• Auction hall for leftover catch.	Emerge	ency Preparedness	
	• Boat facilities for fishing/passenger, etc.		pians	
	(Avian bird habitat) 75% of the habitat landscapes have been lost in past 7 - 8 years in Mumbai			
	iviumbai.	-		
	Nos of Bird species reduced March 2019	Improv spread r	e the (5 hectares)	
	60,733 species	fo	or ecological	
			balance.	
Sowri	March 2020 4 106 species			
Mudflats	4,100 species	Benefit	from the Sewri fort	
	(Mangrove Mudflats)	for tourism opportunities.		
(Mangrove &	Due to heavy ship breaking activities, the mudflats include heavy metal			
Sensitive	mangrove species.			
Zone)				
		Flamingo mitigation effort		
	(MHTL link) Started in 2018	& later developing it as a tourism botspot around it		
	Out of 21.8 kms, 2.1 kms (12%) of the sea link passes over the	tourism	noispot around n.	
	Mangrove Mudflats.			
	Over, 1000 mangrove trees have been uprooted, for the MHTL reclamation			
Sassoon	(Proposed Botanical Garden)	Redeveloping the		
DOCK	Sassoon Dock smells a lot due to the salt - water fishing on the dock	dilapida	ited Infrastructure.	
(Fishing	under which the port plans to build a botanical garden as a buffer between	Improved fishing activities		
Dock)	Sassoon dock and other zones. & sanitized workspace			
Prominent	Selection Criteria		Possible	
LUIRS	ivaturat /ivianmaae Settlements		I ossible Interventions	
			Transport	
	(Proposed Redevelopment) The fishermen are let down by government	ent as	terminals	
	infrastructure required for a modern fishing dock	sning	breakwaters and	
	initiasi actare required for a modern fishing dock.		environmental	
			precaution	

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CONCLUSION

(The Facelift)

Considering, the massive development along the Eastern Front which is a tourism friendly approach, it does raise a concern on whether it portrays what really exists or is it a makeover that negates certain sections & dimensions of congregation that will never be explored along the eastern fringes.

So, a (Program) to build upon these potentials and softening the thresholds between City and Waterfronts on the Eastern fringes of Mumbai, with resilient methods towards sustaining non – seasonal flux /Disasters/Socio - Economic conditions of Fishermen's community is the intention. Further, bearing its impressions onto various other industrial networks in the city centre such as (Market places/Hoteliers/Maritime experience/ Marine Transports, etc.), that ideates for sustaining the skill, culture & opportunities that would eventually benefit the ethnic community to self-initiate small-scale businesses and encourage the city to explore the east in its current spirit.

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REIMAGINING THE DEVELOPMENT OF MILL LAND

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ABSTRACT

Cities are continually in transition and so the city's Architecture need to reply to it. Transition brings possibilities of growth, expansion, development in social and urban fabric alongside new improvement strategies. This thesis explores the present-day fashion of fabric mills improvement withinside the coronary heart of the metropolis of Mumbai, its drawbacks and proposes a improvement plan for a mill premise for the gain of the city. It is a try to maintain the city's vintage fabric, which at one time was a city in itself and merge its fabric with the brand-new improvement in a cohesive manner.

An effort was made to analyze the response towards the historic city and now could one add new work to it by superimposing or juxtaposing. The fulfillment of the constructing is in its layering, its discovery via way of means of the tourist and its capacity to make a public building truly public. My thoughts come from observation: of the site, of nature, of humans shifting withinside the metropolis.

Keywords—adaptive reuse, holistic upliftment, mill workers community, heritage precinct

I. INTRODUCTION

Initiated in the early nineteenth century, the cotton textile mills played a significant role in city's economic progress, urban development social structure. Today the central district (the mill precinct) of Mumbai where the mills was once flourished stands defunct and it is the hotspot of Mumbai real estate market. Some of the recent development of the mill landis simply commercial of political exploration. This development do not consider the century long history of cottonindustry and its remarkable contribution to the city. By earlytwentieth century there were more than 50 textile mills in Mumbai which transformed it from a trading town to amanufacturing centre. It also gave the city a unique identity and worldwide name .in addition to this economic backbone of the city mill precinct deserves a due recognition.

History, as we recognize, evolves with each generation. The industrial history of Bombay is an vital a part of its history and the textile industry is one of the maximum crucial components of the industrial history. By now, we recognize the socio-cultural elements related to the mills and the extent of impact of those structures at the society. But, those mills are also a superb example of the neo classical structure of Mumbai. Mumbai as a town is host to numerous architectural patterns starting from Gothic, Islamic, Neo classical to artwork deco.

II. BACKGROUND STUDY

India's 1st and world's 6th biggest urban area, capital of Maharashtra state, commercial, financial & entertainment capital of the country, home to over 21 million people.

Mumbai is the populous city in India & second most populouscity in the world. It suggests more than just the land area and material wealth. It is not just a city but it's a concept, a dreamcherished my millions of citizens (1) This rapidly growing city also has an amazing history which acts as a foundation for the entire development which we can see today. But with growing economy and with increasing different needs, we are forgetting this history because of which Mumbai is what it is today. The building and infrastructure of older cities have value, in that they reveal the history through their physical forms. The existence of the old with the new, where both things hold importance in the service, they provide is what generates the genius loci of these cities. The current financial forces make it hard for the mills to retain running in the city. The reality that the textile mills which can be positioned on, now's a completely extraordinarily priced internal metropolis assets makes it issue to some of monetary and political forces. The ongoing improvement is in desire of excessive rise residences, elite class clubs and hotels without taking note of the city's issues. The query arises: who has the primary declare to such lands. Is it the mill owner, who've been given infinite concessions via way of means of the authorities to runtheir industries and who had surrendered their mills to authorities after they have been not able to run? Or the workers / public, wherein as much as 40% of people do now no longer actually have roof over its head? Or the general public at large, who're reeling beneath acute scarcity of openspace, one of the lowest in the world (2)

A. Girgaon- the mill precinct

"Girangaon" is a Marathi word for "Mill village" or the mill precinct, which characterized by industrial architecture of more than 50 mills. Over 600 acres of land in this region was dedicated to textile industry in early

nineteenth century. Girangaon was home to thousands of mill workers and their families (5). The precinct is from Lalbaug to Parel and Worli to Sewri and spreads across an area of 25sq.km. The entire precinct is efficiently integrated into Mumbai's mass transit system and well connected to major streets in the city.

B. Characteristics of land

Over 50 mills in less than a 3-mile radius converted this part of the city into an incredibly crowded, lively and dynamic hub. Almost all of the workers employed by mills lived in close proximity of their work place. Such an aggregation of workers within a smaller region of the city increased the social and cultural involvement. This led to stronger community ties and a rich network of physical and social infrastructure.

C. Social structure

In the length of 1891 to 1921 the population of Parel & Byculla doubled in which because the population of Worli &

Sewri expanded by 5 times. Mumbai now acquired migrants from not simply east and coastal Maharashtra, however it became additionally populated by crowds from Uttar Pradeshand Gujarat (a number of the other states of India) all hired in textile industry. Mill employees covered humans from all castes and religion. Soon they mounted their exceptional locations of worship which includes temples and mosques and began outside agencies in meat and vegetable markets. Initially in the migrant population, the guys arrived alone to be able to discover employment. Later as they settled, they introduced their families along. Most of the unmarried guys lived in groups. As a end result some of housewives began out buffet offerings and canteens for lunch and dinner. In 1970's, the mill precinct had over 500 canteenspredominantly serviced by the girl group.

D. Housing

Due to housing needs from the mill workers, the Bombay Development District (BDD) and Bombay Improvement Trust (BIT) constructed rows of low-price homes in Girangaon. These 1-2 tales high, single to double room tenements with a common narrow hall, and a block of shared toilets located on the end of the hall came to be recognized as "Chawls". (6)

Chawls had been constructed around a significant courtyard that have become the venue for own circle of relatives' celebrations, weddings, sports, festivals, network fairs and meetings. This congested tenement residing created a "Chawls Culture" primarily based totally upon a unique, shared way of life and collective identity.

E. Culture

Many of the social groups in a single Chawl shared a common background. Sometimes they belonged to the identical prolonged family, had common hobbies and cultural outlooks. Girangaon became dense, poor & illiterate. Yet it turned into full of skills in theatre, music and arts. The mill precinct gave many proficient and versatile artists to city. People right here enthusiastically celebrated extraordinary Indian festivals all through the year. During the festive season the streets and Chawls of Girangaon regarded no much less majestic than a rich south Mumbai neighborhood. In truth the tough work, simplicity, honesty and benevolence of human beings introduced to the beauty of this precinct. Even today, the festivals are loved with identical exuberance and honor; but the people' society is poorer, harm and unhappy.(3)

III. ARCHITECTURAL INTERVENTIONS

A. Need of the study

In the mid19th century, textile industry experienced several technical changes all over the world. The conventional handloom technology faced a severe competition from advanced power loom techniques. The mill owners did not upgrade the machinery and also the taxes were too high to manage such a large industry with so much labors working on it. With 1990s the entire textile industry got shutdown and the labors were jobless and homeless with their families. (4)

Upliftment of the mill worker class is much more important as well preserving the heritage of the mills is also important because these are the things which has created the bases of the city. The rapid urbanization is taking place in the entire mill lands which belongs to these labor class who have been given their entire life for betterment of the city. Some of the people left the city when the mills stopped functioning but some are still living in the nearby areas of the mills still relishing the moments. So the mill worker's hard work and their land should be used for their own betterment as well should tell the people about the sacrifices which they made and the entire history of Mumbai.

B. Research gap

Post the unending strike the mill workers have:

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- i. Lost their land, their skills, their villages.
- ii. Overall migration to Mumbai left them with nobackground.
- iii. They don't have a proper home because of working in shifts.
- iv. Started working as a laborers at a very early ageso got no formal education.

When the strike happened because of all these factors, they were homeless, jobless, and nobody even cared about them.

As architects, can we reimagine the mill lands to return the dignity, respect and uplift the mill workers through architectural interventions ?

C. Hypothesis

Holistic adaptive reuse strategies of mill lands can help in redefining the lost identity, heritage and enhance the economic development of mill workers.

D. Scope of work

To reinvent a built form that speaks about how the city grew. This generation knows it as a hustly bustly city, considering the shanty localities and slum areas as a disgracebut that is not just what Mumbai is. It has a lot of heritage which is unexplored and this generation does not know the actual hidden portion of Mumbai and when this generation realises that because of whom actually people are getting what is Mumbai today as a great city, these mill workers are the reason of rapid urbanization of Mumbai, that is the time it feltthat what are we giving to them?

While addressing the younger generation, the upliftement of this mill worker community should also include them which can support them financially. They should avail the benefit of everything which is going to be there on their land. The spaces should speak about the legacy of the ones who lost their lives fighting for their rights.

IV. AIM AND OBJECTIVES

Aim:

Finding strategies that can bring awareness towards the heritage identity and overall enhancement of mill workers.

Objectives:

- To search possibilities for overall upliftment in terms of education and skill enhancement.
- To find out case studies that were successful in bringing the gap between the hierarchy of classes.
- To find strategies that can bring awareness towards the heritage identity and overall enhancement of themill workers.
- To identify methods to maintain the identity of millworkers.

V. LITERATURE STUDY

A. case studies

i. Stubbs mill - Converted to Mixed development of retailand office spaces out for lease



Figure 1_Exterioe view of stubbs mills

source: google

Stubbs mill is great example of adaptive reuse of an industrial building with amalgamation of green building concept. The greater connectivity to the site makes it more usable for a office building. However, the built solution lacks in providing a space for the general people who could have enjoyed this beautiful structure inside out.

ii. Vikhroli mills - Converted to Mixed development of retailand office spaces, public spaces with cafe



Figure 2_Vikhroli mills source: Author

As the site was an industrial property, the client converted it into a public space. All these spaces have sentimental values attached to it. molding the structure into new techniques but with the same experience as earlier is very important. Also, material plays a very important role because keeping them and using them for rejuvenating is also a big factor.

iii. Pheonix mills - Converted to: Mixed development ofretail and office spaces, mall, hotel.

Even if Phoenix mills was one of the first mill lands in Mumbai to go through modifications, the site has been so drastically altered that it no longer displays the past. In different words, the brand-new layer added, is so over powering, that the prevailing and historic fabric is definitely lost. It now not celebrates the history related to the mills, no longer respects the context. Instead, it's far an instance of wherein, economic feasibility of the task over runs design, context and desires of the primary stake holder in mills, the mill worker.



Figure 3 pheonix mills

source: google

iv. Tata modern, London - Converted to Mixed development of Museum with Educational Spaces



Figure 4_tata modern source: google

The entire mill precinct is given for the development of public spaces. It is divided in 2 main categories, museum and educational spaces. For further development a new building is made to house more educational activities. The area division is properly done along with enough area for movement spaces. With all these, the space becomes an idealexample of reuse of a mill building.

Analytical chart showing the interventions done on mill lands in the above case studies:

	Mill land was used for	Design interventions observed	PEOPLE benefitted
Case 1 : Stubbs mills	Commercial space Networkage Conservation	this a commercial huilding housing umail offices The entire structure is conserved externally while internal changes were made. Green building techniques are adopted in the structure.	PRIVATE
Case 2 : Dream studios "viktiroli	Unability in terms of connercial space Public space Heritage convervation	They have converted the structure into an office . The entire precinct is open for public and a cafe is also there. The entire precinct is conserved keeping all the things as it is .	PRIVATE GENERAL PUBLIC
Case 3 Pheonix mall	I. Usability in terms of commercial space II. Public space	the entire milliand is converted into a malliand 5 star hotel Mall is constructed. Achimey and some walks are used as elevation treatments.	Private and public
Case 4 : Tata modern, London	L Public space II. Educational purpose III. Heritage conservation	Restaurant, museum and calé meets the financial aspect of the project. The entire precinct is open for public where museum play a significant role attracting the wildow. ADS of educational space is provided. The entire precinct is conserved keeping all the things as it is.	GENERAL PUBLIC STUDINTS



Conclusion from the case studies:

All interventions that are done were for reusing the mill land and built area but no intervention was done for the mill workers who formed the major part of the area. It never catered to the people whose land was getting used. The findings of all the above case studies show the designs are mostly catering to the private ownership aspect so the methodology is to formulate the solution that can benefit millworkers community to maximum.

B. Today's trend of development on mill lands

City builders and developers have already redeveloped some of defunct mill lands. The land in maximum cases is used for residential high rises and in a few cases for commercial, retail and leisure sectors. Almost every other existing structure on these mill lands had been demolished completely (besides some factory features like Chimney) for redevelopment purpose. The first fabric mill to redevelop is now important Mumbai's leisure and shopping hub. A lodge and a multiplex delivered later in the development. The new development changed mill buildings with little or no green open space. Some of the builders did create a few public areas like purchasing complexes, multiplexes and different retail outlets, but the advantage of these areas and buildings for the ecological sustainability of the city is questionable. (7)

Phoenix Mill: The first to redeveloped fabric mill is modern-day Central Mumbai's leisure and purchasing hub. A multiplex and lodge are currently being delivered right here though the BMC hire deed in 2005 offers the mill over 20,000square yards of land on the annual lease of a rupee for houses of labor staff, and welfare offerings like a school.

Shrinivas Mill: South Mumbai's Millionaire Member of Legislative Assembly Mangal Prabhat Lodha acquired the redevelopment rights, plans a residential complex

Standard Mill: A massive condo complicated of Beau Monde, with flats priced at over Rs 1 crore each. Residential towers have additionally been cleared by the Bombay Municipal Corporation

Morarjee Mill 2: Peninsula Corporate Park houses new economic system offices like TATA AIG and Orange, in addition to a posh fitness center, Wellsprings; a part of the land is on a 999-12 months lease.

Morarjee Mill 1: Construction of the residential compound 'Ashok Towers', with three 30-storeyed and a 50storeyed tower, underway for the beyond six months. Part of the mill'sland is on 956-12 months hire for annual lease of Re 1.

Simplex Mill: This mill, founded by Mohammed Ali Jinnah in 1913, is withdrawn out to Planet Godrej, 5 towers of forty-six storeys each. Part of the land turned into given on a 99- year hire for an annual lease of Rs 43. The lease expired in 1983.

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VI. METHODOLOGY

holistic adaptive reuse strategies which will give maximum benefit to the mill workers community.

The aspect considered through the research are as follows:



Figure 5_Flow chart showing study aspects source: Author

The above aspect will not just focus on developing the land but it will tremendously help the mill worker community. This holistic upliftment will not only help them financially but educationally also. The entire precinct when open to everyone will help the mill worker community to better exposure and employment opportunities. They will get introduced to a lot of other things also in which they can excel.

The research has been divided into five broad parts, essentially for the aim of understanding of the reader and to take care of the principle specialize in sustainable design technologies for adaptive reuse. These are:

1. Introduction and Background:

Establishing the principle aim of the planning thesis, objectives, scope and limitations and research methodologies. It explains the meaning of varied terms and therefore the need of sustainable design practices in adaptive reuse through book case studies of comparable buildings. It also includes the planning guidelines formulated from understandings of those cases. These guidelines are important because they might become the driving force of design.

2. Bombay, and its need for textile museum:

This part discusses the rich industrial history of Mumbai, followed by the urban level problems it's been facing within the present. It justifies the necessity of a museum or any public space in Mumbai. It looks forward to answering various questions one must have while brooding about a textile experiential center in such prime land. This part also discusses various planning policies for mill lands, development regulations, and therefore legal battle of textileworkers v/s the mill owners and certain other aspects of milllands of Mumbai.

3. Site

History of the chosen site, documentation and justificationFor site selection and site analysis is roofed.

4. Case Studies:

Multiple online case studies of mills and industrial buildings which have been put into adaptive reuse were studied. Inferences drawn were to assist into formulation of design guidelines, do's and dont's, components and functioning of mill museum, area statements and therefore design brief.

5. Design:

The final design proposal, as per inferences drawn from the literature reviews, case studies, their analysis and the site analysis. Would be designed in two parts, where first would be adaptive reuse built-up and second would be a replacementbuilt-up complementing the prevailing historic fabric.

VII. FINDINGS AND ANALYSIS

Site selection criteria

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The potential mill lands in metropolitan region were analyzed to find out the optimum from the factors. The sites considered were i) India United Mill 1, ii) Digvijay Mill, iii) India UnitedMill 2 &3.

The project focuses on the development of mill lands. Almostall these lands are located in the central portion of Mumbai such as dadar, byculla, girgaon etc. for the selection of the site, the major criteria was the ownership of the land and any development proposed there. As there are lot of mills which are privately owned and some are owned by NTC (national textile corporation) some of the lands already started the construction of high-rise residential apartments while some mills are still functioning but some mill lands are vacant and no proposal for those lands are received yet. So the selectioncriteria focuses on the ownership and availability of the land.

Comparative analysis of all sites:

	India united mill 1	Digvijay mills	India united mill 2 &3
Location	Parel mumbai, maharashtra 400012	Parel, Mumbai, Maharashtra 400012	Byculla, Mumbai, Maharashtra 400033
Site area and development	The site area is 21 acres and no development has proposed.	The site area is 10 acres and no development has proposed.	The site area is 16 acres and a textile museum is proposed on the site.
Ownership	The ownership of india united mill 1 is under NTC (National Textile Corporation)	The ownership of Digvijay mills1 is under NTC. (National Textile Corporation)	The ownership of india united mill 2&3 is under MCGM (Municipal Corporation of greater mumbai)
Connectivity	Located alongside the most crucial road in the central mumbai.	Located alongside the most crucial road in central mumbai.	Located a little far from main street but closest to eastern express highway
Opportunities for reuse of the existing structures	Existing mill buildings can be transformed right into a small public college or community center	Existing mill building can be converted into a market place or bazaar	Good opportunity for adaptive reuse of mill buildings as authorities has proposed a textile museum
Nearby areas and mill worker population	The site is surrounded by residential buildings and no dominant presence of mill workers.	The site is surrounded by residential chawls and dominant presence of mill workers.	The site is surrounded by residential chawls and dominant presence of mill workers.

 Table 6_Different study factors for selection of site
 source: Author

The sites should be studied on the basis the factors which are mentioned in the above table. They all can help in providing maximum analysis which is required for selection of a particular site.

The data which has collected is regarding the population of mill workers in various areas around. The data is as follows:

A COLORADO	No of Workers			
Mill Jocations	1980	1990	1998	
Mazgaon	16456	6925	4968	
Tarawadi	28114	18933	12800	
Byculla	27257	30332	13134	
Parel	34879	15073	10561	
Sewri	15960	18163	8425	
Naigaon	21591	12485	13595	
Prabhadevi	29721	21032	20225	
Worli	61691	30895	21494	
Chinchpokhli	50787	22083	18220	

 Table 2_Population of mill workers
 source: Author

From the above data, the total no. of mill workers in 1998 was 1,23,422(8). There were more than 3 lakh workers or more atthe time when the mills were blooming but post the strike andafter shutting down of mills, this number drastically reduced. Some went back to their native places while others started to find a new job in the city. While some are still fighting for job opportunities and houses.

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Figure 7_Venn diagram

source: Author

Economic development, identity and heritage, educational enhancement are the 3 important factors which are considered for a designing a space after all the research and after analyzing all possible outcomes. How these factors can help in upliftment of this mill worker community is shown in the above diagram. By proposing a museum, it will preserve the heritage value of the space as well as will provide an economic base for the betterment of this community. Educational spaces will provide skilled base education and activities which can make them financially stable so they can stand up on their own feet. A cultural center can bring them closer to each other just like the old days where they can perform their traditional activities. Restaurants can serve authentic Maharashtrian food which can become a revenue source for the women in the community. All these spaces canshape them with the work which they like to do.

VIII. CONCLUSION

The proposal can consist of a textile museum, cultural center, skill-based training institute and a restaurant. All these activities will help the mill workers community in their upliftment which will include them. Anything which is going to be on their land should have the maximum involvement of this community. It should provide enough employment opportunities which can make them independent in today's world. The entire precinct will become a learning center for all. From aged ones to young people, the proposal will have everyone's involvement. The aged ones can work in the museum sharing their valuable experiences while the adults can work and learn in skill-based training institutes which can provide them with maximum exposure to outside world. Thewomen from the community can serve a major purpose in restaurant's also in other activities too. All the activities which are proposed also consider the economic stability of the entire precinct with upbringing of this mill workers community.

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URBAN FARMING CENTRE: FROM WASTELAND TO FARMLAND

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ABSTRACT

Have you wondered what happens to the mining sites after the minerals are exhausted? They are abandoned and left to degrade, this raises a concern. Mining across the world has perceived exceptional growth as an industry. The quarrying process highly exploits the natural soil and morphs the original ecosystem, due to which such sites turn into wastelands.

How can these wastelands be revived? Can urban farming be the solution? Adaptive reuse of such wasteland can transform quarries into a variety of public-oriented spaces. This thesis is an attempt in transforming the negative impacts caused by several years of quarrying into positive contributions towards the community and the environment after these industrial sites are abandoned or no longer active. By introducing urban farming, the thesis strives to progress in technological advancement for a better and sustainable future.

Keywords: Abandoned Quarry, Wasteland, Adaptive Reuse, Urban Farming.

INTRODUCTION

A quarry is an area from which rocks, sand, or minerals are extracted from the surface of the earth for industrial use. Mining across the world has perceived exceptional growth as an industry, generating growth in terms of wealth and employment. However, what remains a concern, is how the quarry sites are abandoned and left to degrade after minerals are exhausted or the extraction period is terminated. The quarrying process highly exploits the natural soil and morphs the original ecosystem, due to which such sites turn into wastelands.

Majorly quarries are located in close proximity to urban settlements to cut down the transportation cost. As a result, people dwelling in the neighbourhoods of inactive quarries are exposed to high-risk factors. Inhabitants are subjected to air pollution from the dust left behind in the quarry. The gaping holes formed by quarrying can fill with water creating dangerous quarry lakes. Quarries not only cause negative impacts on those who reside in the neighbourhood, but they also leave negative impacts on the environment. Loss of natural habitats, loss of agricultural land, pollution of air and water, and exhaustion of natural resources are a few of the many harmful environmental impacts. Can sustainable development become a solution for transforming these abandoned wastelands into productive land? Adaptive reuse is the process of repurposing a building or site for viable new use, other than those originally intended to address present-day needs [1]. Adaptive reuse of such wasteland can transform quarries into a variety of public-oriented spaces.

PROBLEM STATEMENT

Abandoned quarries hardly leave behind enough soil to allow productive vegetation and natural biodiversity to occur again without any manmade provisions [2]. These lands are no longer fit for traditional farming methods due to exploitation. But alternatively 'Urban Farming' can be an adaptive method to produce food on such unproductive lands and bring the community closer to nature.

Agriculture has faced many problems throughout the world which include growing population, pollution, growing cities and food waste. As cities grow they have been disconnected from nature, the fertile land that can be used for farming and production has buildings all over them. Due to which farms are forced to move further away from the city which increases food miles. Food miles is the distance between the farm where the food is produced and the actual place of food consumption [3].

ARCHITECTURE INTERVENTION

Need of the topic

The mining industry has a major negative impact on the environment. The resultant leftovers of abandoned quarries are unsuitable for most farming methods. Even though quarrying is harmful in many aspects, it is necessary for the growth of several industries. According to the IBM (Indian Bureau of Mines), the number of abandoned mining sites are listed as 297 in the country. This, however, is not the absolute figure since a lot of such sites are unknown and many are claimed by private owners but have ceased their operation. Technological advancement. In that scenario, agriculture is then often displaced to some other location that is sometimes less productive [4]. Hence, it is necessary to make use of such abandoned wastelands into productive lands within urban cities.

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Aims and objectives

The thesis aims to transform the wasteland and its negative impacts caused by several years of quarrying into a productive land that can create positive contributions towards the community and the environment after these industrial sites are abandoned or no longer active.

The main objective is to address the following:

- i. To assure that abandoned wasteland can be put to fruitful use. The primary objective is to put this abandoned land to use where it will benefit the society and help it thrive economically, socially, culturally and also environmentally.
- ii. To make optimum use of the neglected spaces to create a space that acts as an opportunity and reuse it as an architectural phenomenon.
- iii. To explore into program formulation of abandoned quarries as a catalyst for urban farming.
- iv. To create revenue-generating opportunities, in order to benefit the local economy.
- v. To create awareness in the public about the new farming method and the necessity of biodiversity.
- vi. To establish a research centre where people can reconnect with nature and learn more about food production and the importance of food security.
- vii. To explore how architecture can re-establish the connection between humans and nature with minimum intervention.

Research questions and hypothesis

The thesis primarily addressed the following research questions to understand the subject and methodology.

- i. Can we utilize this neglected space to create something valuable for the community to enhance its social, cultural and economic value?
- ii. How can abandoned wasteland be used to generate a productive farm that facilities the community?
- iii. What are the approaches to revive quarries unique characteristics and potential programmatic amenity as a part of the existing urban-scape?
- iv. How are we going to merge technological advancement for building our future to address the contrasting aspects of ecological crises?
- v. Are there any means to spread awareness among people?
- vi. How can the proposed interventions meet the demands of the community living in these areas?

Considering the existing research on how to offer more sustainable and flexible living models for the future, this thesis strives to contribute to the feasibility of using a hybrid farm network in the city for the next generation of urban living. So as to find a balance between farming methods (conventional, greenhouse and urban farm) of production, this research establishes a hybrid farm, which offers suitable benefits in correlation to the context of the quarry site.

SCOPE AND LIMITATIONS

The Indian Council of Agricultural Research (ICAR) is trying its best to implement this new technique of vertical farming to bring about a revolution in Indian agriculture [5]. Urban farming has a great scope in India, but there are challenges like the acceptance of vertical farming by the Indian farming community as there is a lack of awareness. Production of food crops to feed a growing urban population without further damaging the environment, and feeding up farmland and allowing it to return to its ecological setting. This is significantly vital since vertical farming engages multiple disciplines of natural sciences, design, and engineering and affects individuals and environmental setting. The proposed development can be a prototype for local architectural interventions, with a way of helping the nearby community and save the local biodiversity. This proposed typology can not only replicate in the potential abandoned lands but also in other areas with similar conditions.

BACKGROUND STUDY

Urban farms throughout history have been a reaction to issues plaguing a neighbourhood or shortages of food, however today, urban farming is a growing movement in cities throughout the globe, as they provide food locally, provide jobs, better the environment, create community involvement, and Convert vacant land into blossoming farms within urban areas.

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Architects, public health experts, farmers, environmentalists, and many more are working towards solutions for a sustainable urbanized future. Farming methods like aeroponics, aquaponics and hydroponics resemble there is a significant improvement seen in farming equipment provided by technologists [6]. The Indian government also has taken much interest in modern farming and is conducting workshops on vertical farming. The Secretary & Director General of ICAR (Indian Council of Agricultural Research) said "cultivating selective crops under Vertical Farming in the urban and semi-urban areas will provide employment opportunity and help in managing bio-waste and creating a healthy environment. There is a need to take up research on important components concerning Vertical Farming such as systems of harvesting of solar energy, efficient management of nutrients and water, pests and diseases, automation and artificial intelligence etc."

LITERATURE REVIEW

Reviewing literature is the key to ensure a holistic understanding of urban farming. Disconnection from current food supply and climate change are some of the biggest challenges in the phase of rapid urbanization. This chapter forms a structure that will interconnect all these points. The knowledge obtained will help to prioritize different aspects of research for analytical studies and fieldwork.

ENVIRONMENT AND AGRICULTURE

On average, the fresh food that is produced travels 2000km to reach the consumers. Not just transport the food is refrigerated for preserving the fresh supply which takes even more energy. All these activities of transportation and preservation emit a lot of carbon in the atmosphere contributing to greenhouse gasses at a significant amount [7].

More than two-third of the global energy is consumed by urban areas which account for approximately 70% of the earth's CO2 emission [8]. As integrated components of climate change adaptation, there is a need for sustainable solutions for energy, food, transport and water. To guarantee food security and to prevent the destruction of natural habitat for new farmland, it is important to consider new production methods for food.

URBAN FARMING AND SOCIETY

"We need to radically rethink the way we build and feed the cities in the future. Food is set to become a key architectural tool, not just to reshape city and country, but our way of life." – Carolyn steel, writer.

Without knowing usage of agriculture in a sustainable way, man and society have evolved to a greater extent. Everyone focusing on productivity by scaling up watering, creating new and more powerful tools for sowing and reaping, humans play an important role in food supply crisis that is going to be occurring very soon in the whole world. Traditional farming being disrupted is not a futuristic utopia [9].



Figure 1. Types of urban farming

(Building Integrated Agriculture (BIA)-liba lab)

TYPES OF URBAN FARMING

The chapter will cover two main categories:

- 1. Outdoor, soil-based agriculture (green roof farming)
- 2. Indoor, water-based agriculture (hydroponics, aeroponics and vertical farming).

For each method, different factors influence the choice of species that can be cultivated, determine the productivity and the project's success; thus each method will be examined separately in this section.



Figure 2. Rooftop Farming (https://www.djangocollectif.com)

1) SOIL-BASED: GREEN ROOF AGRICULTURE

- Rooftop farming provides extra thermal and acoustic insulation to the entire structure
- Rooftop farming Provide they improve the microclimate and climatic protection.
- Rooftop farming improves the view of the built environment.



Figure 3. Vertical Farming

(www.foodunfolded.com)

2) WATER-BASED: INDOOR VERTICAL FARMING

- Year-round crop production
- No weather-related crop failures
- Environment-friendly System
- Organic Production
- Low irrigation costs, 70-95 % less water compared to conventional agriculture.
- It creates job opportunities for variety of backgrounds, from farm managers to biologists, scientists and educators.

Components of vertical farming

Technologically and structurally some farms rely completely on artificially lightings for growing plants, while majorly other farms use sunlight, in this way vertical farms can be much diverse [10].

1) Nutrient solution and supply

The nutrient solution is a mixture of mineral salts that are needed for a plant to grow. Plant development needs nitrogen, phosphorus, calcium, potassium, sulfur, magnesium, and iron. Each nutrient has a different role within the growing plant [10]. There are two types of supply system such as Nutrient film technique (NFT) and Deep flow technique (DFT). The supply system is selected on the basis of plant type.

3) Growing system



Figure 4. Trellis Stacking (vertigrow,kallol shah)







Figure 6. Spherical Stacking (vertigrow,kallol shah)



Figure 7. Drum stacking (vertigrow, kallol shah)

3) Lighting system



Only 37% of the energy in sunlight is within the wave length (colour) useful for photo synthesis, while 62% is infrared (Thermal energy) and the remaining 0.6 % is ultraviolet. Photosynthesis in the plant leaf is powered by

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1% of the sunlight that falls on the plant. 10% of the sunlight is elected and 10% passes through the leaf. The leaf will retain 80% which is used for transportation. Some of the light is re-radiated, while the fraction that remains is used for building food from the, minerals and water [11].

4) Structure of vertical farm



Figure 8. Types of lighting system

(issuu.com)



Figure 9. General Layout of a Vertical Farm

(reserachgate.net)

Due to the location, types of crops, and environmental factors, vertical farms vary in design. There are 7 main sections in a standard vertical farm, which includes

- i. Environmental controls
- ii. Water and nutrient tanks
- iii. Germination and cleaning layer
- iv. Food processing
- v. Staff and control room,
- vi. Delivery area,
- vii. Waste management layer

This estimates the overall dimension of the building 167.5 meters high. To help transport the produce down to the respective floors, a spacious elevator is installed in the building. The water not absorbed by the vegetables is accumulated and circulated again in a water recycling system.

5) Production

The vertical farm will feature various types of products like species of fruits, vegetables and crops.



Figure 10. Process of production

(issuu.com)

6) Successfully restored abandoned quarries



Figure 11. Restoration of abandoned quarries

METHODOLOGY

The research methodology is divided into different chapters of covering concepts which are Introduction, methodology, literature review, case studies, site selection & analysis and Discussion & finding and each of which has different sub-sections. This will help in understanding the topic more precisely and coming to a conclusion thereafter.

The method followed in the dissertation is majorly divided into two parts – approach and analysis.

	Introduction And Architectural Intervention Hackground Study Literature Review Conclusion And Analysis	
	• Approach • Survey And Questionnaire • Online Survey • Data Analysis	
Casalant	Selection Of Case Study Data Collection Of Case Study Analysis Of Each Case Comparative Analysis	
Divings Press	Design Objectives Stating Design Brief List Of Requirements Area Stational	
sile selection	Criteria For Site Selection Shorthisting Three Site Comparative Analysis Final Site Selection And Its Analysis	

Figure 12. Methodology flow chart (self)

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APPROACH

1) Data collection

The information collected through the literature review as the basis to understand the projects, its drawbacks and shortcomings. The data was collected through various online sources as well as site visits and information through books and experts. Understanding the current situation and finding solutions to its inadequacies was the core intent. This base data collected helped to conduct surveys and interviews.

2) Survey and online Interview

A survey was conducted through Google forms to interact with the user and understand their take towards the ideology and opinions about urban farming. Over 60 people participated in the survey which included urban dwellers, corporate workers, local people, and business people. Discussions with urban farmers and experts was also undertaken to apprehend the ground reality and their opinion on the same.

3) Case studies and project reviews

Online case studies and project reviews were conducted to study various projects in a similar theme to this project.

Case study

1)



Architects: Kono Designs Year: 2011 Type: Commercial Office Location: Tokyo, Japan Built-up area: 19,980 sq.m. No. Of Floors: 9 Floors

Figure 13. Pasona exterior and interior views (archdaily.com)

Many of the vertical farming projects are merely concepts waiting for funding, but the Pasona HQ office building is one project that is already growing food vertically. Refurbishing a 50-year-old building to include office areas, an auditorium, cafeterias, a rooftop garden and urban farming facilities.

2) Thammasat University, Thailand



Architects: Arsom Silp Institute Year: 2019 Type: Educational Location: Thailand Site: 22,000 sq.m. Built up area: 22,000 sq.m.

Figure 14. Site view and observatory deck (archdaily.com)

The design is inspired by traditional agricultural practices of terrace farming, the Thammasat University has Urban Farming as Green Roof's cascading terrace farm levels form a detention lawn which in turn slows down the flow of water. This helps to absorb and store rainwater for using it to grow food. Any runoff is filtered through several layers of soil and later stored in four retention ponds, the ponds can accumulate water up to 11,718 Cubic meters (3,095,570 gallons) and can be used for rooftop irrigation and future use.

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3) Urban Agriculture Research Center



Architect: Hassan Zain Status: proposal Type: research centre Location: Egypt Site: 96,600 sq.m. (23 acre) Built up area: 61,250 sq.m.

Figure 15. Site view

(behance.net)

The Center accommodates a research centre with a laboratory along with a restaurant and café open to the public, assembly hall, exhibition spaces and administrative blocks. The outdoor landscape accommodates a public market and productive garden which the community can enjoy.

FINDINGS AND ANALYSIS

Survey analysis

An online survey was conducted in the form of a questionnaire and distributed via social media platforms. The objective of the conducted survey was to understand knowledge and awareness of urban farming amongst the public, followed by their opinions about it and how would they contribute.

The response of the youth contributed a major part in the survey as their thoughts and opinions will provide a foundation for understanding the topic more firmly. The survey data indicated that 51.6% of respondents are unaware of the origin and method of farming of their food. This data shows the lack of knowledge amongst the people, hence the need for awareness and educational programs can be addressed through this project. Almost 96.8% of the respondents feel curious to know about their consumed food.

