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(ICETDT- 2021)

9th January 2021

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UPG
USHA PRAVIN GANDHI COLLEGE OF ARTS, SCIENCE AND COMMERCE

SVKM's
Usha Pravin Gandhi College of
Arts, Science and Commerce

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Amrish R. Patel

President,

Shree Vile Parle Kelvani Mandal

Vile Parle, Mumbai

Message

Higher Education is an imperative milestone for learners in current times. Indian higher education system is maturing towards its presence in Global Higher Education space. This calls for reformative policy initiatives from stakeholders in curricula, pedagogy, use of technology, partnerships, governance and funding. Encompassing this vision, Usha Pravin Gandhi College has a learner centered paradigm of education where the student is placed in a competitive learning environment of the 21st century to foster excellence, equity and quality.

The academic staff at the college constantly commit themselves towards the growth of students to create the desired intellectual, economic and social value.

With firm faith in the saying, "*Vidhyadhanam Sarvadhanam pradhanam*" – knowledge is the only real wealth in this world, I welcome the students of SVKM's Usha Pravin Gandhi College of Arts, Science and Commerce. I am confident that efforts to excel in the field of higher education through innovative practices, immersed and engaged learning and the inculcation of moral and social values in the learners will continue. May you make the best of these openings to shape your careers and future.

Wishing everyone at Usha Pravin Gandhi College of Arts, Science and Commerce all success this new Academic year 2020-21.

Amrish R. Patel

Dr. Anju Kapoor

Principal,

Usha Pravin Gandhi College of Art,

Science and Commerce

Vile Parle, Mumbai

Message

I am delighted that SVKM's Usha Pravin Gandhi College of Arts, Science and Commerce is organizing a one-day International Conference on "Emerging Trends in Digital Technologies-2021(ICETDT-2021) on 9th January 2021 and on this occasion, we are bringing out a souvenir.

The theme of the conference is very relevant in the present scenario. Life is changing with continuous development of new technologies. We need to understand these changes in the technologies, their security measures and keep pace with them. Due to the changing scenario of COVID-19, the importance of digital technologies has grown multifold.

I believe that the conference will stimulate awareness of latest development and emerging trends in technologies. I am sure that the conference will provide a great opportunity for researchers to present their work, knowledge and experience.

I wish this conference a great success and congratulate the organizing committee.

Dr. Anju Kapoor

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CLEVOCK

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ABSTRACT—
With the digital revolution going on in our society, it's impact have been massively prominent.With this, comes a need to revolutionize our security system also.Security using GSM (Global system for mobile network) module is one of the consistency and speedy techniques.If also in the course of pandemic going on there is always a risk that our hands might not be sanitize, to ensure this there's also a hand sanitizer dispenser.Programming is made significantly easier and compact with Arduino.It also controls the 12C LCD which gives command to the person entering inside.

The project is primarily based on an idea of home automation. Keeping the need of the hour in our mind, we have worked on a door lock that can be unlocked with the help of a very short text message containing a command to open the door.

This can be achieved by sending a text that will be received and processed by GSM module and if the received text contains the exact command that is needed for unlocking, then Arduino will actuate the servo motor that will consequently open the latch.

Keywords—GSM, PIR, 12C, dispenser.

I. INTRODUCTION

Firstly, an I2C LCD displaying a message at the entrance is accompanied with a hand sanitizer dispenser which is necessary in COVID times. Now, a text containing "open" needs to be sent from the mobile number that is configured with the SIM card in the GSM module. A force entry can be taken care of by a feedback message sent on the above mentioned number containing a message. Finally, after getting a "close" command to the mobile number that is configured with the SIM card in the GSM module the door will be closed. A reminder will be sent to the configured mobile number if the Arduino doesn't get the "close" command within a time period of 50 seconds & the door will be closed automatically without waiting for any command.

II. EASE OF USE

This setup will be very user friendly as, firstly, the display will be alternatively flashing "WELCOME, Sanitize your hands first" OR "आपका \वागत है, कृ पया अपने हाथ साफ कर "" in English & Hindi respectively,it will help any user with the