The response shows that almost 96.8% of individuals prefer quality over quantity of food and about 71% of them are willing to spend higher expenses to get the best quality. This data helps to justify the demands of urban dwellers in terms of revenue generation.

When asked about suggestions on facilities that are provided by urban farming, 69.4% of individuals believe that research should be conducted for the development of this field. Hence, the inculcation of a research lab of its own in the project becomes essential. The response shows that 87.1 % of the crowd believes that urban farming will definitely bring large improvements to the urban image.

The majority of the responder's i.e. 82.3% are willing to practice farming along with the community. The response shows that majority of the individuals would like to support and contribute to urban farming in some or other ways. 71% are going to support by buying products from the farm. 59.7% would support by indulging in farming to produce food. Other major share of the chart is 58.1% i.e. by participating in research, followed by 46.8% i.e. supporting by distributing products. 24.2% would support by providing finance. Apart from that, a few suggestions given by the respondents were to consider awareness camps about the local market and local urban farmers.

The concept of urban farming has evolved in the 21st century and it is a new concept for the responders too. When asked about the ideology and acceptance of urban farming on wastelands, the respondents felt it is a great start and most of them has given ratings above 5.

Case study analysis

The case studies help to understand the zoning and design requirements. It proves the practicality and the working of indoor farming including arable crops like rice. The inclusion of workshops and labs are also a takeaway. It gives a broad understanding of climate-responsive design and community engagement through architecture.

Triton foodworks provides practicality in context to India as the site selected is in India. It provides the type of products and species suitable in the Indian context. All four cases showcase the bright future of urban farming and its role and need for the community.

PARAMETERS	PASONA URBAN FARM	THAMMASAT UNIVERSITY	TRITON FOODWORKS	URBAN AGRICULTURE RESEARCH CENTRE
Location	Tokyo, japan	Bangkok, Thailand	India	Egypt
Project Status	Completed	Completed	completed	Proposal
Farming Type	Indoor vertical farm	Rooftop farm	Polyhouse farm	Indoor vertical farm
Plot Size	19,980 Sq. m.	22,000 sq.m	5,060 sq. m	96,600 sq. m
Program	Corporate office and indoor farming	Educational and rooftop farming	Research and Farming	Research, educational and farming
Types Of Produce	Leafy Vegetables, fruits, rice	Rice, herbs, vegetables	Leafy Vegetables, fruits and turmeric	Leafy Vegetables, fruits

 TABLE 1. Comparative Analysis of Case Study

SITE SELECTION

India has about 68 million ha of land (more than 20 per cent of the country's geographical area) lying idle as wastelands. Wastelands are lands that are unproductive unfit for cultivation, and other economic uses due to rough terrain and degraded, depleted soil conditions. Hence, conservation of soil, protecting the existing cultivable lands and reclaiming the already depleted wastelands plays a predominant role for future development. These are some of the primary parameters which are considered for shortlisting the site:

- i. Mining / industrial wasteland
- ii. Urban or Peri-urban fringes
- iii. Good connectivity
- iv. Site surrounding
- v. Climatic conditions
- vi. Site area required minimum of 10 to 12 acres

Based on all these parameters I've selected one site out of the three for the proposal of an Urban farming centre. All three selected sites are abandoned quarries that are no longer active. Following are the three shortlisted sites:

- 1. Rajavali, Vasai, India.
- 2. Dharkhadi, Mumbai, India.
- 3. Kandivali, Mumbai, India.

	-		-
SELECTION CRITERIA	RAJAVALI, VASAI	DHARKHADI, DAHISAR	QUARRY SITE, KANDIVALI
Plot area	113 Acre	25.6 Acre	34.8 Acre
City Population	1,50,055	1,81,063	3,60,944
Road access	Internal road	Internal road	Internal road
Zone	Green zone	No development zone	No development zone
Neighborhood	Low rise Residential, industrial and commercial	Low rise Residential, slums	High rise residential, Slums
Proximity to market	1.5 km	2 km	7 km
connectivity	connected to NH- 48 and western railway	connected to NH- 48 and western railway	connected to NH- 48 and western railway
Land profile	Moderate undulations	Steep undulations	Moderate undulations
Air Pollution	Low	Moderate	High
Soil pollution	Low	Moderate	Moderate
Scope		Lir	nitations

TABLE 2. Comparative Analysis of Shortlisted Sites

CONCLUSION

Land resources are finite, areas going out of cultivation due to social and economic reasons needs to be replenished by reusing wastelands and by preventing further loss of production potential. Cities all over the globe are developing at a quick pace and becoming rapidly urbanized. As the population increases, demand for food production also increases to feed the people. However, due to the rapid growth of population and land use, there has been an increase in pollutants and environmental degradation which has caused unfavourable effects on traditional agriculture. Urban dwellers lack an understanding of where and how food is being produced and distributed.

The proposed urban farm is not only limited to the production of crops but also integrates public awareness and research community spaces for the city. The project will include facilities such as vertical farming pods, open greenhouse, rooftop farming, research labs, learning centre, organic market, cafes, botanical garden, etc.

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ENVIRONMENTAL EDUCATION CENTRE

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ABSTRACT—

Environmental Education Centre is a consciousness Centre that will conduct activities for all age groups, and everyone will enjoy learning with nature environmental activities. The main focus is on the practical education system for children and the soul of the gurukul system, a tradition in learning and education since ancient times. The gurukul system is the most famous educational and teaching system practiced in India in ancient times. The main focus of the Environmental Education Centre will be imparting learning to the students in natural surroundings where they live with each other with brotherhood, humanity, love, and discipline. The theoretical subjects like science, mathematics, language through group discussions, self-learning, and focus are given on outdoor activities like sports, crafts, arts, meditation, yoga, and mantra chanting that developed their intelligence and critical thinking. The special adventure activities provided can be rope walks, rock climbing, commando net, nature trail, etc. Their confidence, personality development, sense of discipline, intellect, and mindfulness increases all those activities that will make them fit. The Centre will also focus on the adult's activities like Botanical gardening and planting trees and vegetables based on framing-related general understanding. Outdoor learning programs that will bring the change in relationship with humans and nature. There will be interactive workshops for the adults to discuss this topic and spread this message to other people.

Keywords— Environmental, workshops, modern gurukul system, sustainable approach.

I. INTRODUCTION

A. State of the problem -

- Our world facing detrimental and preventable environmental and health-related concerns and other critical issues that affect children.
- Few years ago, more children spent time climbing trees, exploring the forests, and forts. A few years ago, children's outdoor activities were organized and generally related to outdoor sports and lacked a positive connection to the natural world.

B. State of purpose –

- Approach to learning that uses real-life experiences as the basis for problem-solving.
- Environment-based education research has shownsignificant improvement in student academicperformance when environmental activities are integrated into the curriculum at this research stage.
- Significant practical learning with life experience studies and research involving green space and urban youth have children's experiences in the natural world positively affect their attitudes, ecological appreciation, and behaviors.

C. Adult's participation

- The Adults can join this Education Centre for the workshops that can conduct hand-on activities related to gardening and farming-related activities essential for people to take part.
- There will be seminars also conducted on environmental education topics. People's participation is significant, and if they think this kind of education is required for our coming generation to understand, they will also protect our natural earth and bring a new change in society.
- Children's will learn from adults only so if they are optimistic enough about this topic then youngsters also like to participate and give their support.

D. The Intersection of Early Childhood and Environmental Education

- Early childhood education and environmentaleducation are in accord.
- Children should have a sense of respect for others and caring for the natural environment at the begging of life or be at risk for never developing such attitudes of a healthy child is to positive interactions with the natural environment is essential [1].
- Environmental education at the early childhood level can develop an environmentally concerned citizenry that will directly relate and connect to earth so that the present generation faces.

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II. ARCHITECTURE INTERVENTION

- An Environmental Centre or School is a unique building because it is first and for the initial period, the only built environment in which a child spends most of the time outside the home in the formative years.
- We plan to have pre-schooling, primary and secondary for children's and awareness programs for adults, and workshop activities for all age groups.
- Learning requires both practical and theoretical aspects, so the spaces will be divided so that the academic learning activities like classrooms, computer lab, laboratory, library, admin spaces, Etc.
- Outdoor learning spaces like gardening activities, Environmental awareness programs, nursery (learn alltypes of spices of plants and trees live visit to sites), birds were watching area.
- The children's that is an adventure park in which there will be many activities like swoop swing, paintball, buggy rides, rappelling, flying fox, ropeways, Etc.
- To kindle interest among students in the knowledge of science and scientific pursuit, particularly in sustainable technology.

III. AIMS AND OBJECTIVE

- To create interest and awareness on protecting flora and fauna and promote ecological balance and the environment.
- To encourage young minds to participate in adventure activities and to explore the outdoors.
- To create opportunities for education in the field of environment and biodiversity for children from underprivileged backgrounds.
- To kindle interest among students in the knowledge of science and scientific pursuit, particularly in sustainable technology.
- To rescue, care, and rehabilitate injured and endangered animals [2].

IV. BACKGROUND STUDY

A. The Evolution of Environmental Education-An Indian perspective

- The Evolution of Environmental Education-An Indian perspective
- The Honorable Supreme Court of India in 1991 made environment education compulsory at all levels of education. State Education Departments gave textbooks for govt. schools from 2004-2005 onward [3].
- NGOs, including the Centre for Environment Education (CEE), join the Departments of Education with the academic institutions, carry out teacher training in EE [3].
- Article 21 of the Constitution is a fundamental right that reads as follows: "No person shall deprive of his life or personal liberty except according to procedure established by law [3]. "
- Article 48-A of our Constitution reads as follows: "The State shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country [3]. "
- 51-A (g) of our Constitution, which reads as follows: "It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, wildlife and rivers to create for living creatures [3]."
- The National Curriculum Framework 2005 envisages that Environmental Education imparted in an infusion model in the Upper Primary and Secondary stages of school education to bring about sensitivity towards the environment [3].
- The result is a highly aware generation. However, the action towards it was still lacking. Therefore, NCF-2005 focuses on a sensitive and ready generation to work for it [3].

V. LITERATURE REVIEW

A. The Evolution of Environmental Education

- global perspectives

- The United Nations Conference on Environment andDevelopment (UNCED) published a report named Our Common Future in 1987, systematically explaining sustainable development for the first time[4].
- They are defining it as a development that meets the needs of the present without compromising future

generations to meet their needs. Agenda 21, adopted by the United Nations in 1990, marked the period from theory to practice in the statement of sustainabledevelopment [4].

- There are many deferent expressions of environmental behavior, such as environmentally friendlyenvironmental, ecological, environmental protection, and sustainable behavior [4].
- The connotations expressed are the same, emphasizing the individual's active participation in solving or preventing ecological, environmental problems [4].
- B. Gurukul system is essential and why Indianeducation needs it.
- India has always had a rich tradition in the area of teaching and education since ancient times. People from other nations such as Europe, Middle East, andPortugal came to India to get a quality education [5].
- It was a residential schooling system whose origin dates back to around 5000 BC in the Indian subcontinents. It was more usual during the Vedic age, where students learned various subjects and learned how to live a cultured and disciplined life [5].
- All were considered equal at the Gurukul, and guru (teacher) and shishya (student) resided in the same house or lived near each other. This relationship between guru and shishya was so sacred that no fee was taken from the students [5].
- The main focus of Gurukuls was on imparting learning to the students in natural surroundings where the shishyas lived with each other with brotherhood, humanity, love, and discipline. All these helped increase their confidence, sense of discipline, intellect, and mindfulness necessary to face the worldthat lay ahead [5].



Figure 1 gurukul education learning process

• Unfortunately, gurukul learning system has disappeared, and the modern education system brought to India in 1835 by Lord Macauley is all about a rat race to be ahead of others. Moral conscience, and ethical training [5].

C. National Education Policy 2020

- When the children feel secure and trust the caregiver, they are likely to emulate the same [6].
- Learners can choose their learning trajectories and programmers and select the paths in life according to their talents and interests [6].
- There are no challenging separations between arts and sciences, curricular and extra-curricular activities, vocational and academic streams, Etc. [6].
- Multidisciplinary and holistic education across the sciences, social sciences, arts, humanities, and sports for a multidisciplinary world ensures the unity and integrity of all knowledge [6].
- The conceptual understanding and learning-for- exams. Creativity and critical thinking encourage logical decision-making and innovation [6].
- It promotes multilingualism and the power of language in teaching and learning—life skills such as teamwork, communication, and self-development. [6].
- Total equity and inclusion are the cornerstones of all educational decisions to ensure that all students can thrive in the education system. curriculum at all levels of education from primary and secondary to higher education [6].
- The heart of the learning process, recruitment, development, positive working environments, and service conditions [6].

D. Analysis

- The relation between teacher and student needs of present times ensures that teachers and students share a friendly relationship and respect.
- The children feel secure and have trust, and then they are most likely to emulate the same. It was present in the gurukul system, which can be inculcated today through modern fundamental use of activities to bond with the students.
- The idea of inculcating a Gurukul system in Indian education is just to help the children understand the concept of a self-independent or balanced life.
- This very ideology of balance should be taught to the kids from a young age to make informed decisions about work, food, exercise, and the way they wish to live their lives.

VI. METHODOLOGY

- This chapter highlights various methods adopted to collect information, data, and people's opinions about environmental education. The regulation studies are also equally crucial because they will construct a structure that will fulfill all criteria essential to making an Environmental Education Centre. Those rules area guideline for the project.
- Data collection the data of the spaces and human figures are matching or not need to check.
- It will help with the google survey form that will be general information and the majority audience review about Environmental Education. The second option is a Personal interview of a person already working in such an organization.
- Google form will help for a quick opinion poll and responses from all age groups and get a different opinion or take away of the topic and survey results can be summarized at a glance with charts and graphs.
- It will focus on opinion and suggestion-type questions and understand the overall perspective of people related to the topic.

E. Regulation studies

- Educational challenges have been prevalent at both the Centre and states for many years in India. The Right to Education Act 2009 listed all the roles and responsibilities required for the Centre, state, and local bodies to rectify gaps in their education system to improve the quality of education in the country.
- The government is obligatory for free and compulsoryelementary education to every child in a neighborhood [7].
- The benchmark mandate The Right to Education Act lays down norms and standards relating to Pupil-Teacher-Ratios (number of children per teacher), classrooms, separate toilets for girls and boys, drinking water facility, number of school-working days, working hours of teachers, Etc. [7].
- Special provisions for exceptional cases The Right to Education Act mandates that an out-of-school child should be admitted to an age-appropriate class and provided with special training to enable the child to come up to an age-appropriate learning level.
- Quantity and quality of teachers The Right to Education Act provides for rational deployment of teachers by ensuring that the specified Pupil-Teacher-Ratio is maintained in every School with no urban- rural [7].
- Zero tolerance against discrimination and harassment
- The Right to Education Act 2009 prohibits all kinds of physical punishment and mental harassment, discrimination based on gender, caste, class, and religion, screening procedures for admission of children capitation fee, private tuition Centers, and functioning of unrecognized schools [7].
- Monitoring compliance of RTE norms School Management Committees (SMCs) play a crucial role in strengthening participatory democracy and governance in elementary education. All schools covered under the Right to Education Act 2009 must establish a School Management Committee comprising a headteacher, local elected representative, parents, community members [7].

A. Data Collection

- Classrooms Minimum size should be 8 m. x 6 m. (approximately 500. sq. ft.) [8].
- Science laboratory- minimum size should be 9 m. x 6m. each (approximately 600 sq. ft.) should be fully equipped [8].

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- Library Minimum size should be 14 m. x 8 m. fully equipped and with a reading room facility and other students' resources [8].
- Computer laboratory Minimum size of the computer laboratory should be 9 m x 6 m each (approx. 600 sq. ft.). The School should have a minimum of 20 computers and maintain a computer to student ratio of 1:20 [8].
- Mathematics laboratory The School should have separate provisions for a Mathematics Laboratory at least the size of a regular classroom [8].
- Drinking water, toilets, and other physical facilities The School shall provide adequate facilities for potable drinking water on each floor [8].
- The School shall follow the guidelines related to the safety of the children in schools contained following
- The School shall scrupulously observe prescription from the State Government/Municipal Authority Department [8].
- Enrollment and section restriction in Each Class The optimum number of students shall be 40 in each section—availability of one square meter built-up floor Area per child in the classrooms [8].

B. Google survey form

1. On average, how often do you visit nature spaces or Environment green spaces [9]?



2. What is purpose for visiting the Nature spaces [9]?



3. According to you, does Nature or EnvironmentEducation is required for the future generation [9]?



4. Does the natural environment play an important roleto grow the children in a positive atmosphere [9]?



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- 5. What are the thoughts about having Environmentstudies and adventure Centre at the same place [9]?



6. Do Adults love to spend their time in the environment surrounding and learn new things [9]?



As per this google survey I got to know for a quick opinion poll, and responses from all age group and will get different opinion or take away of my topic and much more.

VII. CASE STUDIES

- A case study is essential for the survey because it will figure out the principles by abstracting from the examples.
- Will cover at least 3 case studies where two should be live or online domestic case studies and one online case study.
- A. Students Educational and Cultural Movement of Ladakh (SECMOL) Online case study



Figure 2 - SECMOL school

- It is a very innovative school structure design by Sonam Wangchuk in Leh Ladakh because the Ladakhi students cannot clear the 10th standard examination because of the theory, which is not understandable by the Ladakh students [10].
- Sonam Wangchuk realized this and made an efficient school, and all learning processes have the theory and practical both study equally and interact with peoplefrom all countries [10].
- Experience first-hand the solar-heated buildings and solar electricity, cookers, and water heaters. Have conversations with Ladakhi students at SECMOL. Visit local organizations to see sustainable development, wildlife conservation, renewableenergy, or women's empowerment projects, among others [10].
- Stay in village homestays that allow experiencing authentic village life while contributing to the village economy, or camp in tents [10].
- SECMOL hosts a selected few student groups interested in cultural exchange and environmental and development issues. They are primarily groups of students and occasionally groups of adults on learning tours [10].
- B. Maharashtra Nature Park, Mumbai Live casestudy



Figure 3 - Maharashtra nature park

- The activities run by the Park of creating awareness about Environment Education and Nature Education are worth supporting. Now the Park has become a symbol of hope for a better Environment tomorrow in Mumbai [11].
- In May 1992, as MMRDA does not possess the necessary experience and expertise in managing Nature Park and Educational Centre, MMRDA decided to form "Maharashtra Nature Park Society (MNPS)" [11].
- It is a study cum business space where students learn various types of trees and plants, and elders come to purchase the plants. A nursery is a place where plants are grown to the desired age [11].
- They include retail nurseries that sell to the general public, wholesale nurseries that sell only to businesses in the nurseries and commercial gardeners, and private nurseries, which supply the needs of institutions or private estates [11].
- C. Bhavan's Nature and Adventure Centre, Mumbai Live case study



Figure 4 - Bhavan's nature and adventure park

- The Bhavan's Nature and adventure park was a dumping space before it developed so. First, they gave a proposal of Bhavan's nature and Adventure park in 2008 [12].
- In 2014, more than 65 000 students visited, and many groups and NGOs promoted this Centre. Create interest and awareness on protecting flora and fauna, and promote ecological balance and the environment. Encourage young minds to participate in adventure activities and to explore the outdoors [12].
- Create opportunities for education in the environment and biodiversity for children from underprivileged backgrounds [12].

VIII. SITE SELECTION

A. Site selection critira

- Select the Ideal site as per the requirement of the environmental education Centre and focus on the education sector site so that it will come under the Institutional zone and be connected to the semi-urban zone.
- Good connectivity with the central city. Easy transportation: The site needs to be connected with the main road or internal road for entry or exit points.
- The site also has essential vegetation, so keep in mindthat the trees' location makes design and plant more trees wherever necessary and design permits.
- Site surroundings should be matched with our context of the topic and designed accordingly. Check the height restriction if an airport or jail surrounds the site.

B. 3 shortlisted sites – based on selection criteria

- 1. Ambernath, Mumbai
- 2. Belapur CBD, Navi Mumbai, Maharashtra

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3. Bhavnagar, Gujarat

C. Comparative analysis

Comparative analysis based on the point system, I will select he best site that will fulfil the maximum numbers of criteria and suitable as per the analysis.



Figure 5 - Comparative analysis diagram

D. Selection of Final Site

Belapur, Navi Mumbai, Maharashtra

As per the comparative analysis Belapur which covers maximum criteria and get highest points as per the table.

CONCLUSION

Environmental education Centre mainly focus on all those aspects which are covered in this paper and as per the methodology and case study point of view, I have selected a ideal site for the topic and create the design objective and clear understanding of the topic.

ACKNOWLEDGMENT

First and foremost, I have to thank my research supervisor, Ar. Snehal Surve, to guide me in every step and dedicated involvement throughout the process, this research would have never been accomplished without her involvement. I want tothank you for your support and understanding. My family, most specifically my mother, supported and updated me with their redundancy experience in the earlier education system. Their faith in the gurukul system kept me motivated to research it in depth.

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RECYCLING HUB AN AWARENESS CENTRE

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ABSTRACT

Today our environment is facing many problems due to different factors, some on them is the waste generated by humans. Some of the waste gets dispose by them self and some of them are still as same and just keeps on adding to the dumping yards.

The waste on which the topic is based is the constructional waste, which is generated by the demolition of the buildings and these waste are dumped to the dumping yard. The raw material are brought from the query lands, seeing to the demand of the constructions the need for this raw material is increasing day by day, breaking mountains and making different query sites.

The waste debris can also be recycle and use for the construction purpose as well, seeing to the current status of waste generated there isneed of recycling unit on a large scale.

So this was the need of the project and to protect the environment.

Keywords: Recycling, manufacturing, architectural intervention, economicaspect.

INTRODUCTION

Waste is part of the society, it's unavoidable evil and must be handled very carefully city Like Mumbai. The boom in construction and real estate development led to the vast high-end places that we see along south Mumbai. People focused majorly on growth and gaining profits. And not much thought Was given to the fallout of such rapid changes- The urban waste. The urban waste is one of the rising issues of Mumbai as a city. The circumstances, objects, or conditions by which one is surrounded, the complex of physical, chemical, and biotic factors (such as climate, soil, and living things) that act upon an organism or an ecological community and ultimatelydetermine its form and survival.

Waste is part of the society, it's unavoidable evil and must be handled very carefully city Like Mumbai. The boom in construction and real estate development led to the vast high-end places that we see along south Mumbai. People focused majorly on growth and gaining profits. And not much thought was given to the fallout of such rapid changes- The urban waste. The urban waste is one of the rising issues of Mumbai as a city. The circumstances, objects, or conditions by which one is surrounded, the complex of physical, chemical, and biotic factors (such as climate, soil, and living things) that act upon an organism or an ecological community and ultimatelydetermine its form and survival.

That act upon an organism or an ecological community and ultimately determine its form and survival. Proper waste management and treatment can generate renewable energy with a clean and healthier ecosystem, boosting quality of life in all places. With the process of anaerobic digestion, enough power could be generated to electrify homes and will bring down the costs involved too.

The threat of waste to the environment, health and safety is huge, and so are the financial and social problems, waste experts say. Pollution runs into rivers and seeps into ground water. Flooding is caused by garbage clogging drains, and the atmosphere can be poisoned by the toxic discharge from trash.

A clean environment is essential for human health and well-being. At a broader level, climate change, loss of biodiversity, and land degradation can also impact on human well-being by threatening the delivery of ecosystem services, such as access to freshwater and food production.

Humans impact the physical environment in many ways: overpopulation, pollution, burning fossil fuels, and deforestation. Changes like these have triggered climate change, soil erosion, poor air quality, and undrinkable water.

Land-use change: Humans may destroy natural landscapes as they mine resources and urbanize areas. Some examples include the mining of natural resources like coal, the hunting and fishing of animals for food, and the clearing of forests for urbanization and wood use.

The Environmental Management System considers the external and internal elements through the analysis of Strengths, Opportunities, Weaknesses and Threats that impact on the environmental aspects of the Organization through a planning that considers the needs and expectations of the interested parties.

An environmental management system protects public health and safety by establishing procedures to limit or eliminate harmful substances from entering the environment, including public water systems. Every organization in some way affects the environment, which directly affects public health.

Scope

Waste is part of the society, it's unavoidable evil and must be handled very carefully city Like Mumbai. The boom in construction and real estate development led to the vast high-end places that we see along south Mumbai. People focused majorly on growth and gaining profits. And not much thought Was given to the fallout of such rapid changes- The urban waste. The urban waste is one of the rising issues of Mumbai as a city. The circumstances, objects, or conditions by which one is surrounded, the complex of physical, chemical, and biotic factors (such as climate, soil, and living things)

n the present senerio the need of infrastructure is demanding raw material and producing large amount of waste. In India more than 700 million tons of construction waste is generated every year.

It is many a times illegally dumped in nearby area, or landfills. On other side the demand for crushed stone and sand by construction sector is increasing rapidly.

These materials comes from stone which is limited resources in world, because we use more and more aggregates, we are removing mountains, removing aggregates from quarries and making holes in the earth.

The biggest problems is going to come when we need to demolished the buildings.

For which recycling and reuse of debris are in need, which will decrease the load even on the quarry sites.

Criteria and need of topic

- The purpose of taking this topic is to create awareness amongst the youth and elderly for such environmentalissues.
- One of the problem faced by the environment from the humans are the waste, there are different types of waste generated.
- Some waste will eventually rot, but not all, and in the process it may smell, or generate methane gas, which is explosive, leachate (waste water collected) produced as waste decomposes may cause pollution. Badly-managed landfill sites may attract vermin or cause litter.
- The burning of large, open piles of trash in various parts of the world emits dangerous levels of carbon dioxide.
- Waste management reduces the effect of waste on the environment, health, and so on. It can also help reuse or recycle resources, such as; paper, cans, glass, and so on.
- Trash can travel throughout the world's rivers and oceans, accumulating on beaches. This debris harms physical habitats, transports chemical pollutants, threatens aquatic life, and interferes with human uses of river, marine and coastal environments.
- Mumbai generates waste to the tune of approximately 8,837 tones of waste per day, the waste consist of 4241.76 tones of mixed waste which include (bio-degradable and recyclable waste) and approximately 2209.25 tones of debris and silt waste per day.
- Proper waste management and treatment can generate renewable energy with a clean and healthier ecosystem, boosting quality of life in all places. With the process of anaerobic digestion, enough power could be generated to electrify homes and will bring down the costs involved too.
- The more emissions that we produce due to how much trash we generate, affects us long term. One can develop diseases such as asthma, birth defects, cancer, cardiovascular disease, childhood cancer, cpod, infectious diseases, low birth weight, and preterm delivery.

Background study

Mumbai generates waste to the tune of approximately 8,837 tones of waste per day, the waste consist of 4241.76 tones of mixed waste which include (bio-degradable and recyclable waste) and approximately 2209.25 tones of debris and silt waste per day.



Figure 1. Table of Waste Hierarchy

In 2016, the union environment ministry notified the construction & demolition waste management rules, which stipulated that permissions for new constructions or redevelopment will be granted only after local civic bodies devlope their own plan to treat and recycle waste and private builders submit a waste management plan to the civic body and state pollution control board.

By 2017, 53 cities were expected to set up recycling facilities to recover material from the construction & demolition waste but only

13 have done so till date. In 2017 itself, BMC had proposed recycling 95% of the city's waste. Of the 1,200 tonnes of construction & demolition waste generated per day, BMC planned a 2.7 hectare recycling unit at Mulund to treat 1,140 tonnes of waste into sand, clay and bricks. Its construction was expected to commence in 2018 but never took off.

IMPROPER C&D WASTE COLLECTION DIRECT SOURCE OF AIR POLLUTION

Mumbai is one of the most important cities in the world and is known as a very densely populated city. At the same time, Mumbai is also known as the financial capital of the country. There is an odd proportion of area and population of the city. Lack of living space, increasing number of vehicles, inadequate sewerage facilities, solid waste dumping space and increasing number of vehicles, in adequate sewerage facilities, solid waste dumping space and increasing number of same causing many problems to the human and the environment.

Mumbai generates waste to the tune of approximately 8,837 tonnes per day. The waste consists of: 4,241.76 tonnes of mixed waste (bio-degradable and recyclable), 2,209.25 tonnes of debris and silt.

India generates 62 million tonnes of waste each year. About 43 million tonnes (70%) are collected of which about 12 million tonnes are treated and 31 million tonnes are dumped in landfillsites.

About 0.1 million tonnes of municipal solid waste is generated in India every day.

Heaps of concrete, bricks and metal waste from construction are choking water bodies, green areas and public spaces in cities.

Toxic dust particles from the debris are polluting air, at a time when cities have to reduce their particulate pollution by 20-30% by 2024, under the ongoing national clean air programme (ncap)

The Deonar dumping ground is a waste dumping ground in the city of Mumbai. Located at Shivaji Nagar.

It was formed in 1927, the dumping ground is managed by city's civic body, (municipal corporation) also known as municipal corporation of greater Mumbai.

There are more 3 dumping grounds one in Mulund, Gorai and other in Kanjurmarg.

The dumping ground at Deonar is the largest and oldest one in city, the area of the land is about 132 hectares.

The Deonar dumping ground is a waste dumping ground or landfill in the city of Mumbai. Located in **Shivaji** nagar an eastern suburbof the city, it is India's oldest and largest dumping ground, set up in 1927.

The Goria dumpsite was in operation from 1972. Spread over an area of 19.6 hectare with 2.34 million tonnes of waste in a heap of height around 26m, was closed for dumping in year 2007. The work of scientific closure was completed in year 2009.

New Delhi is the top city in India which generates the maximum constructional waste...according to the **World Bank Report**, 2.01 billion tonnes of municipal waste is generated worldwide each year.

As per orders of honourable. **High court** and honourable. **Supreme Court**, the Government of Maharashtra handed over a plot at measuring 141.77 hectares area at KANJUR to MCGM on

24.10.2005 for developing MSW disposal site.

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Types of inert waste:

Excavation Waste:

- This process, known as "dig and haul," removes contaminated material (soil, solid wastes) from its current location and transports it to a permitted off-site treatment and/or disposal facility.
- Excavated material" refers to waste consisting mainly of rock and earth excavated during construction of infrastructure (tunnels, culverts etc.) And buildings.
- Can be recycle it on site, use it to form retaining walls, in gardening or other landscaping ventures but you might not be able to reuse all the excess soil in your own yard or within a commercial setting.
- For making basement, foundation etc the soil are excavated mainly known as excavational waste.

Demolition Waste:

- Demolition wastes are heterogeneous mixtures of building materials such as aggregate, concrete, wood, paper, metal, insulation, and glass that are usually contaminated with paints, fasteners, adhesives, wall coverings, insulation, and dirt.
- Demolition debris can be disposed of in either Construction and Demolition Debris landfills or municipal solid waste landfills. Alternatively, debris mayalso be sorted and recycled.
- The environmental impacts caused by C&D waste mainly include land space consumption, landfill depletion, energy and non-energy resource consumption, resource depletion, air pollution, noise pollution, water pollution.
- This waste are not limited to concrete, stones, and bricks. Most of these wastes can either be recycled or reused. These are some of the best parts to recycle as they are rarely damaged to great extents. They include sinks, pipes, water heaters, and toilets.

Vertical Extension Waste:

Vertical extension of a building is as such once a building is completed and more further extension on it is known to vertical extension, such panels are made of mix products such as the whole panels is designed in industry and placed one by one.
Aims

To design recycling unit and an awareness center for develop efficient management of demolition waste and to provide infrastructure for startup.

Objective

- To study and understand recycling unit and its system.
- To understand and analyse the present condition and the role of municipal corporation in management of demolition waste in Mumbai at ward level.
- To evaluate the awareness of demolition waste in the people connected to this field.
- To identify, compare and analyse different strategies that can be adopted to make efficient recycling unit and awareness center.
- To evaluate business opportunities, spreading awareness of such increasing day to day.
- To understand the role of architectural planning in making efficient recycling unit and awareness center for startup related to demolition waste.

Limitations

The topic which is selected as Recycling Hub (An awareness center) aims to focus on the constructional waste generated in tones per day in the metropolitan cities, which further ends up in the dumping yard.

The main focus will be on the cement waste generated from the demolished sites and even by the constructional contractors.

Recycling them and making buy products out of it such as cement blocks, paver blocks, lego blocks and many such other.

Architectural Intervention

Identifying different spaces and facilities that are provided.

- Studying the sizes, process, connectivity, flow, placement and adjacencies of the spaces.
- Studying the architectural planning in response to the climate and sustainability.
- Identifying the awareness and thinking about of demolition waste inpeople connected to this field.
- Understanding various aspects regarding these facilities from theusers.

Understanding the importance and need of the recycling unit and awareness center.

Studying the urban policies regarding the various aspects that are to be considered while designing a recycling unit and awareness center.

Literature

- The constructional waste are collected from the demolished sites and brought to the recycle unit.
- Then the bigger pieces are crushed to smaller one.
- The waste is washed off using the conveyor belt to decrease the dust coming out of it and all to decrease the air pollutions, many recyclers used sewage treated water for their recycling unit and again they treat the water for further usage.
- Here the aggregates and sand are seperated and the sand are send as a raw material for the construction site.
- Then the aggregates are crushed to fine particles for making the cement blocks, brick block, tiles, paver blocks.
- The fine particles of cement and bricks are transported to different manufacturing units to create the end products.
- After the blocks are made they are dried upto 7 8 days and then they blocks are send for checking the load bearing capacity of the block, if the block fails then the whole slot is discarded and send to recycle them.
- Many recyclers use additional material such as fly ash which has a cementing property within it to make the blocks.
- Many a times the constructional waste which comes to the recycling unit are recycled upto 95%, which

diverts a maximum tones of constructional waste from landfills.

METHODOLOGY

Study and understand construction & demolition waste,

Understand and analyse the present condition and the role of municipal corporation in management of demolition in Mumbai atward level.

Evaluate the awareness of demolition waste in people connected to it.

Identify, compare and analyse different strategies that can be adopted to make efficient demolition waste.

Evaluate business opportunities and requirement related to demolition waste.

Understand the role of architectural planning in making efficient demolition waste management and hub for integrated hub for startuprelated to it.

Preparing a list of construction & demolition waste center based on the selection criteria.

Observing and analyzing the listed demolition waste management center.

Finalizing three cases for study. One national and One international cases.

Findings and Analysis (Survey)

The questionnaire is formed based on the research of literature. The questions were produced through google form.

The survey was distributed to people using WhatsApp and Email.

The number of people who responded were 28 out of which 1 were discarded and remaining 27 were analysed.

Based on the answers, the awareness, understanding and behavior of people towards demolition waste was understood clearly.

CONCLUSION

According to the analyzed data, it can be concluded that many people of the society do not have awareness about demolition waste management. The survey comprised of about 40% questions based on awareness amongst which, 30% of the respondents turned out to be unaware of the same. Along with it, about 90% of the respondents have shown interest in the startups in demolition waste management. 99% of people gave positive response that recycling unit can also be a helping hand for the low level economic people and at the same time their can also be manufacturing of other handmade thing. Hence, socialawareness regarding the demolition waste management and opportunity for working in the same is needed.

Comparative analysis of casestudies.



CONTENT	IL & FS BURARI	GODREJ	SRC AGGREGATES
LOCATION	DELHI	 VIKROLI 	ENGLAND
 ESTABLISHED 	- 2009	 1998 	 2011
 туре 	 RECYCLING UNIT AND MANUFACTURING 	 RECYCLING UNIT AND MANUFACTURING 	 RECYCLING UNIT AND MANUFACTURING
 AREA 	 24,364.09 SQM (6.2 ac) 	 3252.41 SQM (0.8 ac) 	 257,917 SQM (63.7 ac)
 WASTE GENERATED 	 3900 TONES PER DAY 	 2000 TONES PER DAY 	 1600 TONES PER DAY
 WASTE RECYCLED 	 2000 TONES PER DAY 	 60 TONES PER DAY 	 1500 TONES PER DAY
 WASTE USED 	 CEMENT, BRICK BAT 	 CEMENT 	 CEMENT, BRICK BAT
OUT COME	 PAVER BLOCKS, CONCRETE BLOCKS 	 PAVER BLOCKS, CONCRETE BLOCKS 	 CONCRETE LEGO BLOCK, CONCRETE PAVEMENT, AGGREGATES, SAN AND GRAVELS.

Critical analysis of cases:

C	ONTENT				
	SITE	 MAEVANI 		KURAR	• BANDRA
•	WARD	• P/N	\$	P/N	• H/W
	AREA IN SQM	• 14,062.52 s q m		11,587.66 s q m	+ 13,145 s g m
•	PRIMARY DEVELOPMENT ZONE	RESIDENTIAL AREA		RESIENTIAL AREA	COMMERCIAL/INDUSTRIAL ZONE
	CONNECTIVITY	1.5 KM TO MAIN ROAD		2 KM TO MAIN ROAD	778.6 MTO MAIN ROAD
4	HEALTH CARE	+ 01 IN 500 MTR RADIUS		01 IN 650 MTR RADIUS	01 IN 1.5KM RADIUS
	STPNEAR BY	ADJOENING TO THE PLOT 152 M RADIUS	9	6.7 KM FROM SITE	- 3.98 KM FROM SITE
•	LOCALITY	ISOLATED FROM RESIDENTIALS		WITHIN RESIDENTIAL AREA.	MARSHY LAND AREA

Figure 3. Table of comparative analysis.

Selection Criteria

According to my thesis topic, three different sites in INDIA which are reserved for solid waste management system, i.e. In Western Suburb of Mumbai as per the development plan of 2034 of Municipal Corporation of Greater Mumbai. The purpose of selecting the site in Mumbai is because Mumbai generates the higher amount of inert waste and it will be more feasible for the recycling unit to work for it.

These are some of the primary parameters which are included for thestudy and analysis of the site:

- Geographic conditions
- Demographics analysis
- Site specification and detail
- Accessibility
- Surrounding
- SWOT analysis

Selection of Final Site

After comparing and analyzing all the three sites for proposal on all primary parameters, the site I have selected is Malvani Malad West in Western Suburb of Mumbai. Reason for selecting the site are as follows:

- The major development zone is residential compared to other two which are in commercial and the other is residential zones.
- There is Abdul Kalam Ground which is crowd pulling advantages for the site. Making more aware to the peoplefor such hub.
- The site is having direct connectivity to the main road.
- Having a sewage treatment plant adjoining to the plot and also the site is isolated from the residential unit which willnot hamper the residential zones from the noise pollution which we can see in (Kurar Malad East Site).
- The site is surrounded with trees and mangroves.

Climate of Malvani (Malad) is a Tropical, Wet and Dry Climate. The maximum average temperature recorded as 38* c in month of april and minimum average temperature is 16* c in month of December. Malad recieves maximum average precipitation of 216mm in month of July, and 2200 mm of rain falls Anually in Mumbai.

Socio Economic

- Malvani malad is developing and a primary residential region. Prominent landowners are also developing residential complex in Malad. It is also a place for local retailer and fish markets.
- With a few spread of villages such as Malvani fishing village, Kharodi Gaothan (called Kharodivadi), Charkop, Marve, Erangal and Manori.
- A single road from Malad station connects, Marve, as itdoes today.
- Within the present boundaries of Malvani, salt pans are shown in an area that is now reserved for the staff of Central Government. Local Architectural Context.
- It is famous for many recreational areas, it has varied crow from Gujarati, Maharastrian, Up and lot with Christians etc.
- The site is currently used as a vacant plot. Since the site is located at poisar river, Malad west, Mumbai. The site is largely flat. Besides the site, there is a residential area. Also, the site is connected marve road which can help in better accessibility. Malvani fire station is the nearest fire station from the site at a distance of 1.5 km it will take 10 min to reach fire station to site. The site is surrounded by the residential zone.

CONCLUSION

Design objectives:

Architecture should speak of its time and space, but yearn fortimelessness...

-frank gehry

As environment is a major part of our life, we are everywhereconnected with the nature.

The problems today we are facing and many as such happen in he past, somewhere we are the reason to it.

Our environment is precious and as such it is very important that we all do our bit for the environment.

Our environment is houses and helps our ecosystem grow and thrive. Without protecting and taking care of our environment we're putting so many lives at danger such as animals, plants and crops, and even our own.

Our mother earth is currently facing a lot of environmental concerns. The environmental problems like global warming, acid rain, air pollution, urban sprawl, waste disposal, ozone layer depletion, water pollution, climate change and many more affect every human, animal, and nation on this planet.

The threat of waste to the environment, health and safety is huge, and so are the financial and social problems, waste experts say. Pollution runs into rivers and seeps into ground water. Flooding is caused by garbage clogging drains, and the atmosphere can be poisoned by the toxic discharge from trash. In the present senerio the need of infrastructure is demanding raw material and producing large amount of waste.

In India more than 700 million tons of construction waste is generated every year.

It is many a times illegally dumped in nearby area, or landfills. On other side the demand for crushed stone and sand by construction sector is increasing rapidly.

These materials comes from stone which is limited resources in world, because we use more and more aggregates, we are removing mountains, removing aggregates from quarries and making holes in the earth.

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Seeing to the current and past years situations of environment, for which directly or indirectly we are the reason to it, helped me to select this topic and has laid foundation on various terms throughout my journey.

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ARCHITECTURE OF OMPHALOS HAVEN

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ABSTRACT

A house is defined as a building built for habitation where as a home is an abode built for one's family. A home provides you with the community that will always be there for you in times. Sadly, not everyone experiences the same environment at home. There is denial of constitutional right of 'right to live' for a huge majority of Indian people due to varied reasons and some which are mention in the paper. A huge fraction of people needs a sense of support a boost that they lack from their respected families and people around them. People tend to stay in the same toxic environment because they lack residential and financial independence. The basic values of humanity are democracy, equality and the growth of society and of people. These can only be accomplished through the opportunity to exercise the democratic rights of well-informed people and play an active role in society. This paper seeks a solution to the need of haven for distressed people. A place where they feel safe, uplifted and not judged for their choice of identity. The outcome will result in more welcoming and inclusive place for everyone as the main motive will be upliftment of society through every possible way.

Keywords—constitutional and democratic rights, upliftment, haven, ptsd, lgbtq, temporary shelter, catalyst, cognitive architecture

INTRODUCTION

Denial of basic Human and Constitutional rights, seclusion and stigma by society is the root cause of all the problems in the society. It's not just towards females, caste, and religion but in every possible stage and situation

India being one of the fastest growing and developing nation lacks the safe space lifestyle for a huge fraction of people. Due to yearlong rigid lifestyle system, there is a lot of imbalances in the society. Many people try to find an escape but fail.

There are many people who need upliftment a sense of support that they lack from their respected family. Many people tend to stay in the same toxic environment because they lack financial and residential independence. Mainer times people face domestic violence, torture, depression, etc. due to such situations. Basic help should be provided to uplift these people and help them live a happier and respectable life. The basic values of humanity are democracy, equality and the growth of society and of people, these can only be accomplished through the opportunity to exercise the democratic rights of well-informed people and play an active role in society. Society as in such will grow when every human is uplifted and a gender-neutral medium is followed by everyone. In times of need a haven can be a greater help. A huge fraction of the society is facing issues and have no place to turn back to.

Issues can be labelled under many terms like ptsd, domestic violence, difference of thoughts, gender inequality, ill-treatment by family, torture, finding it hard to live in the same traumatic environment etc.

A) NEED OF STUDY

The most important reason for the study is to understand, help and provide people who need support with basic human's rights such as Life, Liberty, Dignity, and Equality. Humans are given rights by the constitution to live on the terms they desire. There is a need to understand every human's life, sexuality, and their behavioural pattern to end the injustice. According to the CONSTITUTION OF INDIA 1950 as stated in Article 15:

1.) The State shall not discriminate against any citizen on grounds only of religion, race, caste, sex, place of birth or any of them

2.) No citizen shall, on grounds only of religion, race, caste, sex, place of birth or any of them, be subject to any disability, liability, restriction or condition with regard to—

(a) access to shops, public restaurants, hotels and places of public entertainment; or

(b) the use of wells, tanks, bathing ghats, roads and places of public resort maintained wholly or partly out of State funds or dedicated to the use of the general public. (Constitution of India , 1950)

According to the constitution the state or any citizen cannot illtreat, take away opportunities, show partial behaviour for any another citizen based on his/her/their cast, gender orientation physical state, liability, place of birth in any place. Every human needs to be treated in the same way in all possible ways and places.

Every human should have the freedom to live a life of dignity and equality. Every human has a right to choose his/her/their sexuality, way of living and quality of living. Still, this is not the case for a huge fraction of people residing in India. People have a bias behaviour for people according to their gender and respective discrimination are faced by them, people losing their spouses, parents or any dependable family member are manier times illtreated by the family, people facing huge traumas are sometimes excluded by family, people who face depression, people who try to adapt changes than their families often face backlashes, and people who reidentify their sexuality are banished from the families. There are people who can't lift themselves up in the society and need a little push, not running parallel to the thought of, 'survival of the fittest' There are always people who do not fit into the criteria that the society has formatted for existing. And families and friends sometimes don't help in such cases as they might not understand these concepts and it becomes harder for people to open up. Due to unavailability of residential and economical help the options people choose are:

- 1.) To keep existing in the same toxic environment
- 2.) To commit suicide
- 3.) To run away

So, in such time of need every human need help. A place to reside and some help to lift themselves back up in the society. A place to educate them, give them shelter and to make them capable enough to venture into the world on their own and support themselves. It is extreme important that each and every individual gets their rights and we as a society are responsible for welfare for all that co-exists with us. Accepting the variations, changes, speaking up for injustice and the different genders and to co-exists peacefully is necessary

AIM, OBJECTIVE, LIMITATION

AIM

Aim of the research is to create an awareness and educate everyone about issues faced by people today and provide the distressed people with basic help of food, shelter and education. By providing space that caters not only to the issues of today, but actually integrates itself into the fabric of society, architecture can become an integra component of social development. Helping them become independent and capable enough to venture back to the society on their own and live a life of dignity and respect

OBJECTIVE

- Providing distressed people basic education in order to make them independent so as to make them capable of walking shoulder to shoulder with the society
- Providing health care basic facilities and helping them to overcome the traumas they go through; due to the issues they had come across.
- Helping them in getting their rights that are denied to them despite all the laws
- Giving them a platform to showcase their talents and their strength to the society.
- Providing a media through which their lives can be understood.
- Giving them temporary stay facilities and financial knowledge.
- Providing an interactive platform where all the people can communicate with each other as humans, rather than male, females or Transgenders.
- Creating an atmosphere inducive for their proper mental and physical growth, where they can stand as humans and not judged by their preferences.
- Creating an open and comfortable space to talk about their traumas and to educate others.

C. LIMITATIONS

Organization focuses on different aspect having the same main motive. The first acts as a primary home to the people to educates and sustains them. The second one acts as a community center majorly for women and also the men of a particular tribe. But the issue is as we give them a place to stay, we again make them dependent on a home and make them weaker. The center now acts as a safe bubble for them that protects them from the society. So instead of making it bubble center the main motive is to make a catalyst center that helps them educates them and pushes them forward to the world. As it might become impossible after a while to sustain everyone as the number might increase. Self-Financing can also become an issue with increasing number of people. Various methods need to be applied to try making the centre self-sufficient.

ARCHITECTURE INTERVENTION

Architecture with the right program and right environment can act as a social agency to help uplift distressed people. The spirit of human is inspired to share deeper reflections of a higher authority that makes them believe in life and gives strength to face all the problems. Designing a haven center won't be just a place to learn, stay and educate people but a space that will be set as a place human can relate to and can approach for their benefits and needs. Providing a haven that will not only be a residing or learning point but a place that gives motivation, inspiration and the power to live as a dignified human to everyone that visits the place. A reflection to their own life, but a motivating and zestful representation of better future.

Issues that have not been acknowledged by the society needs to be catered, a fast-living life often forgets the people that need help. Each human has a right to live a life according to their will and nothing should come between them and their freedom, be that Domestic violence, mental health, traumas, upliftment, etc.

LITERATURE REVIEW

People sometimes leave their homes or families for many reasons like: domestic violence/ abuse, unacceptability by family, difference of opinion, death of parents and reluctancy of other family member to take care of them etc. Due to sudden removal of one of the basic necessity 'SHELTER' they can find it hard to sustain in the world on their own. As a human they all need temporary help to get themselves back in the society.

UMBRELLA TERMS

1. Ptsd:

Post-Traumatic Stress Disorder (PTSD) is a severe and psychological disorder that can be acute or chronic and is the result of exposure to any traumatic event. Every individual goes through a traumatic event during their life, but most of them do not develop PTSD. Under normal circumstances, the symptoms associated with PTS goes away with time, but in extreme situations, the exposure is continuous thereby not allowing any time for individuals to recuperate. Traditionally, PTSD is associated with veterans after deployment, on the battlefield. PTSD comes from any type of traumatic event of any severity. It might include things like car accidents, physical assault, rape, war or even verbal and emotional abuse, as stated by Dr Coleen Cira, a psychologist specializing in women and trauma. Humans who are exposed to events like these are at increased risk for PTSD as well as for panic disorder, major depression, generalized anxiety disorder, and substance abuse, as compared with those who have not experienced traumatic events (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995).

2. Depression

Depression is an extreme common illness affecting all ages, gender, different socio-economical groups and religion in India. Depression is one of the 2 diagnostic categories that constitute CMDs and anxiety disorder

3. Domestic violence

Domestic violence is considered one of the most common forms of gender-related violence, Nevertheless, it is a frequently neglected problem in crisis intervention centers, emergency wards, and obstetrics and gynecological emergency rooms.

(Marianne Flury, 2010)

4. Lgbtq

Homosexuality in India is considered as a social stigma and taboo in Indian society. Homosexuality is not new to the Indian society; it very much finds its existence in history. But still in 21st century LGBT community has to face social discrimination. Sexual minorities in India are the very easy victims of the hate crimes, they are easy target and are exploited physically, sexually, verbally

RESEARCH AND ANALYSIS OF CASE

1. Ptsd

Adolescents in India are evidently exposed to a range of potentially traumatizing and negative life events. However, the knowledge on this area is relatively sparse. Zero gender difference was found in the generality of PTSD, with 8.9% females and 10.5% males fulfilling the diagnostic criteria for PTSD.

By understanding how a person's brain perceives the environment around them, the most, architects can do is to employing techniques and concepts that would provide a space conducive to healing (Hildebrand, 1999). This research is based on the theme that a healthy design can create a strong relationship between the space and physical and mental health of the end users in it.

2. Domestic violence

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Domestic violence is widely prevalent and deeply entrenched in India. The National Crime Records Bureau (NCRB) 2019 has reports that majority (30.9%) of all the 4.05 lakh cases under crimes against women are registered under Section 498A of the Indian Penal Code (IPC). In the present study, 52.4% of men experienced violence that is gender based. Out of 1000, males 51.5% experienced violence at the hands of their wives/intimate partner at least once in their lifetime and 10.5% experienced violence in the last 12 months. The most common spousal violence was emotional (51.6%) followed by physical violence (6%) (statistics from: (payal, 2021)

Barbarity against females is a serious problem in India. One third of females age 15 - 49 have experienced physical brutality and about 1 in 10 experienced sexual violence. 35% females have encountered physical or sexual violence. Around 2 in 5 (37 percent) of married women experiences some form of physical or sexual violence by their husband. 1 in 4 married women have experienced physical or sexual violence by their husband in the 1 year preceding the survey

(Statistics from: (NFHS-3, 2006))

2.1. Most women do not seek help when they are abused

Financial uncertainty contributes as a major factor for females to continue living in such toxic environment. Some people follow the age old Indian patriarchal system and do not let females return to their matriarchal place post marriage. And women not being educated enough or financially independent enough continue to exist in the same environment because they lack the support they need.

2.2. Why men don't talk about domestic violence



Figure 18 (source:https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6437789/)

3. Depression

According to WHO, India is home to estimated 57 million people (18% of global estimate) affected by depression. With India witnessing significant changes (which includes, urbanization, globalization, modernization and migration that is coupled with rapid sociodemographic transition, depression is likely to increase in the proceeding years. As per NMHS (2015-6) in India, 1 in 20 (5.25 %) people above 18 years of age have suffered (at least once in their 18 years) from depression amounting to a total over 45 million persons with depression in 2015(source: (K, 2020))

People with depression are often stigmatized and excluded by their family and society. They also tend to underperform in education and work, thereby remain increasingly deprived of economic and social opportunities, with a decreased quality of life.

4. Lgbtqia+

The LGBTQIA+ acronym stands for Lesbian, Gay, Bisexual, Transgender, Queer or Questioning, Intersex, Asexual or Ally and now 2S has been added to represent Two-Spirited which is used by Indigenous people to describe their sexuality or gender and the plus sign encompasses inclusivity. It is not that homosexuality is new to the Indian society, it very much finds its existence in history. But still in 21st century LGBT community has to face social discrimination. Sexual minorities in India are the very easy victims of the hate crimes, they are easy target and are exploited physically, sexually, verbally.

4.1 Challenges in India Honour killing and corrective therapy Lack of proper healthcare Acquisition of identity Documents Government aid

1. Ptsd

a) The Indian mental healthcare act

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- b) The lunacy (supreme courts) act, 1858
- c) The lunacy (district courts) act, 1858
- d) The Indian lunatic asylum act, 1858 (with amendments passed in 1886 and 1889)
- e) The military lunatic acts, 1877
- 2. Domestic violence
- a) Pwdva
- b) Section 498a of the Indian penal code
- c) Section 304b
- d) One stop center sakhi
- e) 181 women helpline
- f) Nirbhaya fund
- g) Mahila shakti Kendra (msk)
- 3. Depression
- a) Mental health care act
- b) Prohibitions and punishments
- 4. Lgbtq
- a) Nalsa
- b) Transgender bill in India
- c) Ban of 377
- d) Sweekruti
- e) Transgender persons (protection of rights) act, 2019 (transgender act).

Psychology and architecture

Any place, whether architecturally constructed (built environment) or naturally available (nature) provides human beings with a strong connection to place, and this sense of embodiment is how we come to relate and understand to the world (Prestwood, 2010). Building design has the potential to induce stress and affect human health. Public Health has been one of the most important concerns as back as 1926, when public and community health was declared a fundamental right to the people. When this directly implicates on city planning, architecture becomes a part of the action to be taken. It has been proved in that barren neighbourhoods with dilapidated buildings and unused outdoor spaces make for an unsafe community living, evoking anxiety and fear in people. There have been many terms that define this specialty that brings architectural design into the health of human beings. The most used or popular terms are Cognitive Architecture or Environmental Psychology, both that have gained popularity in the recent times. In the current time, people spend about 90% of their time inside a built structure (Paletta, 2018). The role of Architecture in improving mental health and psychology of the human brain and the possible negative impacts of poor design are explained in the section titled "Architecture's role in Mental Health and Psychology" in the book "Cognitive Architecture: Designing for How We Respond to the Built Environment by Sussman and Hollander.

A) Co-housing

Cohousing communities consist of private homes that are strategically positioned around Common Area to facilitate maximum possibility of social interaction between neighbours. Cohousing communities are created and managed by its residents, who value a healthy mixture of privacy and community. Sustainability and innovation are two words often associated with these communities – natural products of people working with one another for community's sake.

Social cohesion and social capital

- 1. Social relations.
- 2. Social interaction

- 3. Place attachment
- 4. Sense of community

METHODOLOGY Moto

Moto is to take them out of the toxic environment but not let them get back to the bubble they were for a long period of time. It is to make them self-sufficient and trying to get them on their feet so they can also contribute to the betterment of the society and to their own betterment.

- a) Mental health service should be recovery oriented
- b) Cohousing services should be provided
- c) All the services should be provided in a safe and secure environment
- d) Records and data of all the people should be maintained
- e) Self-sustainability of the entire project
- f) Help to all as much as possible
- g) A gender-neutral space

Interview

- a) Mrs. Umaima Mulla Feroze (Ex-joint honorable secretary, seva sadan)
- b) Dicky Baruah The Humsafar trust

Regulation study

- a) NFHS- chapter 15 domestic violence
- b) Guideline for ONE STOP HELP CENTRE by Ministry of women and child development
- c) Indian Public Health Standards (IPHS) Guidelines for Primary Health Centers
- d) Constitution of India article 14 15
- e) PSK guidelines 2015

Adressing the issue

After analyzing the problems and needs giving them shelter for temporary time and people who are capable enough trying to find them things that would support them economically.

Solving the issue

HOUSING: temporary housing facilities for people who need shelter

MEDICAL: medical facilities for people under depression or traumas

EDUCATION: types of education according to the education status of people

PUBLIC: walk inn help for people who can't or won't need temporary stay

Case study

Name	Focus	Purpose	
Seva sadan	Girls	To foster girls between 6 to 12 who are abandoned by their families or belong to	
		EBC. Take care of them till they turn 18	
Socso rehab	Ptsd	To provide people who have lost their normal capabilities due to accident or sickness	
center		proper health care to help them regain their physical abilities to continue working	
		faster, healthier and safer.	
Social	Co-	Using a regular layout with a 7.5m modulation, the project supports an edified	
complex in	housing	structure of 52 dwellings and supporting units with outdoor spaces of streets, plazas	
alcabideche		and gardens are like an extension of the house itself.	
The	Lgbtq	Humsafar Trust is an NGO in Mumbai which promotes LGBT rights. Founded by	
humsafar		Ashok Row Kavi in 1994, it is one of the largest and most active of such	
trust		organizations in India. It provides counselling, advocacy and healthcare to LGBT	
		communities and has helped reduce violence, discrimination and stigma against them.	

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Mava	Men	To engage boys and men to address issues of gender inequality and discrimination by	
organization		interrogating the existing dominant model of masculinity, and help stop prevent	
		gender-based violence against women	

critical analysis

A.) Findings

A need of one stop center that can cater all the issues under one roof was the solution that was found after interviewing Mrs. Umaima and Dicky Baruah both community workers women and Lgbtq community and from all the case studies. A temporary shelter that can sustain and empower them for an age group of 19-35 for all genders separately. The more we talk about issues openly is more it gets normalized for the society. Issues that are taboo to talk about in families should be openly talked about for normalizing it.

B.) Money generation

Money generation is one of the major factors that needs to be catered and thought of before designing and proposing a center. A considerate amount of money roll is required to keep any center, institute running. There would be help from government initially and also certain donations, but one can't always rely on them for longer course as the amount might keep fluctuating. Certain fees, maintenance, salaries and costing for induvial should also be taken care off. It should be thought beforehand that how can the people provide for themselves without relying on outer sources. As noted from SEVA SADAN they took various classes a course for kids in the organization and for people outside to keep the income running.

Avenue for fund generation could be segregated into 3 basic parts:

1. Donation.

Various organizations, companies, people etc. provide funds to help centers on yearly basis. As noted from list of donation chart of SEVA SADAN for year 2019-2020 they had received an amount of Rs.1,69,86,035/- from various people and organization. The amount was huge due to yearlong presence and work of Seva sadan. It is a well-established help center that has serves the society for 113 years. Donations might vary from center to center. Therefore, one can't always rely on the same but keep an opening for it.

2. Government grands.

Government has initiated the proposal of 150 ONE STOP HELP CENTRE pan India for women. The schemes are implemented through states through the Nirbhaya Fund. The Central Government will provide 100% financial assistance. The funds would be made available by Ministry of Women and Child Development, GOI to the District Collector/District Magistrate directly. The MWCD, GOI will be responsible for budgetary control and administration of the scheme at central level (one can also run an independent center without taking funds from government on later stage). After receiving proposal from the state/ UTs and with the approval of the competent authority, the MWCD will transfer the funds to the concern District Collector directly. Funds shall be released to the District Collector/District Magistrate bi-annually and second instalment will be released after receiving the Statement of Expenditure (SOE) and Utilization Certificate (UC) of the grant from the concerned District Collector/District Magistrate.

Under "SWEEKRUTI" scheme for LGBTQ community The Self-help group duly constituted and registered with DSSOs will be supported with one time assistance of Rs.50,000/- for initial activity support and start-up capital. According to the Budget provision and utilization, the Collectors concerned should place the estimated budget requirement for their respective districts well in advance to the SSEPD Dept. for release of funds. In case of NGOs the application/ request for funds shall be submitted to the SSEPD Dept.

3. Fees and income from internal sources run by people residing in the center.

Various classes and workshops would be made available for the residents the same could be made available for outer public at certain cost. Secondly there would be a mini market area designed with various shops which would be allied to the workshops provided by the center and would be run by the residents and also made available for outer public. A space could be rented for Café and Restaurant for outer food chains which can also help in generating job opportunities for the people in center. Vegetable market area would be provided which could sell vegetables that are grown within the center on a small scale. This would create job opportunities and income generation along with educating the residents about agriculture and marketing. Exhibition center is proposed that will be rented to people according to their needs. Certain conference spaces can also be designed for renting.

CONCLUSION

The total understanding of design parameters, the characteristics of spatial alignment and impact of each architectural element that goes into creating such a therapeutic environment, will have an adverse effect on the quality of life the residents would be experiencing

To provide assistance and integrated support to people affected by violence, under one roof. To provide immediate, non- emergency and emergency access to a range of services including medical, legal, psychological, shelter and counselling support under one roof to fight against any forms of violence against all three genders.

A.) Future proposal

Proposing a one stop help center for the crowd that needs help (as mentioned in the literature review) can solve a large chunk of problems faced by people which they find hard to speak about. Setting measurable goals for all departments and ensuring gender equity and convergence vis-à-vis the schemes/services across different departments/sectors.

The site divided into 3 zones

- a. Public
- b. Semi public
- c. Private

A.) PUBLIC:

Public space includes shops and other retail places that are run by the people in the organization. A walk-in help-centre and registration place for humans who need quick assistance and information

B.) SEMI PUBLIC:

Semi-public space includes schools for people along with auditorium for practising different art forms and other needs. The entire semi-public space will be a learning and displaying opportunities. Libraries, open school, etc.

C.) PRIVATE:

Private space includes hostel for people in need of shelter. It includes office space to keep all the registrations and clerical work and a small open hospital/trauma centre (physiatrist)for treatment of humans who have suffered huge traumas and need help

- 1. Front area
- 2. Welcome center
- 3. Admin block
- 4. Help center
- 5. Helper block (separate for all 3 gender)
- 6. Education block
- 7. Market block
- 8. Cultivation Land
- 9. Cultivation land
- 10. Health block
- 11. Residential block (separate for all 3 gender)

The entire design would be designed on 27000sq m plot

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CHANGING PATTERNS OF COOPERABILITY

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ABSTRACT

Co-operation is an act of an individual that makes him/her part of a group or community. This act of cooperation varies with the context and activities. The Smallest module of co-operation can be said to be family where group of people co-operates with each other to survive and sustain. This scale of Cooperation can also vary.

Koli community is one of such Community who cooperates among each other developing complex network of Solidarity. This network further results into unique culture and tradition. This interdependence and collective identify helped them to sustain in this changing pattern of fishing. Going ahead with this community identity many Koliwadas set up cooperatives in their own villages to facilitate fishing.

The community which having inherent cooperation culture is an ideal ease to run such co-operatives society to help each member of community. But interestingly in Versova Koliwada where such cooperatives significantly work, co-operation among its members and that community is seem to be reducing. The spatial configuration that flourishes communal relationship is seem to be diminishing with 'progress' of co-operative society.

Hence, the inference collected study of Versova Koliwada was critically analyzed and applied to the Manori Koliwada where co-operation among Kolis still exist and flourishing through traditional pattern in fishing, in order with case of Versova should not be repeated.

Keywords-cooperability, Koli community, koliwada, cooperatives, spatial configuration

I. CONTEXT

Mumbai being an 'metropolitan' region is home to different communities due to its social economics and historical processes. Mumbai is also a home to its oldest inhabitants who were self-sustain through their occupation but now succumbed to the pressure of urbanization. One of them are Kolis. Koli is fishermen tribe living on the coastal Konkan region of India. Same tribe settled on the coasts of seven islands that made-up present-day city of Mumbai. Large and diverse availability of fish close to shore led them to own Mumbai's coastal geographical locations. The hamlets wherethe Koli reside known as 'Koliwadas'.

Over the years community engaged in fishing and develop the way of life according to the context where they residing. The spatial configuration of their homes in Koliwadas also reflects this way of life. Their homes and surrounding spacesfacilitate fishing and other allied activities. Same peripheral spaces were used to dry jute nets which further mended by group of men from same or different families. These activities happened with watchful eyes of young boys who were sitting there, learning. So, courtyards were also acting as informal learning spaces where knowledge related to occupation carried out from generation to succeeding generation. Same courtyards occupy by women from different families for their household chores where children accompanied them with playing around. The courtyards became the centre of community activities commonly performed by all age groups, families; encouraging co-ordinate working and strong sense of community interdependence.

This community knot still exists in today's scenario where Kolis are fishing not only for food but also to sell the fish catch in masali-bajar (fish market). Conventionally these markets are situated along the *Bunder* (port) where boats dock and unloading of fish catch happened. These new spaces catering fishing industry have a strong spatial hierarchy within themselves that defines activity and importance of spaces. While men go for fishing, women of the community sell that fish catch in markets. In fishing markets along with business, women spend some time listening to each other's anxieties, fears and dreams. These markets become their safe spaces. Sometimes helping out with each other's kids because childcare services were inaccessible to them. At other times sharing ingredients or cooking meals together when there wasn't enough food. They gave money to women in need even if their own funds were tight. Such Koli women's small acts of kindness developed into a complex network of solidarity, shaping a sense of collective identity. Similar collective identity also formed when men support each other by both economically and emotionally while sharing spaces at Bunder or at junctions of smaller streets (traditionally know as *gullies*).

These sense of collective identity and interdependence helped them to form a co-operative society that looks after every day requirements of the fisherfolk like build structures and services needed to aide working. These co-operatives manage and facilitate smooth functioning of fishing industry and generates economy.

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One such example of co-operative moment in fishing industry is Versova (historically known as Vesave). Situated at strategic intersection of Malad creek and Arabian sea, Versova is one of the most active and thriving Koliwada in the city. Initially co-operative involved in sale of fish. But as industry booms due to this co-operative initiative, it further stepped towards to boast of cold storage and ice factory of its own providing allied facilities for fishing industry. As fishing business boomed further, it provides each member economic stability in a way that, now today every individual trawler owner strikes his own deal contrasting initial idea of co-operative working. Today co-operative role is restricted only towards providing ice and fuel service to its fisherfolk members indicating the failure of this system. Along with providing allied services today co-operative regulates floor price below which no one is allowed to sell, ensuring there is no unhealthy competition. This highlights the importance of such body even though it fails to facilitate its original idea. The affluence shows in the changed skyline of Versova Koliwada. Traditionally where there are series of transition spaces around houses that allow people to interact and work together and made by themselves based on availability of local materials; where most of the everyday functions happened, all are gone and replaced by 4 to 5 storied typologies of houses and narrow lanes. The houses that were constructed by community themselves using locally available material are now reconstructed with Rcc frames, with the lavish use of marble and granite.

So, transition spaces which gave birth to Co-operative initiative and structure, then why and how they are getting?

II. HYPOTHESIS

In case of Versova, co-operative model inspired from the co-operative movements in 1960's failed even in community which developed co-working form over the generations. After gaining particular capital from co-operative initiative many individual members showed less interest in same co-operative initiative. Hence the 'formal' structure of co-operative failed to deliver its intended purpose. Rather than that it started to create disturbances for the architectural elements and characters which initially gave birth to co- operate working within community.

Hence it is important to formulate the program based on the understanding of socio-cultural structure of Koliwada which preserve and further enhance the inherit network of solidarity and sense of collective identity. The Architecture of such program became an important product of these processes which shapes the culture of new era of fishing which affected by several environmental and economic pressure. Here Architecture will be medium to showcase community background and its values to show. Architecture acting as the reference point for co-operative value of Koliwada and aid them to sustain in economic and environmental pressure.

A. Research question

What will be the new reference point for program which preserve and enhance the inherit co-operative identity of community which further helps them to sustain in new era offishing?

B. Research aim

To study 2 Koliwadas in Mumbai to understand socio-cultural structures and compare changing architectural patterns in them with respect to changes in occupation.

III. METHODOLOGY

The primary study involved a qualitative research approach and included an ethnographic study of the Versova and Manori Koliwada. It included interviews with individuals from different communities, elders in the village, active fishers, land owners, local developers, as well as representatives of various institutions such as the village trust, the mandals (associations) and the macchimar sahakari sanstha (fishers co-operative society). The information was collected through a specially designed interview to analyse the village structure, co-operative structure and its governance, financial status, architecture, housing typology and other aspects related to environment

The primary study aims to find parallels between two chosen Koliwadas in terms of fishing industry, village structure and architecture. Objective is to map fishing industry and its structure in both Koliwadas. Another objective is to find relation between spaces and type of stakeholders associated with it. The study of spaces and its transformation with changing pattern of activities is carried out by analysing spaces through series of plans, sectional elevations, sketches and isometrics. This method will help to understand how build form contributes traditional and contemporary patterns of activities. The overall framework of research is represented in 'Fig. 1'.

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Fig. 1. Methodology diagram for research

A. Limitations

Considering the sphere of research where two Koliwadas are studied on the parameters of fishing economics, transformation in economics and local architecture; problems while documentation, field work and researching are considered as limitations. The proportion of scale of research to the time period given to research is high with considering the methodology that is used. Documentation of Manori Koliwada was carried out in lesser field visits and even in the monsoon season where fishing business was totally shut. It is difficult to documenting individual house as residents hesitates to disclose their personal details to stranger. Again, residents thought that municipal cooperation body is involved in this survey and did not disclose their details nor allow to take photograph of their houses.

IV. VERSOVA KOLIWADA: AN ETHNOGRAPHIC ANALYSIS



Fig. 2. Land use and commons of and around Versova fishing village

Versova Koliwada is located in the north western suburbs of Mumbai. The area of Versova, which even today is referred to as Seven Bungalows, was earlier surrounded with agricultural lands dotted with a few bungalows. Versova Koliwada was the only dense village settlement in the area adjoining the creek, historically comprised predominantly of Kolis but also other *coastal communities such as the East Indians and the Muslims*. ¹ The East Indians who were originally farmers, used to cultivate agricultural lands surrounding the village. A significant portion of the gaothan² was also occupied by the Muslim community. Apart from the Kolis and other indigenous inhabitants, various migrant communities have also settled in the village over time.

In the past two decades the Koliwada has undergone massive transformation in its built fabric, environmental conditions, livelihood practices and community structure. We could narrate the case of Versova Koliwada as two interconnected stories: the story of fishing industry, and the story of architecture.

A. Story of fish industry

1) Traditional livelihood and introduction of cooperatives

What really defines the coastal community is the historical relationship it has to the foreshore areas and coastal waters, and the social arrangements that entail ways in which land and water resources are these are used, apportioned, shared and sustained. (S. wagh, 2017)

In and around the fishing village the Kolis have been historically engaged in different kinds of artisanal fishing practices adapted to the various physical and ecological conditions of the coast. Artisanal fishing is a highly

skilled activity practiced in shallow waters along the coast or in the creek adjoining the village using selfinnovated craft and gear combinations (Punekar, 1959). According to Punekar, the secondary occupation of creek fishing was earlier a common activity especially for impoverished fishermen who could not afford large boats or labor. It provided them with just enoughto sustain their families.

Before independence of India, Kolis of Versova faced number of problems like paying the high cost for fishery requisites, marketing of fishes, exploitation by fish merchants etc. To overcome these problems, local fishers came together and purchased fishery requisites like ropes, twines, paints, coal, tars and supplied these fishery essential items to fishers of Versova at nominal rates (S. Wasave, 2021). This marked the foundation for co-operative movement in Versova. 'Vesava Macchimar Vividh Karyakari Sahakari (*VMVKS*) in 1944 and 'Vesava Koli Sahakari Sarvodaya Society Limited'(will be refer as VKSSSL onwards) in 1952 were formed respectively Even though their main aim is to work for wellbeing of Kolis of same village i.e., of Versova. But both co-operatives started to work individually. This highlights the interesting aspect of formation of co-operatives in Versova. The co-operatives formed with existing social hierarchies Different communities often occupy different parts of the village, their location usually based on livelihood patterns or access to resources. The Kolis usually occupied a part of the village which had direct proximity to the sea and foreshore areas.

Gaothan is known as urban villages. There are three types of urban villages in Mumbai which are koliwada, gaothan and adivasi pada. As per development regulations from Mumbai Municipal corporation, all urban villages collectively known as gaothan. Gaothan is a portion of the land of a within village structure. Two different groups of Kolis formedtwo different co-operatives working for smooth functioning offishing processes of their own individual groups. At the time of initiation of a cooperative society, prime activity of the cooperative was to supply fishery requisites at a reasonable rate to their members. One of such important fishery requisites is ice. Ice is essential for fishers to protect their fishes from spoilage. But traditionally when ice was not available, Kolis dry their fish catch and store it in bamboo baskets around theirhome.

2) Contemporary pattern of livelihood and the changing role of cooperatives

For centuries, the coastal fish economy was sustained by artisanal fisher folk operating small, unmechanised craft, supplying fish to inland markets. In the 1960s, big business (private limited companies) began to enter the fisheries sector. The expansion of trawler fleets and catching fish primarily for export led to major changes in the ecology and economy of fisheries. Subject to a squeeze on livelihoods, some of the fishers themselves transformed from artisanal fishers to commercial trawler ³ owners (Pontee, 2013). This transformation can be traced down by tracing the introduction finfrastructure provided by co-operatives for aiding fishing activity.

Traditionally a joint family system existed and often the entire Koli household was engaged in the occupation of fishing in one way or another either in the catching, drying or processing, or selling of fish, with children often lending a helping hand. Punekar (1959) mentions that due to strong kinship relations and social bonding within the community, work was shared within the community and there was no need of hired labour. Many of the dolnetters in Versova now own trawlers and are engaged in deep sea fishing, artisanal practices have declined. Many Kolis who are boat owner started fishing activity to out-sourced to hired labour. A large number of Koli women however still continue to be engaged in the selling of fish (Commoners as enclosures). This marked the disconnection of Koli family from fishing as mainly hired labour is engaged in fishing activity. This degree of disconnection increases as newer generation opt to educate and set up their own business.

In the case of Versova it is observed that after achieving economic stability and establishing network of fish sell, individual member gets disconnected from cooperative in terms of selling their fish catch. He/she only depends upon cooperatives for allied services like services of ice and diesel. The boom in the fishing industry have changed the skyline of Versova Koliwada. The traditional houses having series of transition spaces around it have been replaced by 4 to 5 storeyed typologies of houses and narrow lanes. This transition in architecture will be discuss in detail in the next chapter.

3) Transforming livelihood and changing land use

village which is ordinarily used for settlement. Gao- than or "village site" means the land included within the site of a village, town or city as determined by Section 122 of the Maharashtra Land Revenue code

¹ Big trawlers refer to draggers, which are commercial fishing vessels. Some of the big trawlers are owned by Kolis themselves individually or in association with external non-fisher partners.

Traditionally the livelihood pattern was spread over a vast area along the creek and shoreline. Fishing activity along the western beachfront extended all the way up to the *Macchlimar* bus stop to the south of the village. This

was across the road from an area presently known as *Aram Nagar* where the Kolis from Versova earlier parked their boats. Certain members of the community also practiced traditional creek fishing in intertidal areas

their boats. Certain members of the community also practiced traditional creek fishing in intertidal areas adjoining the estuary on the landward edge. These areas were commonly referred to as '*Khuntachya jaga*'. Over the years many of these common areas and village lands have been taken over by either the State or by private developers through series of enclosures.

B. Story of Architecture

The spatial configuration of Koliwada reflects the way of life which Kolis developed over the years. Over the year, external pressure due to enclosure of common lands and internal pressure of development due to family expansion and changing pattern of fishing results into Change in housing configuration. In this chapter we are going to study this transition with series of case study of such housing typologies. Comparing this project through metrics of open spaces, social spaces, circulation space, built areas and densities, using drawings sketches to highlight and illustrate their projective capacities.

1) Selection criteria

Selected cases are shortlisted on basis of their location and occupational status of owner. The intent of this study is to analyse relation between spatial architecture and occupation and how it modifies with changing patterns in occupation.

2) Vesavkar's house

. Current occupation of owner is not occupied with any work. The main any Source of income of owner is rent from occupying his redeveloped residential and commercial block. Today this koli family is connected to fishing activity only interms selling of fish where lady of this house buys fishes from Versova bundar and sold them in Andheri Masali bajar (fish market). Earlier this family was engaged in fishing with their own mechanical boat but due to reduction in availability of fish they drop this on inherit occupation in 1990. This timelineof occupation is map along with time line of transitions in architecture of this house to find parallels between them. In this way, we can analyse and understand relation between occupation and Architecture.



Fig. 3. Timeline of transition of Vesavkar house with change in occupation.

3) Raje's house

Owner of this house engaged in fishing occupation activity and have small sized boat. They continued this fishing activity by artisanal gill net fishing in Malad creek and estuary and return to shore daily. They sustain themself from daily fishcatch they caught and excess of it sold the in local fish market.



Fig. 4. Illustration showing transition of build form of Raje's house over the years.

4) Chandi's chawl

This build form was chosen to understand how land use changes with respect to change in occupation. This building was recently developed (in March 2021) on land where earlier fish drying Mandavi was the (temporal bamboo structure) was there. This is newly developed residential block consist of all rental units. Even if this parcel of land is own by governmentbut Mr. Chandi have customary tenure right over the use of it. Even this was limited to use this land for fishing related activity only, the owner had developed it for rental residential block.

The owner of this land is trawler owner who owns three mechanized trawlers and practices deep sea fishing. Above all the owner nor his family member directly goes for fishing. They have hired labors for fishing and its related activity. The catch from fishing was sold to retailer/auctioneers directly of Versova bunder and catch which is not sold that any particular in cold storage for next day auction. This contemporary pattern of fishing results into redundantly uses of these landswhich traditionally used for drying of fish.



Fig. 5. Illustration showing location of selected project along with densities and typologies of buildings around neighborhood..

5) Comparative analysis

The story of these three houses provides a context of transformation in Versova Koliwada. The veranda and back yard which are two important spaces in Koli household disappears in new typology due to various factor like family expansion, shortage of land etc. As family grows, in order to have enough space for every member, whole/part of houses have been constructed up to edge of plot and with an increase in number of floors. This new typology is observed to be disconnecting its residents from ground by breaking the flow of the space with its large volume.

Modification of veranda in case of Vesavkar's house have affect the porosity of this sociable space. It is observed that the Veranda becoming more and more privatize, restricting the accessibility.

Along with development of gaothan plots common lands where traditionally fishing related activities were performed are also developed. Contemporary pattern created due to smooth functioning of cooperatives makes the traditional fishing practice with redundant use of spaces which were earlier designed to aid traditional fishing activity.



Fig. 6. Sectional elevation through selected cases in Versova gaothan.

The next stage of Study will be to understand socio economics of Manori koliwada where fishing is done by traditional practices.

V. MANORI KOLIWADA: AN ETHNOGRAPHIC ANALYSIS



Fig. 7. Land use and commons of and around Manori fishing village.

The findings from Versova Koliwada were analyzed and further stage of study was to identify another Koliwada where artisanal fishing techniques still practice. For this stage many Koliwadas were studied and further

shortlisted. Community involvement and continuation of traditional or artisanal fishing practice was main aspects for shortlisting another Koliwada. Among such Koliwadas like Bhati, Dongarpada, Gorai and Manori were shortlisted. At last, Manori Koliwadawas selected to study due to its location, geography.

A. Story of fishing industry

The fishing in Manori still carried upon by artisanal fishing practice which include manual throwing of net in sea water. Limitation of fish catch in creek and navigational problems at estuary has been led Manori Kolis to be dependent upon fishing in Arabian sea.

Here boat types varied from small scale non-motorized boats, small scale mechanized vessels to medium size mechanical vessel. These small-scale boats carrying one to two people at maximum, catch fish in small trips around shallow coastal waters and returns to shore in two - three hours. This time period also varies depending upon availability of fish catch. These boats bring in small fish.

Small and medium size mechanized boats carries five to six and ten to twelve Nakhavas respectively. In many cases clan of brothers from one family owns medium sized boat on which all brothers go for fishing and hence there is no need of migrant workers as employers. This medium size boats complete their one trip in four to five hour or in one to two days depending upon season and type of fish they want. This medium size boats also go for long trips in order to get bigger fishes. But such expedition for bigger fish is limited in Manori koliwada due to limitations of capacity of vessels and unavailability of cold storage infrastructure to store this catch.

Fishing related infrastructure lacks in Manori Koliwada. Cold storage or ice factory which we had observed in case of Versova is absent here. Only diesel pump for refueling vessels is erected over here by Manori cooperative society. There are total three societies but there sphere is limited only up to provide diesel and introducing government scheme to local Kolis. But locals argued that such scheme does not reach them. The hierarchy within Koliwada reflects in cooperative structure where administrating members belonging to same community take actions for their own benefits and have no connect with fishing activity happening in village.

This lack of infrastructure related to cold storage has led Kolis to continue with fish drying process. And hence their relationship and interaction with drying yards still continues. Once boat return to shore Nakhavas manually pull the boat towards seashore. This traditional pattern of docking vessel up to shore line still continues even though modern rcc jetty is constructed by government along southwest shore parallel torocky bed. This amenity was designed without considering the need and traditional pattern of fisherfolk and hence Kolis don't use jetty for loading and unloading of fish catch. The linear stretch of jetty and comparative smaller width hampers the unloading and sorting activity. The medium size boats havinglesser weight anchored along jetty remains unstable due to tidal water level along the span of jetty. This creates disturbances while unloading. Once fish catch is unloaded, Kolis required sea water to clean this catch which is not possible in case of unloading on jetty. After unloading the catch, it further sorted down into different categories. Women of the house gather on shore as boat started to dock on shore. Their sorting work begins once the catch arrives. Their husbands also help in sorting and separating. As mentioned earlier, the catch was divided equally among brothers (when boat is belonging to same family), each brother goes to his wife with fish catch and then sorting process starts. This interesting configuration of joint operation (of fishing) finally converted into individual (nucleus) activity and ownership; highlights inherit cooperability among family. Such pattern and configuration could not be possible on linear and narrower jetty as it requires horizontal spatial arrangement. And hence such 'formal' and 'modern' amenities couldn't work effectively.



Fig. 8. Photo collage showing fishing activities in Manori

Fish drying activity is major activity that been carried out by community after fishing. Mainly women of the community involved in this activity as men are engaged in fishing. The dry fishing yards use for drying of prawns are located on the hillock top which is further situated towards southern side. This hillock is levelled and further topped with plain cement concrete bed in order to have plainer area for fish drying. But this intervention

not only affects ecosystem of hillock but also stop water to percolate down. Most of drying yards are located towards western side of hillock in order to have highest sun exposure. After half a day, prawns are turned over to ensureall sides become dry. Hence Koli women along with their servant spends most of the day on this drying fields and shoreline in order to carrying fish catch from shore and spread it over hillock. This work is physically exhausting as women worked under the exposure of sun throughout the day. Many women seek comfort under shading trees in hot afternoon. Butmost of the trees are cut down in order to make space of drying yard.

Younger generation also sometimes accompanied them in fishing and its related activities due to absence of secondary and higher secondary schools in this locality. Only the youngster who find jobs based on their education discontinuethis occupation as it involves lot of time and lesser economic generation. The dried fishes are collected by women and they stored it in their individual houses which is traditionally done by generations. Hence no matter that houses of this Kolis are of older traditional typologies or newly redeveloped structures they still possess architectural spaces to accommodate the storage of dried fish and other equipment related to fishing.

B. Story of Architecture

koliwada on the one side where decline in artisanal fishing resulted into redundancy of common lands and architectural elements (which were traditionally evolved through socio- economical processes over the years due to livelihood pattern) as their intended purpose has gone. The degree cooperability can observed to be decline even though the 'formal structure' of cooperative society is present. The provision of the fuel for trawlers and boats, ice for keeping the fish catch fresh and employing a network of other people to aid allied process, the cooperative makes the act of fishing much easier for owners. But interestingly degree of cooperability and the connection of fishing activity and family or that of community has decreased with the 'formal structure' of cooperative society.

On the other hand, Manori koliwada where artisanal fishing practice still carried by community. Where whole family and that is community involved in fishing and related activities. Community still shares its relation with common lands as fishing activity continued with traditional way. House typology still possesses architecture element that helps fishing related activity to be happened irrespective of house is older or redeveloped. With most of the houses belongs to Kolis practicing artisanal fishing, not other parallel economic activities are observed at larger scale. The cooperative is also present here but its services and infrastructure are limited compare to that of Versova. The absence of cold storage andice factory made fish drying activity still working today. The cooperability among community still thriving due to various reasons like use of common lands, limited use of hired labor and existence of family connection with occupation. Although some transformation particularly in term of cooperatives canbe observed similar to that is in case of Versova observed during the year of 1960-80.

Hence it is important to intervene at right time and formulate the program so that the case of Versova will not be repeated here. This program should be nothing but a physical form of the cooperability which inherently exist in Koli opposite to the 'formal structure' of cooperative that Versovapossesses.



Fig. 9. Sectional elevation through selected projects in gaothan area of Manori

Each house has Verandah irrespective of its newly redeveloped or of vernacular typology. The areas of such verandahs may decrease in newer typology of houses but there are still present opposite to what we observe in Versova. These verandahs functions remained same that is dry fish container storage, mended nets, resting places for elderlies, etc. Porosity of verandahs along length of by lanes creates public/semipublic spaces for interactions and meetings. Houses of different families appears to be one irrespective of their religion.

VI. CONCLUSION

By comparing two Koliwadas which are at different stages of transformation one could find the parallels between the processes of transformation of these two Koliwadas. Versova

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ADAPTIVE REUSE FROM STADIUM TO HOUSING

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ABSTRACT

Many sport stadiums are not designed to be fully inhabited outside of game-day. In many cases, the expectations of what a multi-use stadium should look like fail to deliver on its promise. If sport stadiums are mega structures that are not used regularly, then their design and programs should be re-considered.

Whichever country who hosts the World Cup Has a quite nice boom in the economy, the boom is very helpful for the city which are the venues for the Tournament. But the boom in the economy is very temporary and the Stadium which is built especially for the world cup stands abandoned most of the time. Stadiums take quite of space in the city and the space is not used mostly by the people of the city.

For a state like Odisha who faces frequent cyclones and Housing is an issue there. The City of Puri has a lot of potential considering it's the Cultural and Heritage Hub.

The city is constantly evolving and changing or adapting to the new but the stadium architecture has not changed much as of yet.

And Does a Stadium being abandoned after the world cup is over beneficiary for the city. It's absolutely not so what can be done to the stadiums which would not easily dissolve into the city after the tournaments are over...

Keywords—Adaptive Reuse, Stadium, Housing.

INTRODUCTION

India is Hosting the coming Hockey tournament 2023. The Stadiums contend within the tournament area unit in Odisha Itself.

Considering several Cases round the World regarding the arena Being abandoned when Such Massive Tournaments.

Examples: Arena prosecutor Amazonia, This stunning arena was designed for the soccer tournament 2014, Apparently, it absolutely was used just for four matches within the entire Tournament of tournament 2014. and was used for two matches within the Rio athletic contest 2016. Since then, the arena stands abandoned. quite three hundred million USD was spent on Building this arena. And apparently, solely six Matches were contending during this arena. This was only 1 of the various samples of the Abandoned Stadiums. and arena takes up quite heap of area in our town.

And another issue of Odisha is that it's the State that is hit by Frequent Cyclones. within the last one hundred Years, 260 Cyclones are hit to the state. So, the State additionally wants a housing for the affected individuals.

-Odisha is raising sports hub of Bharat

Today, if somebody talks regarding sports particularly hockey in Bharat, maybe he/she won't forget to say Odisha as a result of the Japanese state has been rising as a sports hub of the country. many of us have additionally started career Bhubaneswar because the sports capital of Bharat. A decade agony, individuals outside Odisha solely knew regarding athletes only it came to sports, and, at maximum, individuals understand the Baramati arena, wherever few international cricket matches were hosted.

Though the Kalinga arena was there in Bhubaneswar, individuals weren't tuned in to that as a result of the platform was confined to the coaching of native athletes. But, now, this arena has become a middle of excellence for the country's sports personalities.

Naveen Patnaik, the Chief Minister of Odisha, had justly said: "Investment in sports is associate investment in youth. Investment in youth is associate investment within the future."

(Sambad English Bureau, 2021) [9]

-Odisha government aim to host a unforgettable 2023 wash room tournament

With precisely 2 years to travel, Hockey, Bharat and therefore the Odisha government area unit wheelwork up to host the 2023 Men's Hockey Tournament in 2023, Bharat can host the competition for a record fourth time since its origination in 1971. The tournament is slated to be command in Bhubaneswar and Rourkela from Gregorian calendar month thirteen to twenty-nine, 2023. once Bharat hosted the fourteenth edition of the globe Cup in 2018, all the matches of the competition were command at the Kalinga Hockey arena in Bhubaneswar,

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however 2 venues are going to be utilized for the 2023 event. Odisha Chief Minister Naveen Patnaik, on Dec twenty-four last year, declared a brand new best arena to be made in Rourkela town, which might be the largest arena for hockey within the country with a sitting capability of twenty,000. The arena is about to possess all the fashionable facilities and can supply a singular expertise to players and therefore the fans throughout the 2023 tournament. The work to develop artificial hockey turf in every of the seventeen blocks of Sundargarh district has already begun. "It are going to be a challenge and a chance for United States of America to arrange the 2023 tournament in 2 venues - Bhubaneswar and Rourkela. Since the globe Cup in 2018 was command at the Kalinga Hockey arena in Bhubaneswar, most of the arrangements area unit in situ in Bhubaneswar, whereas a brand new best hockey arena is being in-built Rourkela,"

(IANS, 2021) [6]

Background study

-How world cup/Olympics affects the host cities

It is wide believed that the lure of the athletic contest makes it a wise move for a town to host the event. the idea that the event can draw an oversized range of holiday makers could be a common reason why many of us bid for the Summer athletic contest. alternative economic edges that a bunch town will give embody inflated broadcasting revenue, inflated employment, price tag sales, sponsorships, and tax revenues. The athletic contest impact on gross domestic product is one in every of the most economic indicators which will be measured throughout the games. It also can be helpful for a town to be elect as a bunch, though the perceived edges area unit bigger than those related to hosting the Olympic Games, these area units usually overshadowed by the prices. Host cities usually underestimate actuality prices of being a neighborhood of the Olympic movement, whereas every athletic contest Games has its own distinctive edges and prices, all of them share identical basic edges and area unit evaluated on an individual basis.

(Michael, 2017) [7]

-Economic edges of hosting world cup/Olympics

Hosting the Summer Olympic Games will have many economic edges related to town like price tag sales, licensing, inflated employment, broadcast revenue, sponsorships, and inflated touristy. the biggest sources of revenue for host cities is often derived via broadcasting revenue or through sponsorships, with ticketing and licensing delivery in half dozen significantly. The impact of touristy is especially tough to accurately quantify; as long as it's not possible to gather info on however each single traveler spent their cash. Also, a number of the inflated touristy income simply represents substitute disbursal or a 'crowding out' impact that might have otherwise occurred during a totally different section of the touristy business. The economic edges are going to be considerably compact by the scale of the investment into the athletic contest, because the theoretical best-case state of affairs involves a colossal inflow of touristy, active promotion of town and country, and a sizeable injection of direct revenues and taxes into town and country.

(Michael, 2017) [7]

-Housing Needs in Odisha

Compared to the flop show in urban areas, the story in rural Odisha isn't a success either. the massive takeaway of the agricultural story is that the State has didn't meet the target of over eighteen.5 large integer rural homes below the 2 phases of the PMAY-G theme. Odisha may see the development of over sixteen.5 large integer rural homes below the Central theme thus far. The annual average completion rate within the rural housing theme stood at around three.3 lakh. At this pace, the State will accomplish the housing for tired the agricultural areas once 2031 solely

(PATRO, 2021) [8]

Aims & Objective

AIM

To uplift a city's economy by adding up a venue for the Upcoming Hockey world cup 2023 and to analyze the proposal of stadium and search for its possible optimum uses.

OBJECTIVES

-To build a stadium as of an additional venue for the Hockey World Cup 2023

-To convert the Stadium into Housing for the people who are affected by the cyclones and other issues of the city.

-To make the space of the stadium useful for the city and making it blend in the city fabric by not letting the space go waste or used rarely because the Space taken by the Stadium in the city is a lot and can be used for the beneficiary of the people in the city

URBAN SCALE:

- Improving urban Infrastructure structure
- Enhancing the community of Puri
- Boosting the Economy of Puri
- Solving Social Problem

ARCHITECTURE SCALE:

- Adaptive Reuse of the Stadium
- Recycling Material
- Using The Material in the Local years

HUMAN SCALE:

- Home For the Needy
- Residence Needed as the growing population
- Creating a community within
- Social Activity with sports

HYPOTHESIS

To uplift the city's economy from the upcoming hockey World up and to analyze the proposal of stadium for its possible optimum use for housing

LITERATURE REVIEW STADIUMS



Figure 19 Field Orientation

Great care must be taken regarding the angle of the playing field in relation to the sun and the prevailing weather conditions.

(Geraint John, 2007) [5]

-INTERNATIONAL HOCKEY FEDERATION

Whilst every effort has been made to ensure the accuracy of the information contained in this series of publications, any party who makes use of any part of the Standard in the development of a hockey facility shall indemnify the International Hockey Federation (FIH),

(FIH, 2018) [4]



Figure 20 Field Dimensions

Figure 21 Field Requirement

AFFORDABLE HOUSING ZONING REGULATIONS

In the Development arrange varied Land Use Zones (LUZ) area unit indicated with their specific boundaries and these land use zones shall be regulated in accordance with the provisions of the sectional laws prescribed within the Development arrange.

Except as otherwise provided, no structure or land hereunder shall be used and no structure shall be erected, reerected or altered unless its use is in conformity with the sectional laws and also the provisions of those rules.

(Aparna Das (GIZ India), 2020) [6]

AFFORDABLE HOUSING OVERLAY RULES

With a vision to ensure access to formal housing for all sections of society living in Development Area, following development control norms (affordable housing overlay) are prescribed for facilitating development of EWS or LIG or MIG housing units.

The category-wise, size of the dwelling units shall be as given in Table Below

Sl. No.	Category of Dwelling Units	Size of the Dwelling Units (in square meters of carpet area)	
(a)			
1	Economical Weaker Section (EWS)	Up to 30 square meters	
2	Low Income Group (LIG)	Up to 60 square meters	
3	Middle Income Group (MIG)	Up to 100 square meters	
Note: The size of the dwelling units shall be modified, if the sizes are varied in the "Policy for			

Housing for all in Urban Areas, 2015", as amended from time to time.

 Table 3 Unit Norms

Reservation for Affordable Housing

Every plot with area more than 0.4 hectare shall have reservation of land for development of housing units for EWS and LIG.

At least 20% (twenty percent) of saleable residential land shall be earmarked for EWS and LIG category.

It is further provided that plots carved out for EWS and LIG categories in an approved layout shall not be amalgamated and or sub-divided, unless they are proposed to be developed as a housing project consisting of dwelling units of exclusively Economically

(Authority, 2020) [2]

METHEDOLOGY

Theoretical background

Study of stadiums and urban environment to understand their relationship and importance in history.

Identification of problem and analysis

To identify the major challenges and problem in stadiums. To study the economics of such civic structures.

DATA COLLECTION

To carry out case studies of similar projects in India with multipurpose approach. To carry out library study to know the basic standards of the required spaces to be designed,

To carry out visual and physical survey of the site and its surroundings. To know the soil bearing capacity, underground water table, vegetation, site topography and various disaster to which site is prone to. To take the details of site from government records, documents and satellite images.

DATA ANALYSIS -

Defining the functions and framing out the detail requirements of the building with areas required. Analysing the site conditions to decide the suitable orientation and landscape requirements.

DESIGN PROCESS

Formulate a conceptual design that meet the requirements. Refinement and detailing of design



Figure 22 Stadium To Housing Chart

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Figure 23 Methedology Chart

FINDINGS & CASE STUDIES STADIUMS SPORTS STADIUM, BATHINDA, PUNJAB Architect: Sarbjit Bahga, Chandigarh



Figure 24 Stadium Plan



Figure 25 Detailed Plan of Stadium

stadium is provided with floodlights to facilitate sports activities during late night. Keeping in view the international norms for seating, durability and subsequent maintenance, steel perforated chairs have been provided in these pavilions.



Figure 26 Section Of Stadium

(Bahga, 2011) [3]

AFFORDABLE HOUSING CIDCO HOUSING - NEW MUMBAI Architects: Raj Rewal Associates



Figure 27 Cidco Low Cost Housing

The City and Industrial Development Corporation of Maharashtra Pvt. Ltd. (CIDCO) Housing in Belapur Central Business District (CBD) was planned as extremely low-cost accommodation for the lowest income groups. The programmed requirement of 1048 apartments were varied, mostly comprising one to two room units and some larger two-bedroom units that could be sold individually.



Figure 28 Cidco Housing Plans

(Associates, 2018) [1]

ANALYSIS OF CASE STUDY

After going through the case studies, some major conclusions can be derived for the affordable housing:

1. To decongest the metropolitan cities, housing colonies for the LIG need to be developed in the peripheral regions of the city.

2 Affordable housing is best achieved when done in clusters as against application on single dwelling units.

3. The affordable colonies should be well connected with the city center by means of various transports to make the workplace easily accessible to the inhabitants.

4. In the housing colonies, the inner paths can be used as the means of pathways and pedestrian commute whereas main roads can be at the outer part surrounding the colonies. This provides easy accessibility as well as safety.

5. By the use of shared spaces, collaborative housing etc, housing shortage can be curbed without compromising with the living standards of inhabitants.

ADAPTIVE REUSE OF STADIUMS

Salt Lake Stadium Now A 250-Bed Covid-19 Hospital The largest sports stadium in Asian nation changed into a field Covid-19 hospital on weekday with AMRI Hospitals taking guard of the Vivekananda Yuba Bharati Krirangan. The Salt Lake bowl Covid Hospital opened its doors within the evening with 250 beds, transferal a sigh of relief to anxious patients and their families. there's an enormous shortage of Covid beds thanks to the billowy variety of cases within the town and its surroundings

(Yengkhom, 2021)

RE STADIUM

Shohei Yamashita Thesis 2020



Figure 29 Before After Restadium

Residential stadium is a thesis project both in Polytechnic di Milano and Keio University to achieve adaptive reuse of the football stadium transforming residential village after the World Cup event in U.S.A in 2026. The host city, New York, is one of the megacities to have a huge population, which induces the shortage of affordable housing for low- and middle-income citizens. Thus, a realization of sustainable transformation is of great importance for adapting or mitigating current situations



Figure 30 Conversion of Stadium to Housing

STADIUM USE 2026

In 2026 the stadium holds World Cup matches in the field with the capacity of 40,000. Two levels of view stand and corner parts work for spectators to watch events and the others install mixed-functions

RESIDENTIAL USE 2027

After the mega event, the stadium is transformed into the village whose has the mixed functions and residential units in the volume. All of the space is able to turn out for the realization of a lively life.

(Yamashita, 2020) [11]

As of Studying all the cases of the Adaptive reuse of the stadiums the Table above is the analysis of the Percentage of the sports stadium is used to its optimum use. The first three cases used the field area whereas the Re Stadium used the Stands Area or the Built area to be converted to Housing. The first three cases move the field and the intervention was temporary but in the case of re stadium the intervention was permanent and very much adaptable to the city

WHY PURI ?

Considering the rapid growth in the population of Puri the City need Housing which is one of the basic requirements for survival of a human being which are the food clothing and shelter. Therefore, the Government of Puri have increased the land use of the Residential area by 14% from the existing land usage in the Proposed Development plan of Puri. The city is growing rapidly



Figure 31 Graphic Of Puri By Author

ODISHA AND CYCLONE

Among all the coastal states of Asian country Odisha is a lot of liable to cyclone wherever nearly one third of cyclones of East Coast visits the state Odisha. Out of the whole severe cyclonic storms of the Bay of geographical area V-J Day have an effect on Odisha and districts like Balasore, Bhadrak, Jajpur, Cuttack, Puri, Ganjam, Kendrapara, Jagatsinghpur, Khordha, Gajapati ar a lot of liable to cyclone. within the last a hundred

years total 260 have confronted Odisha coast out of that a hundred and eighty were depression, fifty-seven were storms and twenty-three were severe storm that accounted for sixty-nine, twenty second and September 11 severally of the whole disturbances.

Most of the foremost cyclones have occurred within the month of Oct and Nov i.e in post monsoonal season and also the graph below shows that:

• a lot of numbers of depressions have affected the Odisha coast within the month of July and August

• a lot of numbers of storms have affected Odisha coast within the month of June and July

• a lot of numbers of severe storms have affected Odisha coast within the month of Gregorian calendar month and Oct.

CONCLUSION

The Conclusion of this Research is that The Additional Venue for the Upcoming Hockey World Cup 2023 would be a great way for Pumping the economy of Puri which is drained in the Covid Phase and The City what really needs is the Housing considering the Population Growth and the People suffering from the Frequent cyclones. So Creating a Stadium and then converting the stadium to housing would be a great adaptive reuse.

ACKNOWLEDGMENT

I would like to express my deep and sincere gratitude to my Guide, Ar. Rupali H. Gupte, G.D.Arch, M.Arch (Project Management), Principal of Smt. K.L Tiwari College Of Architecture ,for giving me the opportunity to do research and providing invaluable guidance throughout this research. Her dynamism, vision, sincerity and motivation have deeply inspired me. She has taught me the methodology to carry out the research and to present the research works as clearly as possible. It was a great privilege and honor to work and study under her guidance. I would also like to thank her for her friendship and empathy

I am extremely grateful to my parents for their love, prayers, caring and sacrifices for educating and preparing me for my future.

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BEYOND SKATEBOARDING

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ABSTRACT

The reason for this Thesis comes after realizing a relationship between skateboarding & Architecture. Having grown up on Mumbai and there wasn't seen any special interest or curiosity about the city. A random thought of building a skate park came into the mind after looking at the city that there are not enough skate parks in this city. However this commitment to skateboard grewa need to venture to new terrains.

Skateboarding is an intrinsically urban activity which highly depends on concrete. How to define the urban, if not than a continuous slab of concrete runs across the neighborhood, districts, places, living environment and lives. As world is rapidly covered in Asphalt, the kingdomof skateboarding continuous to expand.

Defining a skate park which was not just as a sport facility but a more of a community space where people meet each other to be with friends with different background. It is more of a place where so many youth with a visionary mind come together. This thesis is not just about a skate park as a sport facility but to use it as a tool to build community and it means to bring a positive social change. Moreover, the athlete vision of scores, coaches, training, performances and so forth will be ignored as much as possible. The following text treats skateboarding in Indian context and how it makes the change and used as a tool to bring a positive change in rural context and also a background study about skateboarding.

Skateboarding-community-tool-uplifment-positive change- rural

I. INTRODUCTION (FRAMING SKATEBOARDING)

Skateboarding: A fluid & dynamic field It might seem like an easy task to define what skateboarding is, in one way it is; it is simply play with a wooden deck on four wheels. Howeverthere seems to be more complexity to it. As Gustav SvanborgEden (Skateboard co-ordinator at Malmo city) explains, skatehas many dimensions: "skate is very diverse. In every circumstance it is presented, skateboarding is always reduced from its true character". (Angner, 2017)

"...skateboarding is a fluid, dynamic field, a global phenomenon whose participants have strong connections to local scenes, a rebellious activity and commercialized form."

- Kara-Jane Lombard (2016)

As this quote suggests, it is quite problematic to define exactly what skateboarding is because it is dynamic, ever changing and in many ways contradictory. There are simply different sides to the story as architect Søren Nordal Enevoldsen states: "skating is so many things; it's the act itself, it's the industry, the clothing, style, trends, competitions and media, it's the skate spots and skateparks and so on".

A common debate is if skateboarding is a sport or a lifestyle. According to Eden it as better to look at skateboarding as an interface through which you as a skater face the world, meaning that it affects all parts of your life. He argues that in skateboarding you can be physically aggressive or relaxed depending on what you want, that it is a physical way of expression that at the same time is closely tied to aesthetics, culture and film: "skateboarding has a wide and rich cultural capital". Considered this way skateboarding can open the door to a wide range of interests and become what you want it to be; a sport, a lifestyle or a free medium for expression depending on what you feel (Angner, 2017).

II. SOCIAL CONTEXT

A. Identity

That skateboarding has identity shaping elements is no secret. Skateboarding has even been compared to Romanticism with skaters having their own dress codes, language and expressions and so on (Borden, 2001, p. 138)

B. Freedom & individualism

Skating appeals to individuals who didn't find their place in other sports because they felt restricted by the structure, or simply didn't enjoy the sport. Skateboarding offers freedoms to its members, freedom from the mandatory practices of a regular sports, freedom from the supervision of a coach or parent, and the freedom to participate in any way the individual sees fit.

represent themselves in way that matches their identity. (Subculture and sociology)

With the freedom to participate in any way the participant chooses, comes the idea of Individualism. Skateboarding allows its members to express their individuality in many ways, from the clothes and shoes they

C. Alone but together Sessions

Further, skateboarding is a social practice and rarely happens alone. If you go skateboarding alone, chances are that you will make a friend or bump into one at the skate spot or skatepark. The group activity that takes place at a skate spot or skatepark is called a "session" and can be described as an individual group practice, a sort of an "informal competition" (Borden, 2001, p. 124)

wear, to the wheels on their skateboards, or a signature skating style. Skateboarding allows the individuals to

D. Local activity, Global connectivity

Professional skateboarder Gunes Ozdogan explains that since skateboarding is a global culture and shared instantly through media you are bound to have mutual points of interest with other skaters. This way skateboarding can bridge gaps between different demographics, across ages and backgrounds. Further, this makes it easy to take the initial

steps of bonding and is thus a great way to integrate in communities where you do not have many other friends and acquaintances.

E. A Safety net for outcasts

Many interviewees mentioned that skateboarding can serve as a safety net for people that have started off on the wrong path in life. Eden explains that there are a lot of great things about organized sport but there is a large crowd of people that do not fit that profile and seek other activities to engage in. Inhis view a portion of these people are quite strong individuals that do not want to be confined by anything and do things their own way. He thinks that skateboarding can provide a good alternative for this group since these people are in a category that can end up being very expensive for cities if they follow the wrong path. Association secretary at the Swedish Skateboard Association Katharina Sterner2 also thinks that skateboarding gives these people a sense of belonging

F. Currency

Individual expression, creativity and authenticity are highly valued qualities within skateboarding and praised within the skateboard industry (Beal & Weidman 2003). Further, (Borden, 2001, pp. 144-135,262)explains that the currency within skateboarding is your moves and how you gracefully you can communicate them.

G. Skateboarding, gender issues & homophobia

It is no secret that skateboarding is an activity predominantly practiced by men (Borden, 2001, p. 144). Eden explains that this partially has to do with how communication within the skate industry being directed solely towards boys. – Decades of having teenage guys as only target group has led to expressions in skateboard culture being deterrent to women. There are other values and traits that quite contradictory havebeen excluded in skateboard history, homosexuality for instance. Looking at the social structure of skateboarding this however is quite ironic (Borden, 2001, p. 147)

H. Skateboarding is getting more inclusive

Because of skateboarding being a subcultural activity that has its own communities, it means that, as well as fostering and enabling skate scenes, organizations can also work with pre-existing communities, strengthening and empowering them through skateboarding. This can be seen when we look at the Wheels of Fortune event, which has been running for 10 years and is hosted by Skate Like a Girl. It is a skateboarding event for trans, queer and non-binary young folk, with various panels aimed at creating a more inclusive space for young skaters to exist and express themselves. Skate Like a Girl is a Seattle-based organization with chapters in Portland and San Francisco. They are active in creating safe spaces for women and trans skaters and fostering creativity and leadership programmes that centre around young girls. (Subculture and sociology)

III. ADVANTAGES

- Skatepark reduce illicit behavior
- Provides safe environment for skateboarding
- Skateboarding has significant physical healthbenefits
- Skateboarding has significant mental health benefits

- Skateparks have positive economic impact
- Skateboarding used as a medium of mobility, which helps one to travel around the neighbourhood in ecofriendly manner

IV. AIM AND OBJECTIVES

The aim of this thesis is to provide deeper understanding about skateboarding and how it started in India . Further, it aims to create a community and how skateboarding is used as a tool to bring a positive change in social, cultural and economy of a village. To succeed in this, qualitative methodologies such as interviews, literature studies, site observations and case studies have been used to provide insight into different aspects of the topic. The result of this thesis represents the architect as well as skater perspective on the matter, which should be kept in mind when reading.

The objective of this investigation is to move away from the negatives of skateboarding in the public realm and focus on what are the overarching benefits that skateboarding can offer to a community space and how they can be implemented by planning and introduced in the rigid structure, which will leaddisruption and drive a change in village.

V. LITERATURE REVIEW

Skateboarding in India has conjointly reworked into a medium of change. Janwaar, a small, distant village close to Panna in Madhya Pradesh, has used skating for social change. Ulrike Reinhard, a digital roamer, author, and futurist has reworked Janwaar with skating. Reinhard needed to form positive amendment in Janwaar and felt introducing a powerful counter-cultural entity, like skating, into a rigid structure can result in disruption and alter within the village.

The story of Janwaar Castle solely started in April 2015 and it's impressed many folks in India and abroad to accept skating as a tool for change. It is NOT skateboarding for skating sake . It uses skating to drive basic social, cultural and economic change.

The purpose of the skatepark referred to as Janwaar Castle is to uplift the lives of the youngsters, bring some fun into their lives and allow them to learn new skills whereas enjoying and, by extension, develop the village at giant. The skateparkis growing into a modest complex: there's a hut product of bamboo to store the boards and kit and hold basic categories in English, maths, and hygiene, tutored by volunteers. There area unit one or two of bogs underneath construction.

The skatepark brought a hope and smile to an uneventful village that modified the manner of thinking to the folks living within the village . it had been sort of a spotlight to the problems of gender, race, class, sexuality and therefore the family. skating is like associate escape to the regular monotonous life , it's several physical , mental state advantages.

It has a quote that says "NO college NO SKATEBOARDING". It means that kids won't be allowed to skate it they don't move to the varsity. It will increase the education rate within the villages which is able to bring a serious development within the way forward for the villages. "The skate park compete an important role in breaking the taboos of caste and gender within the village. kids from all social teams would come back to the skate park. Ulrike had solely 2 rules at the skate park - 'No college, No skateboard' and 'Girls, First'. Ulrike believes like Janwaar; skating will facilitate alternative villages across India."

-Ulrike Reinhard

She told The Bridge Chronicle that skating can have apositive future in Bharat and Olympic Games can play animportant role within the method. She stresses on the a part of the sports authorities if Bharat needs to vie on the world stage. She feels Bharat wants structure to develop the game to shut the gap with alternative countries during this house. Skateboarding has garnered a special place in Bharat. With many new skate parks germination all round the country, the Indian skating scene has been prosperous. it's become a medium of amendment. however we've didn't offer skating the eye it deserves. We, as audience, ought to play our half within the growth of the game within the country. The audience plays an important role within the success of any sport. while not fans, alternative necessary entities like brands and authorities would not grade skating, resulting in its dying.thus let's support our skaters and push them to form the 2024Paris Olympic Games.

1) Beyond Skateboard

Skateboarding is a fluid and diverse topic and involves multiple styles, spaces and meanings. It could mean freedom, art form or maybe something else for every individual. The user gets to decide what he wants to do with the skateboard. It also develops creative thinking for a individual.

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2) Skateboarding can serve as a social tool

Skateboarding can serve as a great tool and gives something to the users that have world wide in common and is free andeasy to do, this can be something to consider formunicipalities regarding social programs and events.

3) Inulsion is the key

While skateboarding has high social and cultural values and can offer a meaningful lifestyle for people who do not fit theprofile of organized sports it also has challenges.Considerable efforts need to be put oncommunicating that skateboarding is something that can be meaningful for all demographics across genders, backgrounds and ages.

VI. METHODOLOGY

The objective of this investigation is to move away from the negatives of skateboarding in the public realm and focus on what are the overarching benefits that skateboarding can offer to a community space and how they can be implemented by planning.

This paper will seek to investigate the answers for following answers:

- Can skateboarding be used as a tool to uplift the community and bring a positive change in their social, cultural and economical aspects?
- Does Skateboarding encourage women and enablespeople to understand importance of gender equality ?
- Can we overcome the caste ,gender ,sex ,discrimination ,religion that a village has and can everyone be treated as a human by not judging by their cast gender or economic factors?

To answer these questions and to understand the problems inrural area, an interdisciplinary approach is required to understand skateboarding's role. I shall be exploring case studies in India, including janwaar based community NGO's. I shall also be exploring case studies in other parts of India and looking more into detail about the community where I shall seek to draw the opportunities of best practice. This place is not well developed in every aspects but the changemakers has set an example while they try their best to bring change for the village with skateboard as tool to make a change.

To study this case in detail and the facilities provided I shall be interviewing the founder of this organization and it is bestto experience the touch of village by visiting it and having conversation with the people who reside there.

By exploring these case studies, I am able to understand about the detailed working of this community and understanding the social settings. The use of the literature that have been explored already, such as the history about skateboarding as well as the abstract, will present a substantive concept which makes the obsolete villages to a brighter future.

VII. CASE STUDIES

A. Janwaar Castle

Location: Panna, Madhya Pradesh ABRD Architects, Year 2015 Principal Architect: Anupam Bansal

1) Design Intent

- .Retain the traditional architectural features.
- To give the building a dramatic feel, add modernarchitecture to it.
- Self sustainability

2) **Re-use of Materials**

The broken tiles of the roof can be used in the floors and coping on windows sills and various other places wherever required

3) Increase height of the building

Steel trusses will be provided on the first floor, which will be a solution to the heights, the lighting and the Ventilation system.

4) Cross ventilation and traditional courtyard

The courtyard in the building is the most important part, it's the most interactive zone, stitching the entire building together and providing cross ventilation to each and every space.

5) Creating an interactive space

The Courtyard space can be a space for the Children, where they can do various activities such as art works, it can also be get together community space for the children.

6) Mixing modern and traditional

Certain modern elements will be added, and some traditional elements will be retained so as to add more character to each of the building.

7) Rain-water harvesting

The village is a drought prone area, hence we are providing awater harvesting system under the courtyard.

8) **Design Proposal**



Fig 1 Ground Floor Plan



Fig 2 First Floor Plan

B. Sabarmati Sports Complex

Location: Ahmedabad, Gujarat

HCP Design Planning & Management

The Sabarmati Riverfront Sports Complex is accommodated on two sites along the Sabarmati Riverfront, one on the east bank, in Shahpur, and the other, on the west bank in Paldi. Along with the comprehensive development of the SabarmatiRiverfront, this project formed a part of the larger vision of enriching the social and cultural hub of Ahmedabad's centralarea. Undertaken by HCP in the year 2019, the project is the first of its kind in Gujarat, and adds a unique addition to the vibrant and lively edge of Sabarmati.

The sports facility in Paldi occupies 8 acres of land, and lies between an events' ground, and a Senior Citizen and Children's Park. It has international standard training and competition facilities for tennis, basketball, volleyball, cricket & kabaddi, all in one campus. The facility also has children's entertainment zones, along with, relaxation zones and public fitness spaces for all age groups. Laid out along the exterior boundary of these spaces, is a 400 m shaded jogging track with lush trees lining its border. Most importantly, the facility hosts Gujarat's first skateboarding park with an international standard inline speed skating rink.

The facility in Shahpur is spread out over 2 acres on the east bank of the Riverfront. This facility also houses international standard basketball, volleyball and cricket facilities. With a shaded jogging track, this facility is also interspersed with children's play areas, and public fitness and relaxation zones. (Sabarmati Sports Complex, 2018)


Fig 3 Master Plan



Fig 4 Skatepark

VIII. FINDINGS

- Introduce the five to new ways of learning.
- Putting the individual child at the center of learning
- To fill in their gaps in Hindi, math, and social studies
- To grasp, understand, and apply the use of "digital"
- To learn for daily life (online banking, budget management, taking care of home, etc.)
- To define a set of values for themselves
- To then pass on what they have learned to the other children
- Sports, music, literature, and art are an integral part of learning
- Understanding the curves and the radius of the skateparks
- To design a enjoyable skatepark where everyone is able to ride a board. Somewhere between a beginner and a professional skatepark.

IX. CONCLUSION

To Introduce this sports in municipal school and build skateparks in government ground because as this sports don'trequire many equipment so it is better for the people with lowsocio economical people to enjoy this sport and also this sports is being recognised on many significant platforms including Olympics. This could change the life of many people.

As we see the old art in villages is depleting this could be a change to give a little revive to it where people can design artbehind skateboard. This could help a bit on the art sector.

Also the skateparks could be a canvas where artist come to design in the skateparks.

Professional Skateboarders

This sport attracts people to come in and have huge number of spectators. There could be events and competition of skateboarding.

Skill development

Construction of skatepark require skill labor, It is not easytask to construct the complex shapes. This could be a special skill learnt and have a employment among the community. There could be Skate magazine where there

are article about skateboarding and people doing the gnarliest tricks where all this could be documented in this magazine.

Economic upliftment

Skateboard manufacturing could be a thing which again increase the scope of the employment in the community.

Also we see the ladder for the skateboarding goes up till representing the country as this sports is officially now in Olympics.

- To bring hope and smile in a boring village
- To educate rural villagers about gender equality and other caste system
- Teach languages, match and about hygiene
- To teach them new skills and exposing them todifferent workshops

X. ACKNOWLEDMENT

I would like to express my special thanks of gratitude to my Guide Prof. Snehal J. Surve as well as our principal Prof. Rupali H. Gupte who gave me the golden opportunity to do this wonderful project, which also helped me in doing a lot of Research and I came to know about so many new things Iam really thankful to them. Secondly I would also like to thank my parents and friends who helped me a lot in finalizing this project within the limited time frame.

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TRIBAL CO-DESIGN AND IDENTITY PRESERVATION

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ABSTRACT

The Adivasi better known as tribals have existed in every part of India since the inception of human life has been recorded and analyzed. A tribe can be defined as a social section within a traditional society that consists of families that are connected through lines of economic, social, blood or religious ties, and also share a common dialect and culture. Tribes are a society, which is determined by their art, culture, and traditions. Indian tribal world is unique and least explored. Sadly, somewhere in the race of urbanization, they are losing their existence as a community. Due to a strong urge in understanding the tribal culture and integrating them with the contemporary world without disturbing their cultural identity, in the present day scenario, there is a rising need to sensitize people towards the aesthetic and cultural norms of the tribes. This can be achieved by reviving their art and architecture blended with modern-day inventions which will develop a cultural connection with the target users. An honest attempt has been made to study and understand the reason behind the lost identity of the tribal population in India. The development of the tribes with emphasis on social, economic and cultural growth can further provide a progressive growth pattern to the entire region. The interim product aims to initiate further ideation, discussion and hopeful action for overall community development across India, where there is a need and will for upliftment.

Keywords—Tribals, urbanization, cultural identity, overall community development.

I. INTRODUCTION

India's culture is among the world's oldest civilizations. Indian civilization began about 4500 years ago. The traditional and epic pieces of literature, the Vedas, the Puranas, the Ramayana, and the Mahabharata emphasize that India is inhabited by several types of tribes or folks. The first settlers of India are our direct ancestors and about 50-60% of Indian genetic ancestry comes from them. First settlers are the bedrock of our population and civilization and human history in the subcontinent begins with them. The country has various interactions between species and abiotic environments that combine to form the existing patterns of community relations that we see today. The population is the descendants of various small groups recognized as janjatis (tribes) that are often forgotten, boycotted, and belittled.

A. Background of the study

A visual of half-naked men and women, with spears and arrows in their hands, feathers in their heads, and speaking a distinct language; come to our mind when we come upon the word 'tribal'. There have been communities still living in line with their ancient values, customs, and beliefs, where they could continue to live in peace with nature and their unpolluted surroundings, even when the bulk of communities in the world kept changing their life-styles in haste to stay up with the "progress" of the planet. The mainstream world, thinking they are civilized people branded these communities diversely as Natives, Aboriginals, Adivasi, Uncontacted folks, etc. Yet in reality, they are stagnant yet volatile at the same time. Primitive traits, geographical isolation, distinct culture, shyness of contact with the community at large, economic instability, are some of the essential characteristics of the tribal community. Their social, cultural, and economic conditions distinguish them from the national community.

India rightly has been described as a "melting pot" of races and tribes. India is characterized by having the second largest tribal population in the world after Africa. While 43% of the non-tribal population depends on agriculture, 66% of the tribal population survives on the primary sector livelihood sources. There is a declining return from direct farming or people simply doesn't have the resources to do farming. In the absence of any other alternative, people are leaving their birth lands and moving to urban areas in search of opportunities.

Some of the major reasons for migration are as follows:

Urbanization - Urbanization has been a serious driver of internal migration. A rise within the demand for labour in urban areas can attract urban wages and increase migration. Rates of urbanization influence rural-urban wage differences.

Employment - People also migrate in large numbers from rural to urban areas in search of employment in industries, trade, transport, and services.

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Education - Due to the lack of instructional facilities in rural areas, people migrate to the urban areas for higher education. In the 2011 census, about 1.77% of individuals migrated for education.

Lack of security - Political disturbances and interethnic conflicts drive people far from their homes. People conjointly migrate on a short-run basis in search of higher opportunities for recreation, health care facilities, etc.

Push and Pull factors - Two principle factors- push and pull are responsible for migration. Pull factors attract migrant to a region (area of destination), like, employment and better education opportunities, higher wages facilities, better working conditions.

B. Need for study

Like other societies, tribal society is also not static, rather relatively dynamic. Their transformation process is very slow. They also face many problems. The social and profitable reality of people compels them to migrate to destinations, which give some stopgap for betterment on either front. Migration has been one of the major managing mechanisms of tribes to escape the lack of livelihood openings in their places of origin. This has created a gap between the societies. Even though migration was seen as the stylish possible result to the utmost of the problems faced by the tribal population, it had its consequences. Migration affects both the area of origin of migration and the areas of destination of the migratory population.

The consequences faced by tribal communities are : Demographic consequences - Migration changes the age and sex composition of the population with the rate of growth of the population.

Social consequences - Migration results in the integration of different societies and leads to the evolution of compound culture. It shatters the narrow thoughts and widens the mental horizon of the people.

Economic consequences - Migration changes the resource-population ratio. Migration affects the occupational structure of the population. The population of receiving areas becomes more productive.

Environmental consequences - The large-scale movement of people from rural to urban areas causes overcrowding in metropolises and puts heavy pressure on resources. It causes erratic growth of cities and causes slums lacking introductory infrastructural facilities.

Other consequences - Migration enhances remittances to the source region but causes heavy loss to human resources, in terms of professed labor.

C. Scope of the study

Migration is a movement of people from one place to another in search of employment, better educational and health facilities, etc. It has its consequences and affects both the rural and urban areas. So, there is a need to provide employment facilities in rural areas to minimize the rural to urban migration and to prevent a major shift in population. Restriction on forest dwellers, Exploitation of forest dwellers, Development programs have led to the migration of tribal population in the name of government proposals. The scope of the project is more in the areas where the tribal population is concentrated and accepting of the socio-economic development. The state of Madhya Pradesh has the largest population of tribals in India. Major tribes of Madhya Pradesh are coping with the problems faced due to the development programs. The approach is to understand different communities, analyze their current situation and strategically design a program for their upliftment.

D. Research gap

There is a vast difference between image and reality.

Lack of opportunity for tribal population in the rural area.

Enforced Migration is not the best-provided solution.

Rural areas are not seen as a center for economic activities.

Lack of infrastructure for tribal and rural development.

E. Hypothesis

Relooking at interventions that bring an overall development in the tribal community by retaining their sociocultural aspect, privacy and respect that needs to be achieved.

F. Aim

To find interventions that were done for the economic growth, identity, and community development of the tribal community.

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II. LITERATURE REVIEW

G. Understanding the tribes of Madhya Pradesh

The tribes of Madhya Pradesh that have involved themselves with the mainstream development areas due to the need for upliftment are Gond, Bharia, Bhil, and Saharia tribes.

Gond tribe - Gond tribe does not have a uniform cultural or socio-economic identity. In Madhya Pradesh, they inhabited the dense forests of the Vindhyas, Satpura and Mandla in the Narmada region of the Amarkantak range for centuries, and are mostly found in the Chhindwara district of Madhya Pradesh. The Gonds, for centuries, were settled farmers and cultivated their land. They suffer exploitation and discrimination and often are forced to live on less productive lands in remote areas.

Bhil tribe - Bhils have settled across the hilly terrain of western Madhya Pradesh as the main populace for centuries now. They inhabit majorly in the Dhar, Jhabua, Ratlam, and Khargone districts of Madhya Pradesh. . Their economy is based on agriculture. When the monsoon fails, Bhils migrate to Bhopal, Kota and Delhi to work as construction labour. The Bhils decorate their house with simple materials such as clay relief work and paintings from natural colours.

Bharia tribe - Their main concentration is at the Patalkot valley in the Chhidwara district of Madhya Pradesh. Apart from this, Jabalpur district and its adjoining regions of the state are also inhabited by the people of Bharia Tribe. The region where this tribe dwells is quite rich in medicinal plants and the tribal people possess deep knowledge about them.

Saharia tribe - The Saharias are mainly found in the districts of Morena, Sheopur, Bhind, Gwalior, Datia, Shivpuri, Vidisha and Guna districts of Madhya Pradesh. The society of this tribe is divided into several subgroups. The Sahariyas are expert woodsmen and forest product gatherers. The main business is gathering & selling forest products. Tattooing is one of the traditional art of adorning women in the tribal region.

The current situation of a tribe concerning, their economic, political, socio-cultural acceptance towards the society forms the mould of the further study. Understanding the community, and gaining their support and respect thus, becomes an important factor for any intervention to be possible around them. Of all the tribes described above, The Bhil tribe is found to be the appropriate study.

H. Possible interventions on Bhil tribe of Madhya Pradesh

Many NGOs working on the upliftment of the Bhil tribe in Madhya Pradesh on a social level as well as some government schemes proposed to involve the tribe with an urban environment. All of these initiatives and interventions have led to the betterment of the tribe over the years. People from the tribe are overcoming the social stigma with the help of such interventions. But, there is an absence of a built form to connect the tribe with itself and the increasingly urban environment.

NGO	Program
Adivasi Chetna Shikshan Seva Samiti	Children
Azad viklang kalian samiti	Right to information and advocacy
Bhilanchal tribal welfare & education society	Art & culture
District management team drdc jhabua	Aged/elderly
Samarth samudayik vikas samiti	Agriculture
	Animal husbandry
Shivganga	Afforestation
	Water conservation
	Youth empowerment
	Livelihood & entrepreneurship
	Women empowerment
SARTHI	Women empowerment
	Natural Resource Management
BHILS	Education
	Health and hygiene
	Eco-friendly farming
	Women empowerment

Table I. List of NGO's working around Jhabua district of Madhya Pradesh

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I. Background study of Bhil tribe of Madhya Pradesh

Bhils belong to the race of the pre-Aryans. The area occupied by the Bhil is the forested lands of the Vindhya and Satpura hills in the western portion of central India (i.e. state of Madhya Pradesh).

Lifestyle - Women of Bhil tribes wear traditional sarees, skirts, bodices and men wear loose long frocks along with pyjama. The peasants wear turbans and Bhils also wear brass ornaments. The Bhils' traditional weapon, however, is the bow and arrow. Traditionally, Bhils live in small, dispersed hamlets known as *phala*, which are occupied by families of the same clan. Each settlement comprises a hut or group of huts standing alone in the middle of an area of cultivated land.

Unique Identity - Among the Bhils of Jhabua, Pithora painting is a ritual held in great esteem. Pithora horses are painted by the lekhindra, the traditional painter and offered to the devas. Paintings are inspired from the everyday life of the tribe.



Fig 32. Pithora painting by Geeta Baria

Occupation and rituals - The Bhils, like all *Adivasis*, live close to nature. During every festival, the Bhils dance the *Garba* and through their songs, invite the goddesses to join them. Bhil religion is essentially animistic. It is the belief in the powers of supernatural forces and the need to order one's relations with these forces that dominate Bhil religious life.

Skills and crafts - Art is integral to the Bhil community. Rough wooden posts of carved human figures are sometimes used as memorials to the deceased. Some Bhils sport tattoos, many in the form of crescent moons, stars, and flowers.

Vernacular Architecture – A Bhil village, whose boundaries are marked by bundles of grass tied to trees along paths and roads, is composed of anywhere from three to forty families inhabiting houses set far apart from each other. The Bhil erect their houses on the tops of the hills with their fields surrounding them, thereby allowing them to maintain constant security over their crops. . Each village has land reserved for communal use, such as for cattle pasture, for roads, for a village cemetery, and the community threshing floor.

Traditional Knowledge - For epidemics, Bhils may resort to building a toy cart that they consecrate and take to another village, whose people, in turn, take it to the outskirts of another, and so on, until the cart has reached a remote portion of the forest. Since Bhils believe that illness is caused by the displeasure of the spirits, they are indifferent to practitioners of modern medicine.

III. METHODOLOGY

J. Case study 01 : MP Tribal Museum		
Location	:	Bhopal, Madhya Pradesh
Architect	:	Kamath Design studio
Community	:	Seven major tribes of Madhya Pradesh
Client	:	Adivasi Boli Vikas Academy, Bhopal
Category	:	Art Administration and business centre
Site Area	:	28328 sq.m (7 acres)
Built-up Area	:	13000 sq.m
Year	:	2013

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The tribal museum is constructed on Shyamala hills, which is situated in the city of lakes, Bhopal. The museum of Tribal heritage at Bhopal is a reflection of art, culture, myth and habitation of major tribal groups found in Madhya Pradesh. The well planned & sprawling campus is divided into 6 galleries depicting Cultural Diversity, Tribal Life, Tribal Art, Tribal Mythology, Tribals of Chattisgarh and Tribal Games. It also has Art Exhibition Gallery and Open Air Theatre. All the artefacts in Galleries are majorly taken from 7 major and most important tribes of state namely Gond, Bhil, Korku, Kol, Bharia, Baiga and Saharia.

This place is an ode to the tribal art and culture of the region. The lives of the region's seven tribes are being celebrated here via their craft.



Fig 2. Outside view of the museum

The Museum is designed to create a built fabric that the tribal communities could identify with, extend, and evolve, to represent themselves and express their ideas and way of life with ease and spontaneity. The design is based on creating an environment similar to the tribal settings and also on enabling the visitors in understanding the intricacies of tribal life.

The program spread across 7 acres on the site is designed in such a way that it involves the tribal community and provides them with a platform to evolve and express themselves. It also provides them with an opportunity to connect with the urban world and to generate economy at the museum.

Conclusion - This tribal museum is very thoughtfully planned and the entire campus is theme-based right from the entrance. Every artwork has some meaning to it which is beautifully depicted. Its architecture is inspired by the rhythms, geometries, materials, forms, aesthetics and spatial awareness of the tribes, allowing it to integrate harmoniously into its context.

K. Case study 2 : Khamir Craft Institute

- Location : Kukma, Bhuj, Kutch
- Architect : Neelkanth Chhaya
- Execution : Hunnarshala Foundation
- Community : Traditional communities of Kachchh
- Client : Nehru Foundation for Development, Ahmedabad
- Category : Schools and institutes.
- Site Area : 8093.71 sq.m (7 acres)
- Footfall : 11000 visitors annually
- Year : 2007

Khamir is an NGO that works to strengthen and promote the rich artisanal traditions of the Kachchh district. The name stands for Kachchh Heritage, Art, Music, Information and Resources. Khamir means 'intrinsic pride' in Kachchhi, the local language.

At Khamir, the idea is to create a democratic and empowering space - a common roof under which a range of stakeholders can exchange ideas and collaborate. They work to shift consumer perspectives and raise the

cultural value placed on crafts. The vision is of a vibrant, sustainable Indian craft sector in which crafts and artisans alike are highly valued by people worldwide.



Fig 3. Outside view of the institute

The institute is derived from the local streetscape and village pattern noted before the earthquake. The planning thus forms courts and chowks that accelerate the community spaces throughout the campus. The complex has a combination of mainly three forms. The workshop area, Administration and residential. All the forms are repetitive except the toilets and part of the administration.

The building was set in the extensive program where not only would studies in Kutch culture be undertaken, but it would also serve as a multipurpose nucleus for interaction between craftspersons and designers, development of craft techniques and use of materials, business and documentation support, training and enhancement of skill achieving, data-banks and traditional knowledge systems and sales and marketing.

Conclusion - The structure is rooted in vernacular techniques which provides an identity while capturing the spirit of the region. It preserves the vibrant culture steeped in craftsmanship in its way.

A well planned economic model to support, sustain and nurture the knowledge of the diverse craft forms. Documentation of craft techniques, skills, and use of materials through infrastructure.

It establishes a kind of urban approach having integrity and involvement.

L. Case study 3 : Tjibaou culturl center

- Location : Nouméa, New Caledonia
- Architect : Renzo Piano Building workshop
- Community : Kanak culture and community
- Client : Agence pour le Développement de la Culture Kanak
- Category : Community and cultural centre
- Site Area : 8550 sq.m (2.11 acres)
- Year : 1998

The Jean-Marie Tjibaou Cultural Center (Centre Culturel Tjibaou) was built to mimic the villages of the local Kanak people. The centre is aimed to present and promote the indigenous **Kanak** culture, its traditions, languages, craftsmanship, and arts. An understanding of the development of Kanak culture was a vital part of this project – becoming familiar with Kanak history, environment and beliefs made it possible to design a building that would fit within this context.

Taking inspiration from the Kanak people's deep ties with nature, the project sought to meet two main objectives: one was to represent their talent for building, and the other was the use of modern materials. To reflect the impermanent living culture, the overall monumental and lightweight sculptural form of the centre gives a less significant permanent existence.



Fig 4. Outside view of the center

The Centre is a cluster of 'huts', small pavilions and tree-filled spaces. It is located on a spit of land called the Tina Peninsula, surrounded by water on three sides. The cultural centre is modelled after a traditional Kanak village, and the pavilions were inspired by Kanak huts. It was designed with a strong emphasis on the utilization of natural ventilation considering the location and planning on-site. The semi-circular layout is inspired by the huts to achieve natural ventilation while defining open communal areas.

The centre consists of ten circular pavilions, of three different sizes, inspired by the traditional cone-shaped wooden hut, called *Grand Case*, which forms the main venue for the activities of New Caledonia's villages as well as the residence of their chiefs. All of them are connected by pedestrian walkways in the form of spokes evoking the central promenade of traditional villages.

Conclusion - The centre acts as a cultural expression of the region and the community. The culture centre brings identity to Kanak culture where the community was the focus throughout the design process. Kanak tradition is not in a single building, but in the topology and the pattern of construction, which is symbolized through the building. The building influences modernity through its derivation of form, use of materials and thoughtful utilization of the surrounding.

M. Case study 4 : Inuit Housing

- Location : Inuit Nunangat, Canada
- Architect : Studio Southwest Architects
- Community : Inuit community
- Client : Inuit community
- Category : Community Housing
- Year : 2017

The term *Inuit* means "people" and it refers broadly to the Arctic indigenous population of Alaska, Canada, and Greenland. Today, the *Inuit* communities of Canada live in the Inuit Nunangat—loosely defined as "Inuit homeland"—which is divided into four regions. For centuries these communities have relied on their natural resources, strong leaders, and innovative tools and skills to adapt to the cold, harsh environments of the Arctic north. There are almost 12,000 inhabitants living in 14 villages along the coast of Hudson Bay and Ungava Bay region.





Fig 5. Outside view of the housing

In Nunavik, traditional ways of life are important to the cultural identity and well-being. The overriding theme for the Inuit housing project was that sustainable housing design would go beyond technical issues of safety, energy and environmental considerations to embrace and emphasize "cultural responsiveness and empowerment." Overall, the success of the project relies heavily on the ability of all parties involved to convey the culture and values of the Indigenous people effectively as well as to incorporate innovative design elements.

Designing and building housing suitable for the families in the northern environment was a challenge. It is tackled collectively through a pilot project; a duplex designed as a prototype of sustainable housing that can be built throughout the region.

A program was designed with ideas and innovative solutions that are a good balance- not luxurious or elaborate, but practical, to code and keep tenants safe. Requirement of greater insulation and air-tightness, better quality doors and windows, and reduced thermal bridging, etc. were the standards.

Conclusion - The building resonates with the community and it not only recognizes the community identity and involvement, but also contributes to carrying on that identity through the design. The collaborative process is seen as the final result of the project.

Improved, flexible, and direct access to programs designed to reduce housing need, and related infrastructure development. Effective research and innovation, and statistics gathering with inter-governmental collaboration.

IV. CONCLUSION

N. Findings from case studies

Each case study presents a detailed study about the set of requirements needed to design a community based structure. Overall study of all the possible categories is achieved. A specific identity of the respective community is reflected through architectural expression. Initiation of every project was formed with community development as the base idea.

People from each community participated at every stage of the building process. Considering the impact factor of every project, further research is carried out on a specific tribal community to understand what could be the possibility for increasing the impact factor for the upliftment of that tribe.

The impact factor of community and culture center is the most as compared to the other three asstes such as Community housing, Art and administration and business centre, Schools and institutions.

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RE-VISIONING URBAN BUS DEPOTS - CASE OF MUMBAI

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ABSTRACT

An urban infrastructure is often seemed as a complete and developed environment full fledge with all the basic necessities needed for a human being. The services related to education, health, transportation, etc. are provided with a greater reach comparing to the rural parts. These provisions further leads to the growth of an urban area. However the needs of every urban area changes over the period of time with growing population. If the progress of fulfilling these changing needs doesn't match with the time and neglected, the same city with full-fledged services starts to compromise on certain needs leading to an unsatisfied living environment for its residents.

This thesis portrays some of the changing needs of the commercial capital of India, Mumbai. Similar to any other city in the world undergoing drastic development, Mumbai is changing its character with respect to time. The dramatic growth in population within the limited land area is forcing the residents of Mumbai to compromise on their standard of living. The problems raised due to land scarcity in Mumbai includes lack of parking, public open spaces and public amenities for the common residents of the city. Revitalizing the bus depot lands and developing them as a model which can be replicated throughout Mumbai for solving these problems can be proved as solution for the future of Mumbai and its residents. This thesis includes research based on the statistical data from trusted sources, surveys of the city residents and ground level personal experiences related to the problems living in Mumbai. The conclusions and solutions are an attempt for the betterment of standard of living of the residents of Mumbai.

Keywords - Parking, Public Open Spaces, Revitalizing, Bus Depots

INTRODUCTION

Description of Topic

Bus Depots are one of the largest landmasses in any urban area. With context to Mumbai the average size of a bus depot in the city is around 6-7acres.Like many major cities in the world Mumbai too is facing the issue of scarcity of land on a severe note. The problems raised because of the scarcity of land are restricting the growth of the city to some extent. While the city is thriving for the new land for the development, these bus depots are only used as a parking lots and garages for the city buses. These large landmasses are not used in an optimum way which can actually solve many of the land scarcity related problems of Mumbai.

To match up with the pace of development with being sensitive towards the standard of living of the residents of the city these bus depots lands should be re-visioned and re-vitalized for many other activities.

The problems raised due to land scarcity in Mumbai includes lack of parking, public open spaces and public amenities for the common residents of the city. Revitalizing the bus depot lands and developing them as a module which can be replicated throughout Mumbai for solving these problems can be proved as solution for the future of Mumbai and its residents.

ABBREVATIONS

B.E.S.T- Brihanmumbai Electric Supply and Transport

B.M.C- Brihanmumbai Municipal Corporation

DP- Development Plan

UDCPR- Unified Development Control and Promotion Regulations

ECS-Equivalent Car Space, MPA- Mumbai Parking Authority

BACKGROUND STUDY HISTORY OF MUMBAI

The earliest documented human history in Mumbai dates back to 1st Century BC when Mumbai was ruled by the Maurya Empire. The prominent Kanheri caves built during this era are considered as the oldest structures in Mumbai. The word 'Kanheri' is derived from the Sanskrit word 'Krishnagiri'. (Economist, 2008)

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The European powers developed an interest for the island in 16th Century. Among them the first were the Portuguese. The Portuguese captured the islands from the Gujarat Sultanate and built forts of Mahim, Bandra and Worli. Portuguese named these region as 'Bombay' meaning a good bay. During the 17th Century the British Empire were gifted these islands in the form of dowry from the Portuguese. Eventually it became one of the first colony of Britain in India. The East India Company acquired these islands from the British Empire after recognizing the potential of building a port in future. Subsequently a fort was built in the early 18th Century in today's Fort area and a port was built on its eastern coast. This port was used to export cotton, spices, opium, etc. to England.

With the establishment of port migrants from other parts of India started to migrate in Bombay to earn as traders and laborers. The population of Mumbai began to increase. In 18th Century the creeks and marshy lands in between the islands were reclaimed by the East India Company. In 19th Century the city witnessed the huge growth in population with the establishment of textile mills. Further in 1947, when India got its independence from British Empire, Mumbai became part of India. 1n 1960 the when the states were form on the linguistic basis Mumbai became part of Maharashtra. Today Mumbai serves as capital of the state of Maharashtra and the financial capital of India.

INDUSTRIALIZATION OF MUMBAI

Mumbai (then Bombay) was a major port on the west coast of India which used to export cotton, spices, opium, indigo, etc. to England. Cotton was produced in a large extent in the central provinces of India. These cotton was then brought to Mumbai was shipped to England. In 1849, the British launched the Great Indian Peninsular Railway. In 1853 the first Railway in India was runned from Thane to BoriBunder. With the competition of Railway line the raw material was easily transported to Mumbai from the other part of India.Due to the availability of cotton and limitation in transporting raw cotton to England. The British developed an idea of making finished produced out of cotton within India and then exported to England. As a result first Textile Mile was started in Mumbai in 1854.

In early 19th Century, as a result of American Civil War the cotton export to England from America blocked. This resulted in India being largest exporter of Cotton finished products for English. This boosted in production of cloth in the city with establishment of many textile mills. Within a century the textile mills number went from 1 to around more than 100. Even after the independence by the end of the 19th Century, textile mills were contributing in a huge financial growth of the city.

POPULATION GROWTH IN MUMBAI

In late 19th Century the city witnessed its first major wave of population growth in form of mill workers. People from main land started to migrate to the city in search of job opportunities. With the increase in population the other associated businesses started to develop in the city. During the Independence of India the population of Mumbai was around 2.5 million.

After the independence of India, Mumbai started developing as country's financial capital. Many people from the other parts of the country (mostly rural) started migrating to the city in search of better job opportunities. The growth in population resulted in hike of housing leading to growth of real estate industry. Today in 2021, the population of Mumbai is around 20 million s almost 10 time of what during the Independence. The population is more than doubled from what in 1991. Till 2030, it is estimated that the population of Mumbai will reach around 25 million with growth of around 0.5 million in 1year. Population Density-Mumbai is among one of the most densely populated city in the world. The density of population in Mumbai stands around 73000 per square mile. Around 40% of city's population lives in slums. (world population review, 2021)

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SPREAD OF MUMBAI'S LAND BOUNDARIES



Figure 1 Spread of Mumbai

The northwards movement along rail and road corridors comes first. Next, the areas around these communication links were developed. Third, these areas extend outwards involve reclaiming land next to creeks and mangrove, and slopes in the hills of Salsette were colonized too. The major railway stations have areas around them that have become shopping fronts. The reclaimed areas house the wealthier middle and upper classes, but poorer people built huts in and amongst these areas and full shanties grew on the poorest quality land.

The agricultural land and forest cover which were once domination the land use of Mumbai were replaced by the buildings and other infrastructure.

INCREASE IN BUILT UP AREA IN MUMBAI

With the increasing population and urbanization of Mumbai the land use of Mumbai changed drastically over some decades. Over the last 4 decades the built up area in Mumbai increased by 350% according to the study done by IIT Bombay. Subsequently being an island city over the period of time Mumbai started witnessing the land scarcity and the restriction in its growth.



Figure 2 Increase of built up area in Mumbai

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SHRINKAGE OF OPEN SPACES

Mumbai plays poor in the availability open spaces compared to the other cities across the world and even in India. Because the area of the city is very less compared to the other major cities in the world, majority of the land is occupied by the built structures in the name of development.



Figure 3 Children playing in the streets of Mumbai

Comparison of Mumbai with other major cities with respect to open space-

Open space for an individual -

According to Urban Planning criteria- 20 sq.m/person

London- 50sq.m/person

Delhi- 15sq.m/person

MUMBAI- less than 2 sq.m/person

The BMC's current land use shows that open spaces form 3.7 percent of the total area of the city.

The 2014 development plan has proposed reserving a uniform four square metres of open space per capita across the city.

PARKING ISSUE IN MUMBAI



Figure 4 Cars parked in Hindu Colony in Dadar, Mumbai

Mumbai is one of India's most congested cities by virtue of the number of vehicles (about 34 lakh vehicles registered till 2019), complicated by its linear shape. Though the Mumbai Municipal Corporation did ensure 30 multi-storey parking lots and about 14 amenity plots for parking ensuring 25948 equivalent car spaces (ECS) for parking across the city, the measures seem inadequate.

Vehicle numbers in Mumbai have jumped from 20.3 lakh to 32 lakh, up 56 per cent in five years. The number of vehicles added to city roads every day is close to 700. Around 70% of the vehicles registered in Mumbai are parked on the roads.

B.E.S.T BUS DEPOTS IN MUMBAI

The B.E.S.T (Bombay Electric Supply and Transport) was formed in 1873 to provide the electric and transportation to the city. The B.E.S.T started its intercity bus service in 1926 and over the period of few years

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spread its service throughout the city. Eventually the bus depots were built with intermediate intervals in various parts of the city.As of today there are total 27 B.E.S.T bus depots in the city with average area of around 6.5 acres. These depots are used for parking, maintenance and as fuel stations.

According to the regulations in UDCPR and Mumbai DP remarks 2034 these bus depots can be converted in other structure apart from transportation activity with the special permission from the authority. According to UDCPR construction can be done of 40% of bus depot area without hampering the bus depot activity.

WORKING OF A BUS DEPOT

Overview

A bus depot (or bus garage) is where buses are sheltered, maintained and parked. It is comprised of facilities for service/repair, washing and fuelling of buses; offices for administrative functions; and parking spaces for buses, and vehicles of staff and visitors it also includes amenities like changing rooms, resting rooms, and other necessary facilities for the depot crew (drivers, conductors, and office and workshop staff). (SGA Architects, n.d.)



Figure 5 Bus depot in Borivali, Mumbai

Components of Bus Depot

Following are the components integral to a bus depot:

- 1) Entrance/Exit
- 2) Internal Parking (bus)
- 3) External Parking (private vehicles)
- 4) Fuelling
- 5) Cleaning/Washing
- 6) Maintenance
- 7) Storage
- 8) AdministrativeFacility

Fueling -Liquid Based Fuelling Station, CNG Fuelling Station, Electric Charging Station

Daily Operations in Bus Depot

Allocating buses and their crew for each duty/trip,Dispatching buses according to schedule ,Processing ticket sales, and cash deposited by conductors (or drivers), Managing parking facilities for visitors and depot staff (including bus crew), Limiting the activities of drivers, conductors, operating crew, and visitors to their relative area.

Time Wise Operations in Bus Depot

BEST bus parking- 10pm -6am, Public Parking- 8am- 8pm

Admin- 10am- 6pm, Maintenance, Fueling, Washing- 11pm- 4am

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RE-VISIONING GREEN SPACES ABOVE BUS DEPOTS

The following is the calculation for increased green open space if each BEST bus depot in Mumbai is redeveloped-

If roof garden is designed on the proposed development-

Average Area of a bus depot - 3 lakh sq.ft/ per depot

Total bus depot in Mumbai - 27 depots

27 x 3lakh = 81 lakh sq.ft = 752514.62 sq.m =185.95 acres

Approx-186 acres

40 % of 186 = **75 acres**

(As UDCPR allows 40% area of total depot plot for commercial development)

75 acres of increased green open spaces. AIM, OBJECTIVES

AIM

To develop a multi leveled structure above bus depots as a model which can be replicated in Mumbai with programs of parking, green open spaces and the public amenities.

OBJECTIVES

To include the infrastructure needs for the residents of Mumbai. (Parking, open green spaces and public amenities)

To increase the revenue generated on the site.

To provide an option for development in the city which is facing scarcity of land.

LITERATURE REVIEW

1. Shrinking Spaces leaves Mumbai Grasping

Source- Times of India

https://timesofindia.indiatimes.com/city/mumbai/shrinking-spaces-leave-mumbai-gasping/articleshow/11548789.cms

Overview

The article compares the condition of the open space ratio of Mumbai with the other cities in the world. There is no adequate space for kids to play resulting in kids playing on the streets, parking lots, etc. Even comparing with the other metropolitan cities, Mumbai is ranked among the worst in terms of open spaces. Bombay High Court on a judgment on mills in 2005 stated that the upcoming generation of Mumbai may face severe mental issue due to the unavailability of the open space.

Inference

Comparing to the other major cities in the world, Mumbai is proved to be one of the worst in terms of open space. Residents of Mumbai are thriving for the open spaces within their locality of residence. There is serious need of proposing options of landmasses within the city which can be used as a public open space to resolve or minimize this problem which is compromising the standard of living of residents of Mumbai.

2. The Mumbai Project: Parking a problem, 21 times over

Source- Dec 2007, Hindustan Times

https://www.hindustantimes.com/india/the-mumbai-project-parking-a-problem-21-times-over/story-QThZEfPdrJqjHt2HbtwH3H.html

Overview-

The city has over 15.6 lakh registered vehicles and a huge number of floating vehicles. The Mumbai Environmental Social Network (MESN) in its survey found that one in every three vehicles plying on the streets is registered outside the city.

The number of vehicles in the city is currently rising at 9 per cent every year, even as the human population grows at two per cent annually. Not surprisingly, no city in the world has been able to provide "adequate" parking for its vehicles. In India, the reverse is happening. Additional parking space is being planned and parking remains unregulated. At any given point in time, more than two lakh cars are parked on Mumbai's

roads. And 70 per cent of these are parked in places where parking is prohibited, according to the MESN study. (Neha, 2007)

INFERENCE

The research states that 70% of the vehicles registered in Mumbai are parked on the road. Due to this inadequate parking spaces the BMC has suggested some alternative lands as parking lots with tariffs. As a result of this multi storeyed parking were developed by the real estate developers and were handed over to the City Corporation. Also the underground car parks were proposed by the BMC which was challenged by some of the city based NGOs.

3. LET'S BRING TO FRUITION, THE IDEA TO USE BEST'S BUS DEPOTS AS PLAYING GROUNDS

Source- 25 June 2021, Akansha Ahire

https://youthincmag.com/petition-to-use-bests-bus-depots-playing-grounds

Overview

A petition was started by a 16 year old footballer Abhibhav Dujodwala to use spots above B.E.S.T bus depots as sports ground. The petition was launched on 18th June and has received a positive response from many. As informed by Dujodwala, with a limited space like Mumbai, the BEST29 bus depots cover over 8,54,695 sqm of space. Utilizing this space for recreational purposes can be a game-changer. The 16-year-old explained that since BEST is running into losses as it is, these paces above the depots can be rented for setting up grounds and thus earn additional revenue.

Abhibhav has informed in his petition on change.org that these 29 bus depot spaces from Colaba to Vashi is equivalent to 800-900 cricket nets or 17 international size football fields.

Inference

As an architecture student one should contribute in this cause by proposing a design for such development. Along with sport ground various other activities can also be added in the proposal.

Considering the space related problems of Mumbai, this idea can be value added and be implied on a bigger level.

METHODOLOGY

The research process initialized with the background study of the city of Mumbai with respect to the chronological development and growth. The stages covered are-

- 1. History of Mumbai
- 2. Industrialization of Mumbai
- 3. Population Growth in Mumbai
- 4. Increase of built up area in Mumbai

The study further focusses on the issues raised due to the urbanization of the city. The stages covered are-

- 1. Land Scarcity in Mumbai
- 2. Shrinkage of Public Open Spaces
- 3. Parking Issue in Mumbai

The need of landmass options within the city to minimize the land related problems of Mumbai and the study of bus depot plots as one of the best option with criteria, justifications and calculations is finalized as a solution. The stages includes-

1. B.E.S.T Bus depots

2. Working of a bus depot

3. Re-visioning B.E.S.T bus depots

In the final stage the literature related to the topic and case studies are reviewed, analyzed for the final conclusions and proposals.

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Figure 6 Salesforce Centre

CASE STUDY – 1 SALESFORCE CENTRE, San Francisco, USA Architect's Description-

"Salesforce Transit Center is a state-of-the-art multimodal transit station in downtown San Francisco, linking 11 transit systems and connecting the city to the region, the state, and the nation. The innovative, highly sustainable design includes a 2.2-hectare (5.4-acre) rooftop park that anchors the growth of a new mixed-use neighborhood." (Pelli Clarke Pelli Architects, n.d.)-PelliClarkePelliArchitects

CASE STUDY – 2



Figure 7 Park N Play

PARK 'N' PLAY, Copenhagen, Denmark

Architect's Description-

"The starting point for the competition project was a conventional parking house structure. The task was to create an attractive green façade and a concept that would encourage people to use the rooftop. Instead of concealing the parking structure, we proposed a concept that enhances the beauty of the structural grid while breaking up the scale of the massive façade. A system of plant boxes is placed in a rhythm relating to the grid, which introduces a new scale while also distributing the greenery across the entire façade. The grid of plant boxes on the facade is then penetrated by two large public stairs, which have a continuous railing that becomes a fantastic playground on the rooftop. From being a mere railing it transforms to becoming swings, ball cages, jungle gyms and more. From street level, the railing literally takes the visitors by the hand; invite them on a trip to the rooftop landscape and amazing view of the Copenhagen Harbor." (JAJA Architects, 2016)

CASE STUDY – 3



Figure 8 Vanke Community Centre

VANKE COMMUNITY CENTRE AND BUS STATION, Shenzhen, China

Project Background

The project is located in Nanshan district of Shenzhen, which is part of the 05-01/05-02 plot of Cloud City, project planned by Vanke, with a total land area of 3,7010.4 m2 and a total construction area of 41,585.13 m2. There are two-story on the ground and two-story underground, and the building height is 9.9m, including urban park, bus terminal, commercial and office.

The site was divided to very dense mini-plots to be designed by different independent firms from Shenzhen, Shanghai and Beijing. In a partnership, UV and Huayi design three mini-plots hosting offices, a bus station, a mechanical parking and traffic facilities. (UV Architecture, n.d.)

FINDINGS AND ANALYSIS OF CASE STUDIES

1. SALAESFORCE PARK, San Francisco, USA

Being a transit structure and due to the area, Salesforce Park attracts more crowd comparing to the other two cases. The design interventions according to the site context are appreciable. Because the park is surrounded by the high rise commercial buildings, a skin is added to the façade to maintain the privacy and minimize the noise. The use of light wells also reduces the energy consumption which is an important factor in public used structures. The vertical stacking of spaces with different activities and the vertical transportation system is another feature which is appreciable.

2. PARK 'N' PLAY, Copenhagen, Denmark

A simpler plan with major feature of car parking. Roof Top Park is designed in a minimal way with a single theme. The possible monotonous façade is made interesting by adding grids and green screens. The entire structures seems living because of the green façade. The social behavior of residents are kept in mind with addition of well-designed signages and murals on the staircase wall. However the access to the roof top garden majorly through staircase seems challenging, effecting the end users.

3. Vanke Community Centre, Shenzhen, China

A community space for a township with many activities of open spaces, bus terminal, car parking, offices and public commercial amenities are planned in a comparatively huge plot than the other two cases. The design of landscape and the massing of the structures reflects the site context. The pathways between the built structures are design with playful and interesting elements. The overall project reflects a great balance between the built and the unbuilt spaces.

CONCLUSIONS AND PROPOSALS

With an approximate distance of 7-8 km between every two B.E.S.T Bus depots, they are spread throughout the city on intermediate intervals. Hence bus depots can be proved as optimal, accessible and among the best landmasses which can be relooked and revitalize.

To resolve mentioned problems of Mumbai with the provision of B.E.S.T bus depots as an option of landmass for the development, the proposal is to develop a module of multi–leveled spaces above the bus depot which can

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be replicated at every bus depot in Mumbai in similar basis, thus catering the neighborhood and eventually minimizing city's problems by provision of necessary infrastructure.

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REIMAGINING AFFORDABLE HOUSING WITH SOCIO-CULTURAL ASPECT

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ABSTRACT

Housing in Mumbai is a complicated issue, and one of the hardest challenges faced by the government as well as privet developers. Affordable housing is most important issue for Mumbai and Mumbaikar's. almost 42 % of Mumbaikars' lives in slum areas. The growing population and many other reasons demand greater production of housing. This study is mainly focused on Affordable housing in Mumbai. Due to globalization many other cities like Mumbai needs Affordable housing. The study is also focusing on different skims which were develop by the government to male India slum free. The research looks at planning as a major issue in today's Affordable housing. The major problems faced by the SRA building tenants is lack of ventilation and sunlight which cause health issues to the tenants. The only thing which can solve these problems is proper planning. Also considering socio-cultural aspect like community living, social gathering spaces gardens can help them to interact with each other and helps them to increase their standard of living.

Keywords—socio-cultural, affordable, green building, sustainable.

I. INTRODUCTION

More than a century ago Bombay was a blustering trade port of India. people migrate to the city in search of work there were no planning of building laws hence the results cramped space with less sufficient light and ventilation and sanitation. To handle this situation government, create a trust, known as Bombay city improvement trust BIT this trust created new bracing, built new neighborhoods, all within the framework of new building law just to create a new and healthier city. and some good structures were released with a good amount of air and ventilation with a central courtyard. a few years ago, the government projects were taking place for the slums redevelopment n few structures were coming up with long straight corridors no thought of air and ventilation foreground and background space planning, hygiene.

In one project explanation architect Sameep padora says that Mumbai's architecture killing us? is this happening are we hurting our mother nature due to our actions to fulfill our selfish demands.

41 % of people live in chawls and slum areas these people are from the middle class and lower middle-class families they cannot Offord good structures with good amenities due to high rates of land. spend their entire time in search of work to survive. these people also want their comfort with good amenities places and basic requirements to live.

Hence affordable housing is needed for these people so the proposed design will provide them affordable housing with comfort with consideration of social and cultural aspect.

O. Architecture Intervention

5) Need of topic

A country like India growing rapidly as the industrial area developing in a city like Mumbai the job opportunities are increasing hence the number of people migrating in Mumbai is more from rural area today

More than half of the world's population resides in urban areas. Due to urbanization the population increases hence the demand of residential places increases areas where slums and houses of economically weaker section are already existing builders start targeting this clusters by developing lower income group housing along with Highrise buildings. Due to this the existing landowner given minimal importance and entire focused shifted to the new development new construction development of Highrise which was giving higher amenities luxury etc. in this process the main focused from existing people shifted entirely on this new development.

The structure which came up which demolished the entire essence of lifestyle of existing people their social and cultural activities their freedom also the routine of life completely changes.

Hence the slum development in cities is must important. As we see the slums, the places are cramped no light ventilation, no hygiene, bad sewage planning, issues of electricity& light et.

Also, in the current pandemic situation, space planning, and a healthy environment is necessary for them.

Mumbai is a combination of high-rise structures and slums. Due to the high rate of land, it's difficult to buy houses in Highrise. Government proposing redevelopment projects for slums to give them a better life and all basic amenities but the structures which are coming up in these projects are very cramped with no thought of light and ventilation, foreground spaces, background spaces, open spaces, sanitation, etc. also a social and cultural aspect.

As we studied the chawal system the people are more in community activities. They are very much closed to the neighborhood.

Hence the redesigning these places with giving thought to all these aspects is a major task.

6) Research gap

The gap is realized that the socio-cultural and better living standard aspect of existing tenants or landowners completely ignored while redeveloping the land with Highrise project.

The existing people came here first due to migration for job opportunities etc. they live here they have their own community, society because of rapid urbanization there is need for growth hence these areas were developed without consideration of this people.

The developers proposing amenities luxury for new people not for the existing people or landowner who are already there

7) Scope Of Topic

- o Identifying the opportunities, threats, issues of surrounding
- Understanding the social, cultural aspect with respect to the people
- Understanding the mentality of people their expectations need etc.
- Creating a space where people will get the all-basic amenities, and requirements
- Consideration of space planning in typical housing and design it accordingly
- Providing better housing, sanitation system, open spaces, community spaces, social gathering spaces to communicate with the society.
- Understanding social and cultural aspect.
- Identifying the requirements of community.
- Exploring opportunities for the people

This project is to find out the solution which can better living standard, which can retain the socio-cultural aspect, also maintain the safety security hygiene, and provide opportunities for economic upliftment and development of the existing tenants or the landowners so a solution which will not consider its EWS or lower income group building but find out solution where in both the Highrise and lower income group can shear an equally beneficial relationship.

8) Hypothesis

Reimagining affordable housing with sociocultural aspect such that it benefits the existing landowners.

9) Aim

To find out the optimum design solution in affordable housing for meeting all aspects of existing livelihood for betterment of existing tenants.

10) Objective

To Analise and define the different aspects for affordable housing

The different aspects to be consider for affordable housing:

Providing better housing, sanitation system, open spaces, community spaces, social gathering spaces to communicate with the society

To find out case studies in affordable housing where such solutions are implemented to research on interventions don for the upliftment of the people residing the affordable housing.

II. Background study

As we know migration plays a vital role in the development and growth of Mumbai which is also known as the commercial center of India. Mumbai is an urbanized and developed city. The main reason for migration in

Mumbai is job opportunities and the second major reason is education. Hence, we can say that the major reason for migration in Mumbai is an economic factor.

In past years many communities came to Mumbai in search of work and slowly they settle down, they didn't just come alone but with their culture and lifestyle. Slowly these communities merge with the existing communities.

Due to migration, the population of Mumbai increases rapidly, the census tells that 9.9 million people were living in Mumbai. Results lack housing in Mumbai the people start living in chawls and slums as migrated people increases, the number of slums also increases. This leads to unhygienic living. The government tried to solve this problem by publishing affordable housing skims for these people.

but less importance was given to these projects by the government as well as builders the focus was completely shifted on new buildings which were cell buildings. Due to this the existing tenants or community suffers. The planning of re-development buildings was not appropriate it is not planned with considering the lifestyle of the existing tenants.

III. Literature review

the following case studies were selected to study the different angles of various points like community, sociocultural aspects green building methods, open spaces, etc. and to understand the design process of each project and to analyze the positive and negative of all the projects which helps further.

A. Case study

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Fig.1.case study

1) Uddan low-cost housing

- In project the structures were categories as hierarchy of income groups
- To keep the essence of the chawl the horizontal planning were done, considering social aspect.
- Internal windows which open in courtyard like structure were provided for communication of community
- In most tight houses the mezzanine floors were created to increase the space
- The sloping roofs were provided intentionally for use of solar cells as well as for more height when its needed
- The courtyard was created for internal visual connection with people living on each floor and to keep space lively
- Venturi effect, ventilation system is there for air circulation, the vertically staggered corridor allows worm air to rise up and escape from louvers present in roof
- The flexible furniture system was designed in interior for more space for use
- The entire wall towards the corridor created as collapsible sliding folding doors
- The corridors are main focal point of this chawls which are created in this structure
- The verandas are proposed as livelihood space for community activity.

2) Aranya low-cost housing project.

- Mixed and multiple land use
- Formation of small neighborhoods and houses extending to the outdoors.

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- Small shops operating within congested areas.
- Trees planted in public places
- Streets accommodating social, economic and domestic activities.
- Even distribution of open and build spaces
- One of the key elements of Doshi's design was a hierarchy of open spaces that included small courtyards to be shared by three to four families,
- larger green spaces for each of the settlement's six sectors, and a central playing field to serve the entire development.
- The township was created with the sense of community.
- The cost-effective structure was created by using local and economically sustainable material
- The healthy and safe environment were created.
- The commercial sector was placed as a central core.
- Achieve a community character by establishing a harmony between the built environment and the people
- Create a balanced community of various socio-economic groups to evolve a framework through design.
- The equally distributed open spaces and build spaces create good environment.

3) BDD chawl

- the clustered of buildup spaces construct around the centrally green space.
- The public plazas are arranged along the roadside
- Also, the affordable shopping houses are created
- Affordable workplaces and shops were proposed for the tenants.
- The vertical social spaces are creating to keep the essence of community structure.
- The internal streets and squares, these primary public spaces have been integrated and evolved to ensure the essence of lively spaces in chawl.
- Spaces for temporal activities have also been provided these spaces occur off city road and internal streets.
- Critical analysis
- The clusters are too closed to each other hence the issue of light and ventilation occurs
- Also, the privacy issue is there.

4) Via Verde - The Green Way

- the housing is focused on green innovations and passive cooling that seeks to generate health and wellbeing outcome
- reducing construction and operational cost
- affordable housing for low to middle income renters as well as privet ownership
- the narrow triangular plot allows for high density housing with vertical street wall condition and the internal courtyard
- basic form and massing of the building allow for creation of the extensive sequence of semi-public open spaces from ground up to the highest roof
- it allows narrow floorplate which increases access to light and air
- the integration of shared programmed semi-public open spaces is the key towards a successful social network among the residents

5) BDD chawl- critical analysis

- The chawls were designed for a male and ignored women.
- They also perpetuated cast divisions.

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- The major issues are the structure were built for single person but the families of 5to6 people are lining there
- Leads to several load on infrastructure.
- Lack of maintenance with growing age of building.
- It leads towards the dilapidation of structure.
- Chawla have very serious problem today
- The tenants have illegally extended the areas such balcony for them.
- This hampers the elevation and structural grid features
- No specific parking is provided hence the 2-wheeler parked on foot path and cars on road which create hindrance in pedestrian as well as vehicular moment
- The common toilets here is an issue of concern from hygiene point of view also make difficult for female Services the services designed over the years.
- 6) Lallubhai Compound Govandi East, Mumbai, Maharashtra 400043.
- No More people have been accommodated, Tall and bulky structures without adequate intra-building spaces
- Lack of efficient airflow, disruption of air path and breezeways. Lack of sense of safety and increased social seclusion
- Community open spaces absent
- No community-level space, play areas Lack of site-based airflow
- Lack of social cohesiveness, communal gathering Side alleys
- No Degraded ventilation within alleys Extremely narrow leading to the formation of waste-yards
- Foul smell from waste-yards force occupants to close windows which degrade IAQ.
- These waste-yards form breeding grounds for insects, deteriorating health of occupants.
- Lack of community control over the spaces,
- Increase of vandalism and crimes in those alleys,
- Lack of cognitive and visual connectivity
- No Kitchen within slums either outdoor or at lower levels Pollutant and smoke persist in living areas due to unsegregated kitchen
- Poor IAQ in the kitchen as well as living rooms
- Women health, well-being and livability get degraded.
- No individual toilets in slums and chawls Attached toilets (but often not maintained
- Breeding of germs from uncleanliness and lack of maintenance leading to health and hygiene issues
- Living area and bedroom No2 floors in slums segregating kitchen and living zones Space constraint
- High temperature and pollutant concentration due to unsegregated kitchen
- Low air exchange rates
- Overcrowding
- Lack of privacy No Ventilators in slums opening to alleys No ventilation
- Lack of airflow and daylight within the corridors
- Degrades community interaction

IV. METHODOLOGY

A. Urban population

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In censes of 2011 India had a huge population of 1,21.96 million between 378.11 million stayed in urban areas. In last decade 2001-2011 the Indian urban population exploded at a compound annual rate – growth of 2.9% as a result within the compounded enhanced level of urbanization from 27.81% - 31.15% and still increasing. The country facing an extreme crisis because of rising population. Combining all the essentials for survival is a struggle for many people. Hence the shortages of housing are a major issue for people as well as for government.

Income category	Income limit (Rs per month)	Housing shortage in millions at the end of the 10 th fifth year plan (2002-2007)	Housing shortage in millions at the end of the 11 th fifth year plan (2007-2012)
Economically weaker section (EWS)	Up to 5000	21.78	24.71
Low-income Group (LIG)	5001-10000	2.89	5.63

TABLE IINCOME CATAGORY

According to article 21 of the constitution of India every citizen has a right of shelter, where he Can live and progress. Though, the shelter is a fundamental right in India still the major chunk of Indian population Is homeless and large chunk of population lives in area like slums. The housing which are comes up in a country in past few years caters richer class Though, there are some cases of housing which were built for the poor, still government is not able to fill the shortages for the housing, due to high demand of LIG housing here the housing demand is not only the problem but also the inferior quality and the mindset of the poor people.

Some of the LIG housing structure led to failure due to some reasons, like the space created Was not match with their lifestyle. In maximum cases the size of structure is too small for them As the families are too large. Due to the lack of affordable housing, results growth of slum areas in country. In Mumbai 41.3% of population means 9 million of people lives in slums. the number of people lives in slums all over the country is estimated to be 104 million, means 9% of the total population of the country.

B. Indian Government's Schemes on Housing Shortage

- Indira Awas Yojana (IAY) - 1985

To provide funding for the construction of housing to the citizens below poverty line living in rural areas.

National Housing & Habitat Policy in India (NHHPI) - 1998

In housing and real estate sector,

- To involve multiple stake holders
- To Repeal Urban Land Ceiling Act
- To permit Foreign Direct Investment (FDI)
- Jawaharlal Nehru National Urban Renewal Mission (JNNURM)- 2005[5]

To construct 1.5 million houses from 2005 to 2012. Two sub-missions namely Basic Services for the

Urban Poor (BSUP) and Integrated Housing and Slum Development Programmed (IHSDP) were

initiated under this scheme for the development of LIG citizens.

- National Urban Housing & Habitat Policy in India (NUHHPI)- 2007[5].

To encourage affordable housing to meet the housing shortage for all categories of the citizens.

Interest Subsidy Scheme for Housing the Urban Poor (ISSHUP) 2008 To enhance the affordability of the EWS and LIG citizens living in urban areas by providing interest subsidy on loans up to Rs. 1 lakh.

- Housing For All by 2022 (MHUPA 2012)- 2012[5].

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-

By the time the nation completes 75 years of its Independence, every family will have a pucca house

With water connection, toilet facilities, 24x7 electricity supply and access

TARLE H

- Rajiv Awas Yojana (RAY)- 2013

To create a mortgage risk guarantee fund to EWS and LIG households. This was aimed at cr [5].

C. Annual income range

conomic section	Annual Income range
TITIC	

ANNUAL INCOME RANGE

Economic section	Annual Income range
EWS	Up to Rs 3 lakhs
LIG	Between Rs.3 lakh and Rs 6 lakh
MIG I	Between Rs. 6 lakh and Rs 12 lakh
MIG II	Between Rs. 12 lakh and Rs 18 lakh

V. DEFINITION

A. Affordable

If something is affordable, it's priced reasonably, and you have enough money to buy it. Your friends might be jealous that the bike you bought at a yard sale was so affordable.

If you live in an affordable city, it means that rents aren't too high for most of its residents, and if you buy an affordable dinner for yourself, it doesn't cost too much. The adjective affordable can either mean "cheap," or it can imply that even if it's expensive, you have enough money to easily buy it. The verb afford is at the root, and its earliest meaning was "accomplish." Gradually, afford came to have the meaning "manage to buy [3]."

Socio-culture

Sociocultural is a term related to social and cultural factors, which means common traditions, habits, patterns and beliefs present in a population group. The term is mostly used in sociologic and marketing contexts and refers to the most remarkable drivers behind the way people makes decisions in a society [4].

B. Survey







According to the survey 58 % people thinks that affordable housing is a low cos material housing , community living as well as low on maintenance.



Fig.3.Survey chart 2

According to the survey multipurpose area playground and community space, these areas should remain as it is in process of re development



Fig.4.Survey graph 1

According to the survey the major factor is lacking in areas is hygiene and sanitation as well as safety and security



Fig.5.Survey graph 2

- people thinks that affordable housing is a low cos material housing, community living as well as low on maintenance
- multipurpose area playground and community space, these areas should remain as it is.in process of re development
- The things lacking in affordable housing are, absence of enough space, recreational space, not enough ventilation flats are too close, flats having minimum view, no space for drying cloths and lift maintenance.
- The major factor is lacking in areas is hygiene and sanitation as well as safety and security
- The preferable areas in society are gym and yoga, balcony, multipurpose area, courtyard, and minimal requirements.

D. Site selection

Location - Datta pada Road, Khande Rao Dongari, Borivali East Pin code is 400066 and postal head office is S. K.Nagar.



Figure 8: Google map of Borivali

According to the survey the preferable areas in society is gym and yoga, balcony ,multipurpose area, courtyard and terraces.



Fig.6..Survey graph 3

According to the survey the things lacking in affordable housing are, absence of enough space, recreational space, no enough ventilation flats are too close, flats having minimum view, no space for drying cloths and lift maintenance.



Fig.7..Survey graph 4

According to the survey the major aspect which is neglected by the builder which leads to the poor quality of affordable housing is that, the buildings are planned in

- Strengths

1) site is near to the railway station, approx. 5 meters away from the site

2) bus stop is adjacent to the site

3) all require amenities like glossary shop mall hospitals etc. are in radius of 5 km from site.

4) the site is collected on height hence no problem of water logging on site.

site is adjacent to the western express highway.

- Opportunities

1) upcoming metro project is adjacent to the site hence, metro station is near to the site.

2) well, connected to the internal and external roads, also western express highway.

- Threats

1) the internal road from site is used by the nearby people regularly

2) some dark spaces were form on site it can be led towards crime

3) existing places are very cramped up which create problem for existing tenants

- 4) due to presence of common toilet on entrance the odor spread all over which leads towards health problems
- Weakness
- 1) lack of planning
- 2) lack of space understanding
- 3) lack of air and ventilation
- 4) lack of sanitation system
- 5) lack of hygiene

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6) lack of maintenance

7) lack of sociocultural aspect

8) lack of communication

9) public toilet is on entrance of site

10)garbage collecting space is also on entrance of site

11) poor situation of in ternal roads

12) water supply problem

13) noise issues due to road on both side metro station adjacent and surrounded by construction sites

VI. CONCLUSION

Rapid urbanization is the reason behind increasing demand of residential areas. It is an difficult task for government and developers as the need of residential areas are increasing it is difficult to create design which is sustainable good in Design and function and also affordable for middle - class and lower middle-class groups.

This research helps to understand the problems face by tenants who lives in SRA buildings as well as in affordable housing and how we can tackle them in better way

VII. ACKNOWLEDGMENT

First and foremost, I have to thank my research supervisors **Ar. Rupali H. Gupte**, without her assistance and dedicated involvement in every step throughout the process, this paper would have never been accomplished. I would like to thank you very much for your support and understanding over these past four years.

The writing of this dissertation has been one of the most significant academic challenges I have ever taken. Though the following dissertation is an individual work, I could never have reached the heights or explored the depths without the help of books published by various authors, the e-books available on the internet, the research papers published by various authors and the various organizations and websites providing information related to my dissertation topic.

I express my sincere thanks to all the teachers who have helped me throughout this process, my parents and my friends for their kind cooperation and help at various stages, which has made my work possible.

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2009

TRIBAL COMMUNITY DEVELOPMENT CENTRE.

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ABSTRACT

A tribal community development centre is a space for the tribal community who have particular interests, goals, prominent traditions, and cultures in common. They come together in one area where numerous activities and events connect the community with their cities and vice versa. The tribal community centre can help tribal's provide elementary necessities, including employment, primary education, hygiene, health improvement, etc. It can initiate a broader bond between urban and tribal with their cultures, art, livelihood, etc. Spaces designed can also be used for multipurpose activities. The community would experience a socio-cultural hub that acts as a platform for interaction between the community and the visitors. Urbanites lack to know or value their existence, prevailing art and folklore, lifestyle, and traditions. This space will be all-inclusive and give them a sense of ownership, where various things are enhanced and looked at while also bridging the gap between different income groups in the community. Globalization has negatively impacted tribal economies, cultures, and identities. The freedom of expression of an artist has been affected by the pressure of globalization, so we need spaces where they can promote prevailing local art, their existence, and reach out in this highly advanced and globalized world.

Keywords—tribal community, upliftment, affecting globalization, self-sustain.

D. 66

INTRODUCTION

Architecture is a vast field with variant advances seen in technology and construction, making it inevitable that anything can be possible. However, architecture is meant to give meaning to everyday lives and, in all forms, be validated. It is highly immortal that good architecture and design should be accessible to all. In contrast, many communities lack or do not get access to essential services and infrastructure in the village areas. In the fastest-growing developing countries, India is one of them. Still, the country faces many challenges where unemployment is a significant concern, which seeds unwanted social problems among youth that should stay away. But with a good platform and the right skills, primary education, and environment, the community can overcome the challenges. This paper attempts to understand the Warli tribe located in the Mumbai- Gujarat border on a humanitarian level, give them space and try to uplift them, and reach out on a broader level.

Difference Between an NGO & Community		
	NGOs	CBOs
	Ngo refers to Non -	CBO stands for Community Based Organization.
	Governmental Organization	CBOs are a miniature version of NGOs.
	They participate voluntarily on a	Cannot Reach NGOs footprint.
	large margin area.	-
Work	Ngo works are allocated on	CBO carries out work for specific communities only
Criteria	broader aspects	
Source of	Funds, Donations by Elite	Works on a local level. Receive funds from their region
funding:	people.	only where they provide or execute services.
Legal	An NGO will constitute a legal	Any legally bound criteria do not lead CBOs. They are
Prospects:	memorandum and an adequate	established randomly by ascertaining the foundations of
	structure of members. They are a	legal norms—an informal group of people who take
	group of people who practice the	actions to rehabilitate the small community.
	social cause on a large spectrum.	
Example:	If any calamity occurs, NGOs	Awareness of AIDS diseases, their consequences, and
-	come into power and perform	help in this prospect is provided for rural people.
	everything to bring the situation	
	back to normal.	
Conclusion:	NGOs are the ones that work	CBOs work informally on small scales.
	legally on large scales	

Table 1: Difference between NGO and CBO.

Overall, they share a common motive – the welfare of society and the people in it. Since the world has been plagued with different problems related to social, economic, and spiritual these organizations have come up to help the needy and make them sustain themselves more effectively.

Table 1: NGO and CBO difference.

AIMS, OBJECTIVES, AND HYPOTHESIS

Aim:

The tribal community development centre would aim to provide rural employment involving people participating in mutual learning experiences with their local resources and an inclusive and self–sufficient environment for community development.

Objective:

- To design a socio-cultural hub for the community- a platform for interaction between the community and the visitors.
- To boost their mental and physical development and provide them livelihood by providing various skills of their potential. It will help them be independent and increase the socio-economic development of the tribes in the society.
- To encourage self-employment in traditional arts, crafts, and products.
- To bridge the gap between various income groups in the community.
- To enhance skill development, focus on health betterment, and help the tribes evaluate through appropriate counselling and programs.
- To promote local arts and crafts and reach out to urban cities keeping in touch with their prevailing traditional work.
- To nurture hope in innumerable ways through various health, education, and skill development programs.

Hypothesis:

The architectural intervention would act as a social agency and a bridge for the upliftment of the community. A civic hub of this nature will catalyze social change through proper research, looking at the community's dire needs, acknowledging and maintaining sustainability throughout the proposal.



Figure 2: Name, year, and CDP started by. (Source: Google Images)

BACKGROUND STUDY AND RESEARCH Community Development And Its History.

There were community centers found in 107 cities in 1918-19 when in 1915, the name of community centers had changed from social centers after the establishment of NCCA in 1916. On the development of the American council at the British Colonial Office, Cambridge, the team adapted the term community development in 1948 for the first time. On 2nd October 1952 in India, the Community development program was initiated to promote a better lifestyle for the entire rural communities. The Community development program began before independence under the leadership of Mahatma Gandhi. While confirming autonomy in the provinces under the rule of Britishers, it included the development of rural areas as a crucial program to begin for welfare, generate gainful employment, and the people's well-being. Gandhiji endorsed communal harmony, economic equity, social equality, de-addiction from alcohol and narcotics, promotion of khadi, health care, sanitation, and empowerment of women.

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Figure 3: Factors and foundation of CDP. (Source: Google images)

During World War II, a Bengal famine occurred in 1943, where food supply was a significant issue in most of the parts. During this period, a pilot CDP commenced through the Etowah project, 1949 Fiscal commission, and the grow more food inquiry committee, which supplied free seeds, subsidies for the construction of wells and barriers manure supply, fixation of grain prices, etc. The major setback was the Zamindari system.

Drastic Progress Through Upcoming Years

In 3 blocks, 55 community centres were there, where each project covered an area of 450-550 square miles with a population of 2 lakhs and about 300 villages. One hundred villages made up a development block with 150-170 square miles and 70 thousand people. Each block, further segregated into 6-10 villages each on 2nd October 1953. The urge to rapidly extend the program to other parts of the country, perceived by the National Extension Service and the CDP covering the entire country within ten years. The team recommended the establishment of statutory electives of the local leaders, the leaders such as the Panchayat Raj institutions, Union of the panchayat, Council of district development, and the village panchayats. In April 1958, both CDP and NES got integrated at the centre and the state. At the end of the five-year plan from 1952- 57, 163000 villages were operating in 1114 blocks, till the 1960's CDP covered the entire country.



Figure 4: Methodology of solving rural village issues. Source: Google.

The CDP 1952 brief states that the Government of free India undertook the biggest rural reconstruction scheme. It was the "Magna Carta" of hope and happiness for two-thirds of the population. It was initially an American concept which is a community program of the present form: emancipation testaments, poverty after war declaration, squalor, and suffering of diseases by million groaning on were seen.

Tribal Communities In The District Of Palghar.

In Maharashtra, tribal communities account for 75 lakhs comprising 47 tribes in 75 talukas and 15 districts. Palghar district has a tribal population of 955000, whereas Jawhar taluka has a 100% tribal population of 160000 as per the 2021 data study. They belong to the Dravidian ancestry as per the anthropological evidence. Tribes in Palghar district consist of Mahadeo Kolis, Konkana, Warlis, Thakar's, Dhorkoli and Katkaris. Mahadeo Kolis are the most progressive tribe where literacy of the Konkana tribe is more petite than them.

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Also, their houses are Chowpakhi. Warli's are famous for their unique and ebullient paintings with a 50% literacy rate and knee-length clothes that Warlis and Konkana wear. The houses they stay in are called Dupakhi. Thakar tribes have two sub-tribes, namely K and M, because these have accent differentiation. Dhorkali and Katkari are impoverished tribes consuming rats, dead cattle, living in hutments.

History And Origin Of The Warli Tribe.

Nomadic life, art, folklore, and customs are what the Warli tribe is well known for. A true believer, interdependent on nature and accustomed to rural methods of living. Community living, collective responsibility shared among themselves be it building a house in village or farm work. They are well known for their Warli paintings, which originated in the 10th century AD. These indigenous tribe of western India lives in mountainous areas as well as the coastal region of the Mumbai- Gujrat border. Warli tribe has animistic beliefs, customs, traditions, and life, and due to such acculturation, they have adopted notions of Hindu traditions. They speak the Varli language, which is unwritten, and belong to the southern zone of Indo- Aryan languages.



Figure 5: Traditional Tarpa dance of the Warli's. (Source: Google images)

Warli tribe accounts for a total current population of 50000 people and is one of the oldest prevailing artistic tribes in Maharashtra. They made their traditional art through rice paste, but today we see them using paints due to rice paste attracting lots of ants, they stopped using it. Nowadays, Warli artists make paintings on canvas, vases, paper, and other surfaces, in high-demand selling in souvenir shops. Varying in paper composition and size, they sell a high collection of their art on paper and canvas. They live a simple life worshipping nature and dependent on it for food and everyday living and taking what is needed. This tribe lives in harmony, which is also reflected in their paintings. The Warli tribe living in Jawhar taluka came under the Mukne dynasty. Their paintings form an undivided part of the cultures in Maharashtra, decorating their houses by drawing their art on the facade. Their paintings are descriptions of their daily lives and events happening in the village. The use of modern colours on paper and canvas is seen where artists draw on them and sell them. Tourists buy paintings from the tribal villagers.



Figure 6: Warli paintings done on canvas for sale. Source: Google images.

Warli Paintings And It Evolution Through Years

Over the past few years, a drastic change has been seen in their paintings. They have progressed from making beautiful and unique masterpieces on mud walls with rice paste and water to making souvenirs on canvas, vases, and textiles. Old traditions are still adhered to, although modern colours are applied to art to meet market demand needs. Pencil crayons, acrylic paints on craft papers, and canvas are provided to them by NGOs. Their paintings are simple but have an immense appeal, and it's beautiful. This art is expressed through mere simple lines without any 3D effects.



Figure 7: Artifacts made by Warli artists in Palghar. Source: Google images.

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LITERATURE REVIEW.

Why Do We Need Community Development Programmes And Initiatives?

About two-thirds of the population living in rural areas are dependent on agriculture for their living. While 12% are landless and among landholders. 65% have less than a hectare of farmland. Only 30% is under irrigation, and the rest is dependent on rains where only one crop can be grown in a year. Only 25% own between one to two hectares of farmland.

Rural Scenarios:

With the use of inadequate sources for livelihood in the rural areas, suffering from poverty, health deterioration, starvation and malnutrition in youth, lack of immunization, and problems faced in hygiene and sanitation, we see a lack of services being provided to them for their better life. These people face water supply issues where 80% of the potable water is contaminated. Then their dire need to depend on money lenders arises to meet their emergencies and thus fall into debt. Consumption of alcohol is what they attempt to, as their solution to forget problems. While some migrate to adjoining industrial areas for work, others live in chronic poverty, losing confidence to live a decent and self-sustained life. [2]



Figure 8: Youth malnutrition was seen in Jawhar taluka, Palghar. Source: Google image.

Initial Start-Up Objectives Of CD.

Some of the initiatives started objectives of Community development included:

- They started supporting and helping villages through planning and developmental activities like creating schemes and proposing initiatives to improve agricultural production, betterment of lives, and skill development programs.
- To make the villagers self-dependant and encourage them to participate in different programs and activities, changing their outlook to traditional and conservative aspects in the village area.
- Encouraging the women and youth to participate in developmental and welfare activities. Making spaces for them for recreation.
- To provide them with basic educational facilities by arranging social education spaces, training, and recreational programs.
- The main objective was to improve the standard of living of the rural people and provide them with various employment facilities by setting up industries and also help improve their production in agriculture. For such purposes, cooperative societies and other such bodies were set.
- Through proper political training programs, the villagers are trained in appropriate civic affairs and working of democracy. [3]

Other Predominant Objectives:

Community development is also aimed at an all-round development of the villagers under the following goals such as:

- Improvement in the production of agriculture.
- Proper set up of cooperative and other bodies
- The strengthening of the panchayats in the village, looking at the appropriate organization and working for the people.
- Setting small village-level cottage industries.
- Also, to the development in topics like rural education, public health, and animal husbandry. [4]

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Visit to Pragati Pratisthan In Jawhar (NGO)



Figure 9: Blind and deaf school in Jawhar, also an NGO.

The causes they work on:

- Disabled Education
- Health Care
- Skill Development & Livelihood
- Women

Their Vision:

- To improve the living conditions of rural and tribal people in Jawhar Tahsil by developing environmentfriendly land and water resource programs;
- To improve the environment and eco-system;
- To arrest the distress migration;
- To improve the socio-economic status of tribal people and strive for their overall development;
- To provide equal opportunities to children with hearing disability. [6]

Their Mission:

- Improvement of health status and promoting quality education
- Promotion and increasing agricultural activities and creating marketing linkages for the same
- Running hostel facilities and education for the deaf and dumb. [6]

METHODOLOGY

A detailed study on the topic was done based on the following headers and sub-topics to gain a deep understanding.

Table of content:INTRODUCTIONAIMS, OBJECTIVES, AND HYPOTHESIS

BACKGROUND AND RESEARCH.

Community Development and Its History. Drastic Progress Through Upcoming Years Tribal Communities in The District of Palghar. History And Origin of The Warli Tribe. Warli Paintings and Its Evolution Through Years

Literature Study Why Do We Need Community Development Programs and Initiatives? Initial Start-Up Objectives Of CD. Other Predominant Objectives.

FINDINGS COMPARATIVE ANALYSIS CONCLUSION/ FUTURE PROPOSAL.

 Table 2: Methodology of the research done.
FINDINGS AND COMPARATIVE ANALYSIS Google Form Analysis



Would you like to visit a Tribal community Development centre where you interact with the Warli tribe, get to know their culture, traditions and learn and teach them ? 58 responses

Figure 10: Google form survey.

Comparative Analysis Of Case Studies.

Table 3: Ca	ase study	comparison.
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	Com	parative analysis	
Parameters for	Manav Sadhana	Jetavan, Kopergaon.	San Bernabe, Mexico.
analysis:	Community centre.		
Connectivity to the city.	Rickshaw and bus stand in 2km. and below radius.	Bus stop in 3 km radius. A rickshaw is also available close by.	Bus stop 175m away from the site (walking distance)
Project vision/concept.	To serve the deprived and do goodwill of people by helping them with facilities.	To fulfill religious aims and to provide the spiritual anchor to practice Buddhism through meditation and yoga.	"A building street which tries and transmits civic values inherent to the urban structure of the neighborhood.
Functional relationship:	Works as an informal school for young children, evening education for adults, and training and activity workshop's function.	Programmed as spiritual and skill development center for Dalit Baudh Ambedkar community. Total of 6 buildings.	Public and semipublic functions are segregated through cluster formation.
Planning organization:	A radial organization with an overlook to a central courtyard.	They are not harming a single tree on site and placing six structures in gaps between heavy plantations. Two courtyards emerge as links suturing these structures into a common identity. Inversion of roof profiles is also seen.	Functions around the central spine.
Built language (structure/ materials)	Reusing recycled waste in- wall techniques, floor and roof slabs, door paneling, etc.	Rammed load-bearing walls of basalt stone dust. Stone dust used was from waste nearby quarry mixed with waste fly ash. Flooring is done with traditional mud and dung by local community members.	Concrete block wall filled with sand and painted on the inside. Wooden panels for façade.
Sustainable features:	Reused waste materials effectively in making the structure a non-pollution environment, economically empowered, and affordable.	All materials are eco-friendly and sustainable use in the making of the Jetavana structure.	Evaporative cooling, louvers, solar PV panels.
Design directives from the inference.	Innovative, contextual, socio-economically responsible, and environmentally sensitive structure. It improved the quality of life of the deprived by giving them this space.	Usage of waste materials and reviving and resuscitating local building traditions by collating material palate.	The functions and site area mix are similar to the proposed programmatic combination for the Punjabi Bagh community center. The idea of a pedestrian urban street can be adopted in the proposed project—the spatial configuration of the public- semipublic functions.

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CONCLUSION AND FUTURE PROPOSAL.

To conclude with providing solution and architectural design proposal, adequate spaces for them such as skill development and learning, a market where they can sell their products and showcase their art, accommodation area for visitor stay, community kitchen and dining, medical and health checkup areas and multipurpose areas where different activities can be held for community and visitors. Engagement of both activities and people would happen to lead to a better environment inside. Globalization has negatively impacted the tribal economies, culture, and identities, where artists' freedom of expression is compromised, so spaces inside would let them express and reach out. Because of commercialization, the transformation occurred, and they are venturing into mainstream society for the sake of art. But the community centre will be exclusively for them, and their art valued. Where spaces designed would act for multipurpose causes and even turn into Covid isolation ward in that area. The site for intervention can be Jawhar in the Palghar district of Maharashtra, where proximity to Warli's is better with the site. Jawhar being a small taluka, has access to all amenities and tourist attractions spots. Jawhar being a taluka with contours gives lovely nature views from any location. A lush green taluka with beautiful points and an old palace. There is no prevailing community center in the area, which allows building one for the tribes to be self-sustaining. As per the needs and demands, this center can be used for different purposes for the welfare and betterment of the tribes

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The journey throughout the dissertation was a very difficult one, but it would not have been possible without the constant guidance of our guide Ar. Janaki Rawal. I would like to thank our guide for constantly motivating us throughout this journey and believing that we can do it and excel in it.

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WOMEN EMPOWERMENT AND BUDDHISM

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ABSTRACT

This paper is an attempt to study the aspect of gender equality as depicted in Buddhism and aims to examine the role of women in Buddhism. It will consider existing literature on the topic and contribute to new avenues of research with the help of literature on gender equality and women empowerment in Buddhism. Dr Babasaheb Ambedkar spread buddhism by ordaining half a million of people in India in 1956. He, inspired by the teachings of Buddha, empowered women by setting various articles in the constitution of India. Empowerment of a woman leads to empowerment of society. If a single woman in a family gains wisdom the whole family gets wise. A woman should be able to progress economically, socially, mentally, spiritually, politically so that she can independently take decisions. Although in many countries women are achieving equality in health outcomes and primary school enrolment rates, the world has not seen the same kind of progress when it comes to gender equality in economic opportunity. Gautam Buddha first ordained women as nuns five years after his enlightenment and five years after first ordaining men into the sangha. The first Buddhist nun was his aunt and foster mother Mahapajapati Gotami. Present study will analyse women in early Buddhism period, the present era women and real empowered women in future without any dominance.

Keywords: Buddhism, Women empowerment

I INTRODUCTION

The Indian society is patriarchal in nature and this remains intact over the centuries. All the references show that Gautama Buddha accepted that men and women are equal with regard to their spiritual capacity and their personality development. This in fact he tried to convey to the people. Here a question arises; why was it necessary for the Buddha to convey this fact to the people? Answer to this question within the Buddhist philosophical framework is that people of those times were not aware either of their personality or their nature. This ignorance about one's own nature determined their action in the society. That is why instead of understanding the equality between man and woman with regards to the personality; they gave importance to the biological difference. It is because of this ignorance, they could not make the distinction between sex and gender. Throughout his discourses related to woman and her problems, Gautama Buddha intended to expose this fact and tried to remove the ignorance of the people regarding woman. As it seems the Buddha believed that when man, woman as well as society have real knowledge about themselves, then they will be empowered to solve their problems. Buddhism does not consider women as being inferior to men. Buddhism, while accepting the biological and physical differences between the two sexes, does consider men and women to be equally useful to the society. The Buddha emphasises the fruitful role the women can play and should play as a wife, a good mother in making the family life a success. In the family both husbands and wives are expected to share equal responsibility and discharge their duties with equal dedication. The husband is admonished to consider the wife a friend, a companion, a partner. In family affairs the wife was expected to be a substitute for the husband when the husband happened to be indisposed. In fact, a wife was expected even to acquaint herself with the trade, business or industries in which the husband engaged, so that she would be in a position to manage his affairs absence. This shows that in the Buddhist society the wife occupied an equal position with the husband. The Buddha's advice to the King Pasenadi of Kosala, who was a close devotee of his, clearly shows that Buddhism does not consider the birth of a daughter as a cause for worry and despair. Buddhism does not restrict either the educational opportunities of women or their religious freedom. The Buddha unhesitatingly accepted that women are capable of realizing the Truth, just as men are. This is why he permitted the admission of women into the Order, though he was not in favour of it at the beginning because he thought their admission would create problems in the Sasana. Once women proved their capability of managing their affairs in the Order, the Buddha recognised their abilities and talents, and gave them responsible positions in the Bhikkhuni Sangha. The Buddhist texts record of eminent saintly Bhikkhunis, who were very learned and who were experts in preaching the Dhamma. Dhammadinna was one such Bhikkhuni, Khema and Uppalavanna are two others. The Theri-gatha contains numerous stanzas that clearly express the feelings of joy experienced by saintly bhikkhunis at their ability to enter the Order and realize the Truth. The Buddhist reformation being a moral reaction against a corrupt state of society, it was necessary that the relations between the sexes should be guarded with care. Strict rules were therefore laid down for the conduct of Bhikkhus with women and of Bhikkhunis with men. The Buddha did not make any difference between man and woman. In no religion has a

woman played such a prominent part as Visakha has done in Buddhism. Buddhism being a matter of selfcontrol and self-culture, it regards every individual, whether man or woman as a complete whole. Accordingly, the Dhamma does not concern itself with those relations between man and woman in which one sex is regarded as completing the other.

II. OBJECTIVE

The objectives of this paper are as follows: 1. To discuss historical background of Buddhism in the context of gender equality and women empowerment 2. To evaluate the significance of thoughts of Buddha on women empowerment in present era. 3. To draw conclusion and suggestions for future empowered women. Historical background of Buddhism The various schools and traditions within Buddhism hold different views as to the possibilities of women's spiritual attainments. One significant strand emphasizes that in terms of spiritual attainment, women and men have equal spiritual capabilities and that women not only can, but also in many cases have, attained spiritual liberation. Such a perspective is found in a number of sources of different periods, including early Buddhist literature in the Theravāda tradition, Mahāyāna sūtras, and tantric writings. There are stories of women and even children who attained enlightenment during the time of the Buddha. Furthermore, Buddhist doctrines do not differentiate between men and women since everyone, regardless of gender, status, or age, is subject to old age, illness, and mortality; thus, the suffering and impermanence that mark conditioned existence apply to all. Feminist scholars have also postulated that, even when a woman's potential for spiritual attainment is acknowledged, records of such achievements may not be kept—or may be obscured by gender neutral language or mis-translation of original sources by Western scholars. One of the oldest examples of a woman who attained nirvana is Prajapati. Buddha's step-mother, walked over a hundred miles to request permission and even, insist on the right of women to become monastics. After she was ordained, she attained the Awakened state and Nirvana along with many of the nuns. Another well-known example is that of Tenzin Palmo. Living at Khamtrul Rinpoche's monastery as the sole nun among 100 monks provided Tenzin Palmo with first-hand experience of the discrimination that restricted women's access to information that was imparted freely to men. Eager for instruction, she felt frustrated by the fact that she was kept out of most monastic activities because of misogynistic prejudices. But due to her intense spiritual practise for 18 years she became the first western women who received the full bhiksuni ordination. She has taken on the cause of equal rights and opportunities for Buddhist nuns in India. S.N. Goenka, was a Burmese-Indian teacher of Vipassanā meditation. His teaching was notable for emphasizing that the Buddha's path to liberation was non-sectarian, universal, and scientific in character. He did not discriminate women for doing Vipassana and hence set as an example of gender equality. He travelled everywhere with his wife, making everyone understand the meaning of gender equality and hence, inculcating in everyone's mind that men and women are equal. There are many such fine examples of women empowerment and gender equality in Buddhism.

III. PRESENT ERA WOMEN

The principle of gender equality is enshrined in the Indian Constitution in its Preamble, Fundamental Rights, Fundamental Duties and Directive Principles. The Constitution not only grants equality to women, but also empowers the State to adopt measures of positive discrimination in favour of women. Although Buddhism prevailed in early India, it faded as a religion over the year. It later was brought back to life after the Independence of India by Dr. Babasaheb Ambedkar. The constitution of India written by Dr. Baba Saheb Ambedkar who was a stern believer of Buddhism made sure that the Indian constitution secured the rights of everyone. Various laws on Domestic Violence, Eve teasing, Women Suffrage, Rape law, Bride burning, Gender Inequality, Women's rights, Sexual Harassment are included in the constitution. There is no gender discrimination for Vipassana which is India's most ancient techniques of meditation discovered by Gautam Buddha. Today's women are educated but still there is wide gender disparity in the literacy rate in India. Few Woman have achieved financial independence but still men are the dominant decision makers while investing or buying a car or house, while women play a bigger role while buying gold/jewellery, day to day household purchases and durables. However, women are outpacing men in financial independence, even with all the hurdles they have to jump. Women are models of humanity, they are more empathic and sensitive to the feelings of others, qualities embodied by mothers. "They have an important role in making the 21st century a century of peace."

In UAE women are respected and given preference in many areas. According to Gallup's Global Law and Order 2021 report, the Emirates scored 95 percent when it came to feeling safe about walking alone at night. "If a woman wanders alone at any hour of the day or night without fear, know that she is in the Emirates,". The participation of women in the UAE Cabinet is amongst the highest in the world, reflecting the strong position reached by Emirati women. This way, the UAE empowers and promotes the political inclusion of all. As for the

distribution of positions in government institutions by gender, women make up to 66 percent of the public sector workforce. 30 percent women are in leadership roles and 15 percent are in technical and academic roles.

IV CONCLUSION

In Buddhism the image of the mother as the embodiment of compassion is used a lot. Since she can become a Mother she has that depth of love, commitment and caring nature. She'll do anything for people who really love her and care for her. Educating women is powerful. It's not just about books, it is about helping them acquire the skills and create models for future success and expansion. It's about enabling them to be teachers in their own right and to take on leadership roles at a critical time. She should have opinions that she is not afraid to express. Time is not far when women will be able to take risks, make their own decisions, will become selfreliant and confident, self-motivating, proactive and doesn't play the victim. Buddhism sets a fine example about women empowerment. Encouraging more women to assume leadership roles is not only good for the women lot but according to His Holiness the Dalai Lama, this could also benefit the entire world. Women at the helm of power could secure a more peaceful, compassionate future for the 7 billion human beings, says the Tibetan spiritual leader. Buddhism has always considered women equal to men and set examples of women empowerment. If we look back in history we can see that women empowerment is not a novel concept to Buddhism. Women empowerment has thrived in many Buddhist nations such as Myanmar and Thailand too. The State Counsellor of Myanmar and Leader of the National League for Democracy of Myanmar is a woman, Aung Sun Su Kyi and has been for many years. This proves that Buddhism believes in empowering its women and does not think of women as an inferior sex to men. In the near future, the empowerment will lead to complete equality between the sexes and hence create a more peaceful world.

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VIOLENCE AND BULLYING AGAINST THE LGBTQIA+ STUDENTS IN SCHOOL

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ABSTRACT

Orientation of violence is not something new happening in the school to oppress their fellow peers. But the fact that the kids are getting treated this way just for fun is a humiliating and depressive behavior towards them. The most affected by this so-called "funny behavior" are the Gen-Z and the Early 20s generation. The whole point of this research presented in an article is to mention about the abusive violence the kids go through as a part of their lifestyles and is a special challenge for them to face all of this on a daily basis and how roughly it impacts other areas of their lives where they should be more focused. Comparatively, a greater number of negative attitudes and violent behaviors are noticed against homosexual boys and transgender minors.

Keywords-violence, oppress, humiliating, depressive, abusive.

INTRODUCTION

A very sensitive topic always needs to be discussed with a good idea and information relating to the topic to not hurt one's sentiments regarding the issue. These days the hurtful statements can be pointed towards anyone out there and people in groups always seem to be more harming, just like in the case of LGBTQIA+ (Lesbian, Gay, Bisexual, Transgender, Queer, Intersex, Asexual+). It is also important to know that there is more to this deceptive behavior against the children these days, violence in a classroom can be pointed towards any immoral people who tend to mostly bully people belonging to a minority group, just like in the case of LGBTQIA+ community. It is a community of people whose gender identity, gender expression, or behavior does not confirm to the sex assigned at birth. It has even been claimed that children in this group receive more violence at school than anyone else. For example, it has been stated that homosexual students experience a greater number of taunts than their heterosexual peers, Studies that have addressed the regularity of school violence against the LGBTQIA+ community find a greater proportion of victims compared to the studies done related with the general population. Specifically, according to data collected in the United States, 74% of minors with a non-normative sexual orientation or identity have been verbally assaulted, 36% physically harassed, and 16% even physically assaulted.

Moreover, LGBTQIA+ youth victims of school violence have even been found to have a significantly higher risk of suicidal ideation and behavior compared to others. Similarly, UNESCO states that the main attitude underlying violence toward the LGBTQIA+ community is homophobia, understood as the rejection or aversion to people who do not behave according to the established gender roles or who feel sexually attracted to people of the same sex. In addition, the violent behaviors they reported were mainly insults, hate speech, harassment and sometimes even physical violence. This vulnerability that young people felt at school made them distance themselves from school as the main means of coping.

AIM

This study is an explanation towards the topic of violence and bullying against the LGBTQIA+ community and them facing such violent situations. From the research it is shown that attitudes toward violence in this context are related to the use of violence as a form of fun, to feel better about oneself, when violence is looked upon as legitimate, and as a way of relating. In addition, it is observed that homosexual boys and transgender minors are subject both to stronger negative attitudes and violent behaviors. Hence, our results can initiate the creation and/or adaptation of these school violence reduction programs to improve the coexistence of LGBTQIA+ minors at school.

METHOD OF RESEARCH

The research work was done for analysis of attitudes, behaviors and violence against the LGBTQIA+ community at school. Quantitative methodology, although important for the investigation of this situation, hardly captures the participants' subjective point of view. This is why qualitative studies have the necessity to special interests, as they facilitate the thinking and mindset of the minor's point of view and how they communicate it to others, leading to a greater depth in the exploration of the meaning and understanding of the information provided that causes such mental health issues to them. After the research is taken it is then defined further, summarizing is an important part and ensuring the accuracy of the information taken and conclusion is done with the writer's point of view.

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INTERPRETATION

At such an age with no enough knowledge about the surroundings and being made fun of is tough and that too within your peers mentally harms a kid's mental health a lot. To make it a safer surrounding and not every minor going through the same, schools can take a step further and actually make it comfortable for the kids like designating your classroom a "safe zone" through stickers or posters on your classroom door. This lets students know that you're LGBTQ-friendly, and are willing to challenge anti-LGBTQ language or harassment.

Start an LGBTQIA+ organization at your school. LGBTQ student organizations show great promise in reducing discrimination against LGBTQ students, promoting their well-being, and fostering safe and affirming school environments. These groups provide support for LGBTQ students, and they can help create awareness in schools and help to counteract discrimination. Teachers integrate LGBTQ people and topics into the classroom so that the students feel confident and come out of their fear zone and actually get involved in activities. Workshops and professional development with experts can help to ensure that your school is inclusive, safe, and affirming for LGBTQ youth. Effective professional development can help to educate staff on how to handle harassment and bullying, and it can provide a place to share resources and best practices to ensure safe and respectful schools.

CONCLUSION

Violence and bullying against the LGBTQIA+ community in the school context are related to the use of violence as a form of fun, to feel better about oneself, when violence is taken as legal and as a way of relating. Furthermore, homosexual boys and transgender minors are subject both to stronger negative attitudes and violent behaviors. The results described here could have broad applicability to socio-community involvements. In terms of research, the approach to attitudes toward violence against the LGBTQIA+ community is a contribution to this field of study. This study provides evidence to the topic, allowing us to explore the variety of behavior and attitudes minors get faced by. This article projects the understanding of school climate and school violence toward the LGBTQIA+ community. The article suggests that it is important to include a change of attitude toward violence within the school to improve coexistence in the academic area. As mentioned earlier, studies suggest that modification of attitudes toward violence is an effective perspective to improve the school climate and betterment for the student's mental health.

FUTURE ANALYSIS

The futuristic approach to this topic would depend on the way minds are being shaped for the situation currently taking place whether it is taken in a positive or a negative way. Like, actually being influenced in a good way and supporting the children and their peers who are a part of the community and actually help them to come out and get to know themselves who they are for real. This will help in putting up an influence and helping others too, also being comfortable in discussion of such issues and not making anyone amongst them feeling unwanted or different than others. This way the upcoming generations will actually be proud to be who they actually are and have the unique identity they have keeping the stereotypes aside as well as changing perspectives of people slowly but steadily

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EFFECTS OF HELICOPTER PARENTING ON GENERATION-Z

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ABSTRACT

What is "helicopter parenting"? And how it affects the generation-z. The term "helicopter parenting" was coined back in 1990 by child development researchers Foster Cline and Jim Fay in their book, Parenting with Love and Logic. "They hover over and then rescue their children whenever trouble arises," the authors wrote at the time. Parents do what is best for their children but unknowingly sometimes it might be to over the top, in other words "HOVER OVER". Every parent wish nothing but success for their kids, these parents pay closely attention to their each and every activity their kids do in order to protect them from pain or disappointment. They are obsessed with a desire to create a perfect world for their kids...one in which they never have to face struggle, inconvenience, discomfort or set back. The term 'helicopter parenting," "cosseting parent," or "bulldoze parenting." Which in other word means "bulldozer," "snowplow" or "lawnmower" parents who try to mow down obstacles in their children's way to make their lives easier and help them succeed. Researchers like Bill Wellock, Alexis Blue and many more who did a research on helicopter parenting explains in deep detail what exactly is helicopter parenting and what it can lead to. These parents just want their child to be happy and they also make sure their child does not suffer from any pain. They try very hard to give a perfect life to their kids but can it just be another example for 'good intentions to poor outcomes'.

Keywords—Helicopter parents, teenagers, generation-z

INTRODUCTION

What is helicopter parenting? Helicopter parenting are parents who pay extremely close attention to their child's experiences and problem also they're each and every activity and schoolwork in an effort to not only protect them from pain or disappointment, but to help them succeed. As rightly said these parents are obsessed with a desire to create a perfect world for their kids...one in which they never have to face struggle, inconvenience, discomfort, or disappointment. They are so named as helicopter parents because they are like helicopters, they "HOVER OVERHEAD". These parents are known to hover over their children and become overly involved in their lives and overseeing every aspect of their child's life constantly. They do every task for their child hence the child suffers from lack of experience and something known as 'learn from your mistakes' as these parents play it too safe, turns out they protect their child too much. When they don't let them take physical or mental risks, they can stunt their development.

Teenage is an age group where there is no understanding of what is 'right' and what is 'wrong' for them. This age group has a lot of mood swings, change in personality or are easily influenced by anything and anyone. Therefore, there are restrictions made by the parents, so they can keep their child on the right track. Parents do this for the child's good and for their successful future. Parents try everything to help their children from any pain, disappointment or literally anything to cause them trouble. But taking all the decisions for your child and control their way of living, will the children be independent enough to live on their own in adulthood? Unknowingly the parent may be helicopter parent, but as many people are not aware about this term, children just call them 'overprotective parents.

These parents are Being overly involved in all areas of a child's life (Academics, Recreational activities and their friendships), Always correcting their children forgetting 'you learn from your mistake', doing each and every task for their children rather than them being independent, solving problems and conflicts for them rather than allowing them to resolve their own problems.

Helicopter parent may think they are doing what's best for the child but unknowingly will these parents be the one ruining their child's future?

Aim/Objective

To find out whether generation-z (age group: 13-16 and 16-19) are affects by helicopter parents. Whether or not helicopter parenting ruins generation-z. A type of parenting ruining the generation is a big issue, however many people are not aware about the term 'helicopter parents' as it is not something very commonly used. Children usually use the term 'strict parents' or 'overprotective parent'. Unknowingly their parents might turn out as a helicopter parent. Both child's and parent perspective are different, not only that the view about helicopter parenting ruining the generation-z will differ from person to person. To search about it in depth many

researches have been conducted in the past. Helicopter parents might be problematic for the child's future, so to know why and how from different perceptive and going more in detail about helicopter parents and objectifying content validity.

- ➤ Is helicopter parenting affecting the child's future, if yes then how?
- ➤ Is helicopter parenting affecting the child's mental health, if yes then how?
- > Are there advantages for the child if they have helicopter parents?
- Can it be blamed on the helicopter parents, if they ruin the child's future by not giving him/her more exposure to the world?
- > Do helicopter parents know that they are helicopter parents?
- Are parents aware about the term 'helicopter parents'

HYPOTHESIS

- GENERATION-Z IS AFFECTED BY HELICOPTER PARENTING
- KIDS ARE MORE LIKELY TO SUFFER FROM STRESS AND ANXIETY BECAUSE OF HELICOPTER PARENTS
- CHILD IS MORE LIKELY TO DEVELOP LOW SELF-ESTEEM OR LOW SELF-CONFIDENCE DUE TO WHICH IT WILL CREATE PROBLEMS IN THE FUTURE
- PARENTS WILL THINK BEING A HELICOPTER PARENT IS GOOD FOR THE CHILD AND THEIR FUTURE AS IT PROTECTS THEM
- AGE GROUP 16-19 WILL BE AFFECTED MORE THAN AGE GROUP 13-16
- SINGLE PARENT ARE MORE LIKELY TO BE HELICOPTER PARENT
- HELICOPTER PARENTING AFFECTS THE CHILD'S INDEPENDENCY AND EXPERIENCE WHICH THEY NEED WHEN THEY GO TO ADULTHOOD

Literature Review

> (Lythcott-Haims, 2015)

"How Helicopter Parenting could be ruining a generation of children"

She talks about how helicopter parents, parents who pay closely attention to their kids activities and schoolwork in an effort to not only protect them from pain and disappointment, but to help them succeed. How parents over helping may lead to harm for the child and how to take a step back if you are over doing it. As we know the name itself helicopter parents indicates how parents "hover overhead". Julie Lythcott-Haims, a former dean at Stanford University and author of "How to Raise an Adult," also says that parents who hover could be ruining a future generation because of being too over-protective and doing so much for their kids this will lead to the kid not being independent enough in their adulthood and also that it's keeping their children from becoming fully functional. She also talked about how parents who are overdoing it in other words becoming a helicopter parents, that there is a way to step back. Paying close attention to your kids is not wrong in fact she mentioned "I would never tell a parent to cut your child off and just throw them into an unfamiliar place," she said. "We have to stop doing so much so they can really begin to lead their own lives."

➤ (LASCALA, 2019)

"What Is Helicopter Parenting? Experts Say It's Too Much For Kids"

She started with how helicopter parenting is not something new but that it just got worse and worse. As helicopter parents are known for hover overing, they hover over and then rescue their children whenever trouble arises. Also as she mentioned these parents are obsessed with craving to create a perfect life for their children, with no problems ,issues, any kind of disappointment or 'learn from your mistake'. Some examples which were given like these hovering can be physical too; not letting your toddler run in the free park in an effort so they don't get hurt. Marisa LaScala also listed the signs of helicopter parenting, the disadvantage of being a helicopter parent out weight the benefits and how to pull back from being a helicopter parent to a normal parent

> (Laguipo, 2020)

"Helicopter parenting creates social and educational problems later in life"

This article talks about a new study which shows how, overly strict parents undermine the autonomy of their children which can lead to less favourable outcomes well into adulthood. A team of researchers at the University of Virginia revealed that teenagers whose parents are overbearing and .overcontrolling may have

difficulties in social relationships and educational attainment by the time the teens reach 32 years old. The research team aimed to determine the long-term effect of parenting that is psychologically controlling on teens, and if the effects will last when they become adults. The researchers said that parents who attempt to control their children through intrusive means might be doing wrong, despite their good intentions. Children whose parents use such strategies may have long-term problems, including low self-esteem and lower grades, since they are discouraged from asserting themselves and gaining independence. Study results revealed that having overcontrolling parents at age 13 was tied to less supportive romantic relationships for those who were in relationships by the time they were 27 years old. The study also found that the children of overcontrolling parents were less likely to be in a relationship by age 32, and they had lower educational attainment by the same age.

(by the agency, 2 June 2015)

"Children of 'helicopter' parents have lower self-worth"

This article talks about how various researches show how helicopter parenting is detrimental to children, and can have a negative impact on them both mentally and physically, regardless of the amount of love and support given alongside. The children whose parents are over involved in their lives have a greater likelihood of developing low self-worth, and of engaging in risky behaviour, such as binge drinking. A study by Brigham Young University in Utah found that the negative effects of over involvement of parents such as making important decisions for their children, solving their problems and intervening in their conflicts, cannot be neutralised by parental warmth. Additionally, a lack of warmth makes the negative effects worse. "From our past work, we thought there might be something positive about helicopter parenting under certain conditions, but we're just not finding it', "overall, stepping in and doing for a child what the child developmentally should be doing for him or herself is negative. said Professor Larry Nelson, whose research involved 438 students. Writing in the journal Emerging Adulthood, the professor of human development stated the following points on helicopter parenting:

- 1. In and of itself is not inherently warm.
- 2. It is not facilitative for development of emerging adults.
- 3. It represents another form of that is linked to maladjustment in emerging adulthood

> (DANIELLE TELLER,2018)

"Why you should give your teens more freedom"

Is intense parental involvement really the key to long term success. In this article the writer who is a parent talks about her experience of how she raised her children and what was the difference between her and other parents who can be considered as "helicopter parents" or "tiger parents".

Many parents heavily police their children's schoolwork, music practice, and extracurriculars in the hope that their offspring will go on to elite universities and professional success. The writer decides to not parent their kids in this way, they chose to give their kids a lot independence hoping that it will install a sense of maturity and responsibility in them, they just provided guidance and support expecting their kids to be good citizens at home and at school, with their goal ultimately being that they will hand over the reins to their children, so that when the time comes their children will have complete control over their own lives. The reason the writer decided to take such approach was because it seemed most likely to produce happiness in their lives and they were convinced that intense parental involvement in a children's life was not the key to their long-term success. The writer also believes that over involved parenting causes unhappiness in children's lives and also causes them to overwork which makes them stressed out, that leads to mental illnesses such as mood disorders and can also cause children to practise self-harm.

RESEARCH METHODOLOGY

Sources of Data

The type of data used for this research is PRIMARY DATA as primary data is information collected personally by a researcher. The method used for collecting primary data for my research is

> ONLINE SURVEY

The online survey is made for children age group 13-16 and 16-19 (generation-z) and for the child parents to collect enough data and get the views on both the perceptive. For the survey there were 90% 'close ended questions' as parents may not put that much effort in answering the questioners.

For children there were 10% open-ended questions to know their personal view points and what they feel about helicopter parenting.

Other kind of data which was used were both quantitative and qualitative as for this research topic "effects of helicopter parenting on generation-z" the data that will be needed which consists of information expressed numerically that captures the 'who, what, when and where's behaviour for knowing how many perfect of child or parents think whether it's true or not. And also other data that consists of non-numeric data that expresses the quality of a relationship, this data captures the quality of people's behaviour by exploring the 'why' rather than 'what, when, where'.

These data were collected these by conducting online survey which consists of 'structured interview' set of standard questions, the questions had the order in which it was placed so it is followed by the sequence which started by asking them "if they were aware about the term helicopter parent" and ending with asking them "on a scale of 1-10 how comfortable you are with your child/parent or what best describes your relationship with your parent/child"

Questionnaire: Parents Online Survey

- Q1. Were you aware about the term helicopter parenting?
- Q2. Are you a working parent?
- Q3. If you have children, do you feel as if you may pay closely attention to their every activity?
- Q4. Do you have apps installed to keep track of your child?
- Q5. Are you a single parent?
- Q6. Do you feel as if you are being overprotective over your child or don't let them do anything?
- Q7. On a scale of 1-10 describe your relationship with your child? (1=bad, 5=okay, 10=very good)
- Q8. How comfortable are you with your child?
- Q9. Do you feel your child is fully independent on their own (if they are living with you, do you feel they will be able to live on their own if they live alone in the future)
- Q10. Do you feel interfering in your child's life too much is good for them?
- Q11. Paying extremely close attention to your kid's activities and schoolwork in order to not only protect them from pain and disappointment, but to help them succeed and is good for their mental health?
- Q12. It's said that kids who have helicopter parents suffer from low self-esteem and low self-confidence, what are your thoughts about this is it true or not?
- Questionnaire: Teenagers Online Survey
- Q1. What is your age group?
- Q2. Do you feel as if your parents are overprotective or don't let you do anything on your own?
- Q3. Do you know someone who has a helicopter parent? If yes then how is it affecting your friend
- Q4. Which of the following best describes your feelings towards your parents (please select 1 option or more)
- Q5. Do you think helicopter parenting helps or hurts children as they transition into adulthood?
- Q6.Please check off one or more of the following symptoms:
- Q7. Last question: Do you feel you are able to be fully independent on your own? (If you're living with your parents, do you feel you'll be able to live on your own and make your own decisions in the future)
- Q8. Do you think your parents pay closely attention to your each and every activities?
- Q9. Have your parents installed any apps, to keep track of you?
- Q10.on a rate on 1-10, how comfortable are you with your parents?

SAMPLING FRAME

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The type of sampling techniques which was chosen for this research is stratified quota sampling. Stratified quota sampling is the type of sampling techniques chosen for this research stratified quota sampling. Stratified quota sampling does not strictly has a huge sampling frame like systematic sampling where the target population is very large. In Stratified sampling it is enough just to know the characteristics of the respondents in order to construct a sample. Therefore the sampling size used for this research is 15 parents and 25 children age group 13-19(generation-z).

Choosing the age group 13-16 and 16-19 to differentiate how it affects the new teenager and the elder teenager. These age group are included in generation-z and specifically this age group was selected for this research to know how it affects the teenagers mental health and how will it be harmful for their future.

Another sampling even used which was very useful for the research is snowball sampling. Snowball sampling is where research participants recruit other participants for a test or study. It is used where potential participants are hard to find. It's called snowball sampling because (in theory) once you have the ball rolling, it picks up more "snow" along the way and becomes larger and larger. On my survey for the children there were questions like "Do you know someone who has a helicopter parent? If yes then how is it affecting your friend" and it talked mostly about mental health and how it affects their confidence. Therefore snowball sampling was necessary for this research so the sampling size increases and also so to know more about the how it affects the age group.

After getting the sample size of 25 including siblings for children, those same children were asked to send the survey to their parents. In total there were 15 parents reply which was enough to see how it differs: the perceptive of parents and children. There was a different group of; working parents and single parent to see how it differs and to prove the hypothesis that "single parent are more likely to be helicopter parents"

AREA OF STUDY

This study was done through online survey as specifically as there was not any particular area to research on as the research just needed a particular age group but after knowing areas which has helicopter parents. The area covered is Borivali to Mira-road. 85% of the data was from the area Mira-road and rest were in between Borivali and Dahisar. The age group needed for this research were available in this area therefore it helped the sample size to increase. Many teenagers age 13-16 and 16-19 live in this area and many of them even have helicopter parents. For this research a huge area of study wasn't necessary as it would have been hard to do this research in a time given. The area of study chosen for the research topic 'effects of helicopter parenting in generation-z' was enough to gather all the necessary information and get to know more about what parents and teenagers both 'feel' and 'think' about helicopter parenting. Many of people living in the area of study did not know what exactly is helicopter parenting so to also spread awareness about the term 'helicopter parenting' and also about how it affects and may be harmful for your child future.

DATA COLLECTION

Summary of questions asked in survey; FOR PARENTS

• Findings



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do you feel as if you are being overprotective towards your child or you dont let them do anything? 15 responses







how comfortable are you with your child ?(1=bad,5=okay,10=very good)



Do you feel your child is fully independent on their own? (If their living with you, do you feel they will be able to live on their own and make own decisions in the future) 15 regenee



do you think interfering in your childs life too much is good for them?



paying extremely close attention to your kids' activities and schoolwork in an effort to not only protect them from pain and disappointment, but $t_{\rm st}$ them succeed, is good for their mental health?



its said that kids who have helicopter parents suffer from low self esteem and low self confidence, what are your thoughts about this is it true or not?

A55	TRUE	
2000	FALSE	
20/6 50%	 depends 	
2055	arent helicopter parents	
EU/S	not aware about helicopter parents	

Summary of questions asked in survey; FOR generation-z (teenagers:13-16 and 16-19)

Findings





Do you know someone who has a helicopter parent?



Which of the following best describes your feelings towards your parents (please select 1 option or more) 26 responses

I feel as if they're always I	0 (0%)			
I feel dependent on my pa		7 (26.9%)		
I feel embarrassed at the	-2 (7.7%)			
My parents let me make d			-15 (57.7%)	
I get over challenging stru	-6 (2	3.1%)		
My parents have always			-16 (61.5	96)
I don't know what I would		8 (30.8%)		
I want them to stop trying t	-2 (7.7%)			
0	5	10	15	20

- ▶ I feel as if they're always leaning over my shoulder, getting into my business.
- ▶ I feel dependent on my parents to make my decisions for me.
- ▶ I feel embarrassed at the amount my parents control my life.
- My parents let me make decisions for myself.
- ▶ I get over challenging struggles on my own.
- My parents have always made sure nothing bad happens in my life.
- ▶ I don't know what I would do without them.
- > I want them to stop trying to control my life.





- I feel anxious when making decisions on my own.
- ▶ I suffer from depression.
- ▶ I feel entitled when it comes to getting my way.
- My parents count as one of my best friends.
- I dislike when my parents give me gifts or support.
- I'm a perfectionist.
- I experience none of these symptoms.

Do you feel you are able to be fully independent on your own? (If you're living with your parents, do you feel you'll be able to ... and make your own decisions in the future) 26 responses



.do you think your parents pay closely attention to your each and every activities? 26 responses



have your parents installed any apps , to keep track of you? 26 responses



on a rate on 1-10 , how comfortable are you with your parents? 26 responses



Perspective of **PARENTS and CHILDREN** about Helicopter Parenting **Parents**;

According to the responses parents say is that it's not completely true that children who have helicopter parents suffer from low self-esteem and low self -confidence. As in research the one of the hypothesis says that "single parents are more likely to be helicopter parents". As one of a great response from a single mother was "it is difficult for a child to understand especially when a child have a single parent what responsibilities a single parent is going through because being a single parent we know what we go through to full-fill their demands responsibilities needs we be a father but by doing that we forget sometimes that we are mother too participating to character at a time we own create distance between a mother and a child but later when we don't exist or don't be in their life they realize may be what we have done for them being a single parent they will definitely do their best in future and they will succeed"

Other parents added "Yes, it is true because at some part of child's life there should not be much interference in their life because in future it can be problem for them to make their own decisions. So I believe that children should be free to take their own decisions". "True and I believe there should be balance with regards to the strictness because the more he/she is controlled the more he will be curious to see what's on other side of the fence."

Others believed it's not completely true or that it depends child to child. "Paying extremely close attention to your kids' activities and schoolwork in an effort to not only protect them from pain and disappointment, but to help them succeed. Is good for their mental health?" 71% parents agreed that it is good for their mental health unlike the children who filled the survey and unlike the articles who talk about helicopter parenting.

85% parents believe that helicopter parenting is no harm for the children instead it is good for their future and it will help them succeed and does not affect the child's mental health. Whereas 15% of them do not agree and think helicopter parenting affects the child and does not allow them to be independent enough for the future.

Generation-z (teenagers: 13-16 and 16-19);

53% of the age group was 16-19 and 46% were 13-16. Out of these age group 50% were aware about the term helicopter parents and others were not. Out of 26 participates of these age group 3.8% teenager agreed that all the times their parents are overprotective and don't let them do anything on their own. Unlike parents responses 66.7% teenagers responded that helicopter parenting hurts children as they transition into adulthood. There are only 3.8% of teens who have apps installed by their parent to keep track of them not only that out of 26 teens, 7 are 10/10 comfortable with their parents, 2 of them are 5/10 and 1 of them is 1/10 comfortable.

These teenagers also explained how helicopter parenting affects the friends who has helicopter parents.

- "She doesn't get to socialize and she feels lonely"
- "They are not able to enjoy their life to the fullest and always have restrictions for going out with friends or for trying something new"
- "Yes, she's very scared and tends to lie to them as they don't allow anything"
- "Yes, she always feels as if her mom doesn't trust her and that's why she doesn't allow her to go anywhere and she then lies to her mom."
- These are the comments made by the teenagers about how it affects their friend. Teenagers also agreed that it affects the child's mental health and also does not let them be independent enough. Not only that one participant also mentioned how his friend was forced by the parent to take the subject he wasn't interested in. he was forced to take C.A subjects but he wanted P.E Controlling the future of child just so they succeed is what every parent do, but taking away the child's interest will just make them feel low.
- Teenagers say is that helicopter parenting is no help instead it is something which is not good for the child. It affects their future and their confidence. It even kills their independency in future. Helicopter parents want a perfect world for the child which is not possible. Decision making is another thing which is taken away by these kind of parents

CONCLUSION

a)Helicopter parenting affects the child confidence for example the child may suffer from low self-esteem or low self-confidence due to which it will create problems in their adulthood. The child will not be independent enough to live on their own in the future. These parents wish nothing but success for their children but by doing things in a wrong way. This parenting affects the child's learning and development that results into poor self-

regulation and childhood anxiety. Also there are many consequences of helicopter parenting towards the child such as;

- Stress and anxiety
- Lack of life skills
- Lack of creativity
- Lack of independent thoughts and action

And many more. These parents wish success for their kids but getting into the child's life too much and paying closely attention to their each and every activity they do just to protect them from pain or disappointment just so they can succeed will make them feel uncomfortable and make them feel as if they are being monitored 24/7. Being overly involved in your kid's life is something no teenager would want. Teenagers have a lot of mood swings, change in personality or are easily influenced by anything and anyone. Therefore, proper care of them should be taken in a correct way and not something which will restrict them from everything. These Parents try everything to help their children from anything to cause them trouble. But taking all the decisions for your child and control their way of living, the children be independent enough to live on their own in adulthood. This IS harmful for their children as unknowingly the parents may be helicopter parents. This will also result into the child having mental health issues.

The signs of being a helicopter parent is easily seen, those are:

- Being overly involved in all areas of a child's life (Academics, Recreational activities and their friendships)
- Always correcting their children forgetting 'you learn from your mistake'
- Doing each and every task for their children rather than them being independent
- Solving problems and conflicts for them rather than allowing them to resolve their own problems.

b) The objective of this research was to find

- > Is helicopter parenting affecting the child's future, if yes then how?
- > Is helicopter parenting affecting the child's mental health, if yes then how?
- > Are there advantages for the child if they have helicopter parents?
- Can it be blamed on the helicopter parents, if they ruin the child's future by not giving him/her more exposure to the world?
- > Do helicopter parents know that they are helicopter parents?
- > Are parents aware about the term 'helicopter parents'

Therefore, yes helicopter parenting is affecting the child's future as it takes away their independency and it does not allow them to learn from their mistake. Children with helicopter parents also are likely to suffer from childhood anxiety as their parents are the one doing everything for them from fighting their child's battles to doing their school work. Helicopter parenting is also affecting the child's mental health because the child will not be confident enough and it will just affect him/her in future if they make any mistakes. There are no advantages for the child if they have helicopter parents as "helicopter parenting has been a thing for a while but it's only gotten worse" as rightly said by the author *Marisa LaScala*. It cannot be blamed on the helicopter parents, if they ruin the child's future by not giving him/her more exposure to the world because parents want what's best for their children, but there is a way to step back from being a helicopter parent. As 43% of parents in the survey were not aware about the term 'helicopter parenting', parents who itself are helicopter parents aren't aware they are as they are not aware about the term helicopter parent itself.

c) The hypothesis of this research;

- ➢ GENERATION-Z IS AFFECTED BY HELICOPTER PARENTING
- KIDS ARE MORE LIKELY TO SUFFER FROM STRESS AND ANXIETY BECAUSE OF HELICOPTER PARENTS
- CHILD IS MORE LIKELY TO DEVELOP LOW SELF-ESTEEM OR LOW SELF-CONFIDENCE DUE TO WHICH IT WILL CREATE PROBLEMS IN THE FUTURE

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- PARENTS WILL THINK BEING A HELICOPTER PARENT IS GOOD FOR THE CHILD AND THEIR FUTURE AS IT PROTECTS THEM
- AGE GROUP 16-19 WILL BE AFFECTED MORE THAN AGE GROUP 13-16
- ➢ SINGLE PARENT ARE MORE LIKELY TO BE HELICOPTER PARENT
- ➢ HELICOPTER PARENTING AFFECTS THE CHILD'S INDEPENDENCY AND EXPERIENCE WHICH THEY NEED WHEN THEY GO TO ADULTHOOD

ALL THE HYPOTHESIS WERE PROVED RIGHT THROUGH THE DATA THAT HAS BEEN COLLECTEDAND THE RESPONSES OF THE TEENAGERS AND THE PARENTS. Future Scope

The futurist approach to this topic would depend on how the parents raise their child, whether it is for their child's benefits or is it just back firing for their child? Children who have helicopter parents now, in future would not be able to survive without their parents even if they are a grown-up adult because helicopter parents are the one who made the child so dependent on themselves. This might not just affect one teenager or one group of teenagers but the whole generation. We very well know that in India 34% population consists of youth, as said the youth have the power to change the nation therefore, these young minds will be more modern and innovative which will help nothing but in betterment of the country. As rightly said by Khalil Gibran "Parents are like a bow, And children like arrows. The more the bow bends and stretches, farther the arrow flies. I fly, not because I am special, but because they stretched for me."

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REVIEW RESEARCH PAPER: REFLECTIVE THINKING – RADAR FOR LEARNERS IN THE INFORMATION DRIVEN ERA

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ABSTRACT

Living in an information driven society can be challenging at times especially when it comes to classifying relevant and irrelevant information or right and wrong information. Moreover it is easily accessible through Whatsapp, internet, OTT platform etc. Every student living in the modern world is constantly bombarded with thought conditioning information through adults around him, media, social circles etc. This process of influencing is from cradle to grave. If education has to equip individuals with the right kind of skills and prepare them for life equipped with the 21st century skills a sound base of a reflective mindset has to be cultivated. The review focuses on development of reflective thinking as a pre requisite to transferring the 21st century skill set of Critical Thinking, Decision Making, Problem Solving, Digital Literacy, Creativity, Collaboration and Autonomy among young learners.

Keywords-Reflective Thinking, 21st Century Skill set

INTRODUCTION

The National Policy of Education of 2020 is the first education policy introduced in 21st Century. The prime focus of this policy is to create a robust education system that will complement the development of the country in the Digital Age. It is in sync with the United Nation's sustainable development goals (SDG4) with the prime focus on developing higher order cognitive abilities. The underlying principle in this policy is to develop good human beings capable of rational thought and action. Another important aspect of the policy is the flexibility it plans to give learners freedom to choose their learning trajectory. Freedom comes with responsibility. The learner should take responsibility of his learning.

Years ago in the post independence era when India was heralding in the industrial revolution JRD Tata had rightly pointed out that ushering the Industrial revolution without changing the education system is like trying to support a structure of steel with pillars of straw. Likewise walking into the digital world without enhancing our thought processes with a creative bend will invite trouble. Cultivation of Reflective Thinking in young minds through guided interactions is imperative to fructify the National Education Policy of 2020. This Research paper is an attempt to bring out the significance of key player (reflective thinking) in development of higher order cognitive abilities.

.Historical Insights on Reflective Thinking

Early Ideas on Reflective Thinking

According to Dewey Reflective thoughts are – our single most potent antidote to erroneous belief. Dewey has clearly implied that a trained mind will think reflectively. Reflective thoughts are not random collective thoughts. It is a sequence of thought such that each thought determines the next as s a possible outcome. *Reflective thinking is active, persistent and careful consideration of any belief or knowledge in the light of the grounds that support it and the further conclusion to which it tends.* Thinking is a basic human facility that we take for granted. Mastering the art of thinking today is akin to channeling our natural. curiosity in a productive way when confronted with an overflow of information. Dewey firmly asserts that Reflective thoughts are a conscious and voluntary effort by the mind to establish belief upon firm basis of reason.

According to John Dewey (1939)[1] reflection is a deliberate and active process wherein we try to make sense out of a difficult situation.

Kolb and Fry (1975)[2] looked at the constituent parts of reflection and created a cyclic frame work for reflective thinking that could be adapted to any kind of experiential learning.

Van Manen (1977)[3] gave the hierarchical frame work indicating three levels of reflection. Emprical – Analytical, Hermaneutic-Phenomenological & Critical-Dialectical.

Kolb's experiential cycle (1984) focused on learning through reinterpretation of an existing experience in short reflecting deeply over an experience.

Boud, Keogh and Walker(1985)[4]they asserted that reflection cannot be understood as an independent phenomenon without considering the emotions attached to the object or situation of reflection. Reflective thinking draws its guidelines from reflection itself.

Graham Gibbs (1988)[5] developed the reflective cycle based on each stage of experience that occurs in the process of learning.

Donald Schon (1991)[6] He claimed that by using reflection practitioners can make explicit, tacit knowledge. He followed a different approach to reflection. His model stressed on reflection while the action is on and reflection after the action is complete. According to Biggs (1999) in King (2002) any teaching learning process devoid of reflection will impart only superficial knowledge

Branch & Paranjape (2002) assert that reflection leads to moral, psychological, personal, emotional & cognitive growth of an individual.

While reflection is a review of a situation that allows us to make meaning, reflective thinking promotes reflective practice that enables us to carry the learning to novel situations (Finlay 2008).

Richard Jordi in his article published on 22nd September 2010 states that reflection in learning can facilitate a dialogue between our implicit embodied experience and conceptual aspects of our consciousness which in turn makes experiential learning more meaningful.

By the late 20th Century the need for reflective thinking was felt by educationist across the globe. There is no denial that in most professional courses sound judgment and decision making heavily relies on Reflective thinking.

The 21st century literacy has a different set of requirements in terms of skill sets the learner needs to possess. According to the Assessment and teaching of 21st Century skills (ATC21S) research these skill sets can be grouped into four broad categories:

- 1. Ways of Thinking
- 2. Ways of Working
- 3. Tools for Working
- 4. Skills for living in the world

These skills sets were actually reviewed by Binkley et al, in preparation; Cisco, Intel, Microsoft (2008) and outlined by the Confederation of British Industry (2007) following a consultation with its members. [7]

This clearly lays an emphasis on the ways of Thinking. In the light of the levels of thinking Reflective thinking forms a base for all higher order thinking skills .

B. Reflective thinking and Problem Solving

Reflective thinking helps learning in a complex problem solving situation as it provides the learners an opportunity to analyze ways and means that could be used to achieve their goals. Researches back the fact that reflective individuals are better problem solvers. Constructivist paradigm is based upon the contributions of Piaget, Vygotsky, Bruner, Howard Gardner, John Dewey, Gagne, Ausubel, C. Hull, Thorndike, E. Tolman, Wertheimer and many others they argue that learners can construct their own knowledge through problem solving that heavily relies on reflective thinking after all learners construct new knowledge after reflecting over previous understanding.

Reflective thinkers are better problem solvers. In an attempt to understand this Kholid et al (2020)[8] used a descriptive- qualitative approach on 140 learners who were made to solve analytical Geometrical questions that caused learners to indulge in reflective thinking due to their difficulty level. The data collected was validated by triangulation technique. It was observed that on 21 out of 140 actually used reflective thinking. The rest were only focused on obtaining the correct answer and did not understand the purpose of the problem.

Demirel, M., Derman, I., & Karagedik, E. (2015)[9] in their study on the relationship between reflective thinking skills towards problem solving and attitude in mathematics reveal that there is a moderate significant difference between students reflective. thinking skills towards their problem solving and attitude towards mathematics in a positive sense.

Kitchener, K. S., & Fischer, K. W. (1990) [10]that logic alone is insufficient to cultivate higher order thinking. A systematic approach to thinking has to be cultivated via problem solving. This clearly indicates that reflective thinking can be cultivated through problem solving exercises.

C. Reflective Thinking and Decision Making

Reflective thinking is the outcome of a disciplined mind a disciplines mind offers intellectual freedom according to Dewey. Reflective thinking if applied to decision making will facilitate effective problem solving. Reflective thinking enables the decision maker to analyze the ebb and flow of ideas that creates a synergy among the various approaches to decision making.

Reflective thinking facilitates unbiased decision making according to Isler, Yilmaz et al (2020).[11] Reflective thinking helps us tap the internalized value system providing a new perspective or a better understanding of the given situation and aids a sound decision making.

Darren Mathews (2021) in his blog on Reflective thinking asserts that having control over the decision making flow is very important as some decisions could be life changing.

.D. ReflectiveThinking and Design Thinking

Hong, YC., Choi, I [12] in their article on Three dimensions of reflective thinking in solving design problems: a conceptual model clearly highlight the. fact that reflective thinking is a prerequisite for design Thinking. There are three dimensions to guide the designer's reflective thinking namely the timing of the reflection, the object of reflection and the level of reflection. Reflective thinking provides meaning to the process of design thinking. Vice versa design thinking also provides a fertile ground to cultivate reflective thinking. Heris Hendriana, Harry Dwi Putra and Wahyu Hidayat (2019)[13] have prescribed design activities in Mathematics to promote reflective thinking.

Hae Deok Song et al (2015)[14] have emphasized on the importance of reflective thinking among adolescents . Through an exploratory factor analysis they concluded that in adolescents three clusters of instructional designs could promote reflective thinking : Reflective learning environments, reflective teaching methods and reflective scaffolding tools. Further a one way ANOVA test revealed that the most helpful factor was reflective learning environment with emphasis being on freedom and collaboration.

E. Reflective Thinking and Professional Development

Every professional at some stage has to think reflectively on how to enhance his practice or Craft. In fact good reflective thinkers are better professionals.

Shavit and Moshe(2019)[15] in their article on The contribution of reflective thinking to the professional development of pre-service teachers have clearly indicated that reflective thinking helped the pre service teachers in their practical work. Reflective thinking is an important facet of Meta Cognitive thinking.

Systematic reflective thinking helps a professional to create meaning and develop continuity between old and newer experiences and between one's own and others experiences. Reflective thinking helps a professional develop a heightened awareness that will in turn aid Professional development.

Kelvin L. Seifert (1999) in his book Reflective Thinking and Professional Development: A Primer, clearly brings out the significance of reflective thinking in professional development.

F. Reflective Thinking and Scientific Inquiry

According to C Rodgers(2002)[16] Reflection is a process of enquiry. According to her no enquiry based curriculum is effective without reflective thinking. Reflective thinking is not a mere haphazard mulling over any idea or situation. It comprises of definite units linked together to meet a common end. Eva Erdosne et al (2002) have studied the effect of representational Guidance and reflective assessments on scientific inquiry through 'Mapping to know'. They concluded that there was a superior effect of evidence mapping with the use of reflective assessments through the inquiry process.

Heekyong Kim and Jinwoong Song (2005)[17] in their features of peer argumentation in middle school students' scientific inquiry have identified four stages Focusing, Exchanging, Debating and Closing. For an effective critical discussion making good use of Focusing stage was reported to be key factor. With appropriate focusing and reflection during this stage they were able to complete the circle of enquiry effectively.

In the Hand book of Meta cognition B White, J Fredrickson and A Collins (2009) have presented their learning that students' development of scientific inquiry is largely dependent on meta cognitive skills of reflective thinking. They too have chalked out four processes of scientific inquiry (1) Theorizing, (2) Questioning and Hypothesizing, (3) Investigating, and (4) Analyzing and Synthesizing. The role of reflective thinking is significant in Analyzing and Synthesizing.

G. Reflective Thinking and Experiential Learning

Learning from experience is a very concrete way of learning if it is backed by reflective thinking. Reflective thinking enables us to challenge our underlying assumptions and beliefs (Brookfield,2017). Learning is the process whereby knowledge is created through the transformation of experience" (Kolb, 1984, p. 38). Kolb's experiential learning is based on his reflective model. Experience is the best teacher only if you can reflect on it. Hans Gelter [18] asserts that reflective thinking is not a spontaneous activity, it has to be learned and encouraged.

After every experience if we reflectively mull over it we are able to derive valuable insights from our experience. James. W. Gentry (2006)[19] in his guide to Business Gaming and Experiential Learning ,while sharing his insights on experiential learning stresses on the fact that for experiential learning to be meaningful the cognitive and affective domain should be involved with the psychomotor domain while performing a learning activity. Through failure of the activity and musing over causes of failure (thinking reflectively) maximum learning occurs.

David Kolb in his book on experiential learning has very beautifully brought out the role of Reflective thinking in converting an experience into learning. In the hand book of Experiential learning edited by Melvin L. Silberman, he clearly states that even if Gaming and Simulations are used to provide learning experience it should be followed by activities of reflective thinking encouraging the learner to make meaning of the experience. Having completed this phase one can guarantee learning.

In her article on Experiential learning Valentina Sharlanova (2004)[20] has described the cycle of experiential learning as :

Concrete Experience - the student is an active participant

Reflexive Observation - the student consciously reflexes on experience

Abstract Conceptualising - the student tries to conceptualise theory or model of what he has observed

Active Experimenting – the student tries to plan how to test the model, or the theory, or the plan for the forthcoming experience

The third stage of Reflexive observation demands an abstract conceptualization that will help the learner connect past learning with the new experience and this phase requires systematic reflective thinking.

H. Reflective Thinking and Self Regulated Learning

(Autonomous Learning)

Dr. Saleh Mohammad Abu Jado (2015)[21] stressed on the effective use of Learning journals that promote reflective thinking and also initiate self regulated learning among pre service teachers. He has mentioned that Reflective thinking allows professionals to analyze, evaluate, critique and helps bridge the gap between imagined views and job realities thus facilitating better learning of the craft.

In a pilot study conducted on nurses Marilyn and James (2013)[22] observed that Reflective thinking among experienced nurses made a difference in their subsequent practice while among novices it help them develop a better perception towards problems faced. The structured reflection with the help of cues and peer facilitated reflection both promoted a self regulated learning from the experience at hand.

Ruth Ann Kuiper et al (2004)[23] in their paper on Promoting cognitive and metacognitive reflective reasoning skills in nursing practice: self-regulated learning theory have emphasized that self regulated learning is important to promote reasoning in the nursing context and reflective thinking being a metacognitive process thus aids self regulated learning among nursing students.

Self Regulated learning in any field relies on the reflective thinking ability of the learner to make the learning concrete.

Millah Kamalia and Ishaq Nuriadin (2021) [24] in their Analysis of the mathematical reflective thinking ability of MTs students in terms of self-regulated learning during the COVID-19 pandemic brought out a direct relationship between self regulated learning and reflective thinking their conclusion mentions that poor reflective thinkers are poor self regulated learners.

In fact self regulated learning is synonymous to active learning (J Pilling, 2007) .With the ever increasing periphery of knowledge learners must take responsibility for their own learning and move at their set pace as all learning cannot be rendered within the walls of the classroom

Reflective thinking aids the learners to develop higher order thinking skills by refining their thought process and enabling them to relate new knowledge to old experience making learning concrete. It equips them to understand abstract information and transform it to concrete understanding which will enable them to transfer the learning to novel situations. Above all reflective thinking helps the learner understand his own strengths and weakness.

Reflective thinking has a significant impact on student achievement too. Afsaneh Ghanizadeh (2017)[25] in the article on the interplay between reflective thinking, critical thinking, self-monitoring, and academic achievement in higher education explores how reflective thinking is an indicator for academic achievement.

I. Reflective Thinking and Digital Literacy

Peter Lang in his book Digital Literacy –Concepts, policies and practices identifies the gradual dissolution of the solid classical industrial order in society into era of liquid modernity (Bauman,2005) and Digital Technology is both the means and symptom of this change. Access to information via digital devices is readily available. Learners are no longer dependant on teachers and other adults to obtain information and convert it to knowledge. Self screening of available information is mandatory. Training young minds to handle all available information, to evaluate and integrate the information and to create information useful to them is the need of the hour or we would have a generation of misguided minds.

Gila Cohen Zilka (2017)[26] investigated the awareness of ICT capabilities, digital literacy, and use of reflective processes in children who received their first home computer and she observed that there was a significant difference in learners who used the computer to complete their home assignment. They did indulge in a certain level of reflection to complete their home assignment.

Sarah .L.W (2017) observed that in United States the teacher education was more focused on functional technology skills and critical and reflective components were largely absent. Her research focused on how to bring reflection in action among pre service teachers while using the digital platforms.

Ayyildiz, P. (2021 [27] while exploring Digital Literacy Levels and Technology Integration Competence of Turkish Academics observes that upgrading training programs to instill reflective thinking as one of the mandatory skill among the 21st Century skill set is necessary to bring about academic proficiency while using digital technology.

J. Reflective Thinking and Critical Thinking

Choy, S. Chee; Oo, Pou San (2012) [28] asserted that reflective thinking is a precursor to developing Critical Thinking. Their research involved pre service teachers and they concluded that further research needed to be carried to bring about reflective practices among teachers so that Critical Thinking is developed.

Fatma Erdogan(2019)[29] in her paper on Effect of Cooperative Learning Supported by Reflective Thinking Activities on Students' Critical Thinking Skills has shown a way to develop critical thinking skills among grade 7 learners in the Math class. Her quasi experimental method with pre test post test control group yielded a result that showed a significant rise in the post test mean scores. This signifies that Critical Thinking could be developed among school going learners through reflective thinking cooperative learning activities.

II CONCLUSION

The National Education Policy of 2020 lays emphasis on development of 21st Century skills among the learners but to achieve this outcome the education system bears the responsibility of laying a strong foundation through cultivation of reflective thinking among learners so that they can navigate the information highway with ease without getting lost in the labyrinth of misrepresentated or wrong details and develop a razor sharp understanding of any problem at hand. Reflective Thinking helps learners to constantly, switch directions in thoughts and change problem solving strategies. The Fluid uncertain future demands that learners be prepared for any kind of eventuality without loss of vigor.

Classrooms must be fertile grounds to provide integrated experiences of modeling reflective in real life situation. Most of the researches on reflective thinking through the years were focused on cultivating the attribute among professionals and adults. Recent trends in the researches among developing countries are focused on getting reflective thinking into the classroom. Thought process cannot be rapidly molded. It is a gradual process. Moreover if classroom teaching should lead the learner to the development of higher order thinking skills (Blooms Taxonomy) like analysis, synthesis, evaluation and creative thinking then learners must be induced to thinking reflectively. The pertinent fact is just as each of the mentioned skill in the paper relies on reflective thinking for its efficacy, each skill of these skill set can be employed to cultivate reflective thinking too!

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CHARACTERIZATION OF POLYPYRROLE FILLED POLYVINYL CHLORIDE THIN FILM COMPOSITES

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ABSTRACT

The present study reveals with study of structural land thermal properties of polypyrrole filled PVC thin films composites. Conducting polymer composites have attracted considerable interest in recent years because of their numeric applications in variety of electric and electronic devices. Polypyrrole has been regarded as one of the most studied conducting polymers because of its physical and electrical properties that have led to several applications such as solid-state devices and electronics. The X-RD diffractogram reveals the amorphous nature of the films. Thermal stability of Polypyrrole filled PVC was investigated by TGA/DSC. It is evident from the results that PPy filled polyblends are more stable. The electrical conductivity of polypyrrole filled PVC thermoelectrets have been studied. Electret effects in polymers can be produced by orientation of dipoles and /or trapping of charge carriers injected from electrodes as well as generated in the bulk of polymers. It has been shown by thermally stimulated discharge conductivity technique (TSDC) that the characteristics of composite is likely to yield information about the extent of mixing between the components. Electrets prepared by composites have better charge storage capacity than the individual polymers. Measurements of TSD conductivity have been carried out at different polarizing fields. It has been observed that the conductivity of polypyrrole.

Keywords: TSDC, Thermoelectrets, Polypyrrole, TGA/DSC.

1.INTRODUCTION

In recent years, polypyrole is popular in research and has been focus of many studies over other conducting polymers because of its high chemical and air stability and ease of preparation [1]. The typical polypyrole, which is insoluble and infusible, exhibits poor process ability and lacks essential mechanical properties. Efforts to overcome these drawbacks have led to numerous researchers on the synthesis of polypyrrole. Among them, a significant strategy to approach high electrical conductivity is preparing blends or composites of polypyrrole polymers with other insulating polymers (Kassim 2004) [1]. The combination of conventional polymers with conductive polymers or fillers is an important alternative to obtain new polymeric materials with design properties. In such blends, the insulating polymer provides good mechanical properties and process ability while the conducting polymer would provide electrical conductivity.

Conducting polymer composites containing polymer materials incorporated conductive filler have recently been subject of intensive studies. Taking this view into consideration thin films of PPy filled PVC were prepared. The present study discusses the electrical and thermal properties in PPy filled PVC.

2. Experimental Details

Polypyrrole was synthesized by chemical oxidative method from pyrrole monomer using ammonium per sulfate as oxidant and p-Toluene sulphonic acid as a dopant. Aqueous solution of pyrrole 0.5 ml in 7.5 ml water was added instantly to a solution of ammonium per sulphate (150 mg) and p-toluene sulphonic acid (500mg). After 5 minutes the product was recovered by filtration, washed with water and dried at 70° c for 12 hours [2].

Preparation of sample:

In the present study PPy acts as an additive. For composite samples of PPy filled PVC 0.5 weight percent PPy doped PVC, 0.995 gm of PVC was dissolved in 15 ml of THF then 0.005 gm of PPy was added. After stirring the solution for specific hours, the film was prepared by pouring the solution on a clean optically plane glass plate. This glass plate was kept over a pool of mercury to ensure uniform thickness. After complete evaporation of solvent, the film was detached from glass surface [3].

Thickness measurement:

The thickness of the sample was measured by the compound microscope in conjunction with an occulometer having a least count of 15.38 μ m similar to method reported by Sangawar (2007). The thickness of the sample was kept constant throughout the work and is of the order of 46.14 μ m.

Electrode coating:

The electrode coating on the film of measured thickness was done by using quick drying and highly conducting silver paint supplied by Eltecks Corporation, Bangalore. A mask of circular aperture of 2.5 cm diameter was used while coating, to ensure uniformity in the size of the coated silver electrode.

STRUCTURAL CHARACTERIZATION

For structural characterization the X-ray diffractograms of PPy filled PVC films were obtained on XRD-PKL 1729 Phillips Bulk XRD (Figure1). The X-ray diffractograms of all the samples ensures the amorphous nature. To confirm the presence of different functional groups in the prepared samples, the study of infrared spectroscopy of all samples was done on Perkin-Elmer Spectrometer. The thermogravimetry analysis of polymer composites was carried out on TGA Perkin-Elmer Diamond TGDTA.

Measurement of thermally stimulated discharge conductivity (TSDC):

Thermo electrets preparation: Experimental sample was sandwiched between two brass electrodes of the sample holder. The metal polymer metal (M-P-M) system so formed was placed inside the furnace. The M-P-M system was heated at a nearly uniform rate up to a polarizing temperature Tp=343 K and was kept constant for 30 minutes. Different polarizing fields (Ep), 4kV/cm, 8kV/cm, 12kV/cm and 16kV/cm were applied using a stabilized D.C. voltage source for 1 hour keeping the field on. The sample was slowly cooled to room temperature under continuing electric stresses. Total time of polarization was adjusted to be 2.5 h in each case. After polarization, the field was removed and the sample was short circuited for 20 minutes in order to remove stray charges if any. Thus, thermoelectres were prepared by simultaneous application of heat and different polarizing fields [4].

After the electret formation the M-P-M assembly was placed in a controlled temperature furnace supplied by Pushpa Scientific, Hyderabad. The sample was thermally discharged at a uniform rate of 2 K/min and the corresponding was measured in the temperature region 313-403K.

3.RESULTS AND DISCUSSION XRD ANALYSIS

Figure 1 shows X-ray diffraction pattern (2θ versus intensity) polypyrrole filled PVC thin films. The diffraction pattern shows big humps at low diffraction angles, which confirms the amorphous nature of polymer composites [5].

Fig. 1and 2 are the diffractograms for 0.5 and 7 wt% of PPy added PVC thin films respectively. A big hump (broad peak) is observed at angle $2\theta = 12^{\circ}$ and 15° for 0.5 wt. % and 7 wt % PPy/PVC composites.

The diffractograms show big hump representing amorphous nature of the entire sample. However slight changes are observed i.e. shift in the peak position, broadening of the peak and decrease in height of the peak.

These results can be explained as follows.

Polymers form ordered structures that are unlike the perfect crystal formed by atomic and molecular solids due to

- 1) Constraints imposed to covalent interchain bonding
- 2) Van der Waals or hydrogen bonding interchain interactions and
- 3) The large configuration space i.e. large entropy of a flexible polymer chain.

Polymers form structures that are often partially crystalline and partially amorphous (Bower D I, 2002).[5]

There are two broad types of polymer crystal structure, depending on the persistence length of the chains (1) Lamellae formed by stiffer polymers, this is commonly accepted crystal model for conjugated polymers and (2) Fringed mucelles, typically formed by very flexible polymers such as polystyrene, polyethylene, polyvinyl chloride etc. Both polymer systems show both crystalline and amorphous regions (Kohlman R S, 1998) [6].

Polymers are subject to lattice distortions of the first and second kind. Lattice distortions of the first kind (Lamella) are random deviations from the ideal lattice points just due to thermal vibrations. For this reason, they are often called "Frozen in thermal displacements". Distortion of this type is very common.

Distortions of the second kind (Fringed mucelles) are also called paracrystalline distortions. Paracrystals have no long range order. They have lattice spacing that has some variation from cell to cell. This types of disorder is characterized by $g = \Delta d/d$

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Where, d is lattice spacing. The effect of this type of disorder is both a decrease in intensity, I with diffraction order, h and an increase in the width, δb of the diffraction peaks. The intensity goes as

$$I = \exp(-2\pi^2 g^2 m^2)$$

& If the width is defined as

$$\delta b = \frac{\int (I(b) - I_0) \, db}{I_{\max}}$$

Where, b is equal to $1/d \& I_0$ is the background, then the width goes as

$$\delta b = \frac{(\pi g h)^2}{d}$$

This type of disorder is responsible for the fact that polymer crystals are typically very small. The small size of the crystals results in increase in the width of the peaks and a decrease in the height but these do not change with peak order. The height of diffraction peak with size L goes as L^2 & the width is characterized by the Scherer equation.

$$\delta b = \frac{1}{\overline{L}}$$

The total effect of the microparacrystals on the width of the diffraction peaks.







RD pattern for7 wt% PPy filled in PVC thin film

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THERMOGRAVIMETRY ANALYSIS

Thermal behavior of a sample is its property against time or temperature while temperature of the sample in specified atmosphere is programmed. At sufficiently low temperature rise, each polymer eventually obtains an adequate thermal energy to enable its chains to more freely and behaves like a viscous liquid. TGA/DTA was carried out at temperature range 33°C to 462°C with heating rate of 10°C/min under nitrogen atmosphere. The TGA was conducted in order to assess the effect of different weight percent of polypyrrole on the thermal properties of the composites. Figures 3 and 4 are thermograms for 0.5 and 7 wt % of PPy added PVC composite thin films respectively.



FIGURE 3 TGA/DSC curves for 0.5 wt% PPy filled PVC thin films



Figure 4 TGA/DSC curves for 7 wt% PPY filled PVC thin films

Thermal behavior of a sample is its property against time or temperature while temperature of the sample in specified atmosphere is programmed. At sufficiently low temperature rise, each polymer eventually obtains an adequate thermal energy to enable its chains to more freely and behaves like a viscous liquid. TGA/DTA was carried out at temperature range 33°C to 462°C with heating rate of 10°C/min under nitrogen atmosphere. The TGA was conducted in order to assess the effect of different weight percent of polypyrrole on the thermal properties of the composites.

From the DSC curves, three major transitions corresponding to glass transition temperature, melting temperature and vaporization temperature were observed for different concentration of PPy. In present study we have not focused on vaporization temperature since almost all polymers will thermally degrade before they vaporize [7]. The endothermic peak and the broad peaks on DSC curves corresponds to melting temperature and glass transition temperature[8]. The corresponding melting temperatures for 0.5wt% and 7wt% PPy concentrations are 283.18° C and 289.78°C. The glass transition temperature increases from 99 to100° C. From the data it is apparent that the thermal degradation began to occur only after the materials have absorbed certain amount of heat energy (Δ H values). The heat initiated the degradation process and breaking down of molecular chain ruptures [8].

From the TGA data it is observed that the weight loss of polypyrrole filled composites decreases and the thermal degradation temperature increases with increase in concentration of polypyrrole in the polymers.

The TGA/DSC analysis for polypyrrole filled composites shows that the glass transition temperature slightly decreases with increase in concentration of filler. This shows that polypyrrole filled PVC polyblends are more stable.

Fig. 5 and 6 shows the thermograms for the thermoelectrets of unfilled and PPy filled PVC for different polarizing fields (4, 8, 12 and 16 kV/cm) in the temperature range 313-403 K. The conductivity increases with increasing temperature by an equation

 $\sigma = \sigma_0 \exp (-E_a/KT)$

Where σ_0 is pre-exponential factor, E_a activation energy of conduction and K is the Boltzmann's

Constant and T is the thermodynamic temperature.

Electrical conductivity of PPy involves movement of positively charged carriers or electrons along polymer chain and hopping of these carriers between polymeric chains. Polyvinyl chloride is proton donor and polymethyl methacrylate is proton acceptor. The charge transfer occurs due to increase in electro positivity. The degeneracy of the ground state has an important effect on the nature of charge species. Polypyrrole is nondegenerate ground state polymer. On addition of polypyrrole the polymer chain gets ionized and this ionization process creates polarons having half spin. At low doping level these polarons are carriers of electricity. Increased polarons result in large probability of interaction which in turn results to form bipolaron. Bipolarons are doubly charged but spinless. A single bipolaron is more stable than double polarons. The relatively high conductivity of polymers probably results from motion of spinless bipolarons. It is also evident



that the conductivity also increases with the polarizing field [9-10].





Thermograms of 7% PPy filled PVC

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4. CONCLUSIONS

The TGA/DSC analysis shows that the films are thermally more stable. It can be concluded that the wt. % of conductive fractions, temperature, charge mobility and the conductivity behavior of the films are in tight interaction with each other. The order of D.C. electrical conductivity of unfilled PVC was of the order of 10⁻¹³ ohm ⁻¹ cm⁻¹. After doping of PPy in PVC in sufficient quantity it is increases to 10⁻⁷ ohm ⁻¹ cm⁻¹. The increase in conductivity at room temperature is due to the percolation of PPy in the polyblends The addition of conductive fillers in the insulating polymers could lead to innovation in synthetic method for better conducting films.

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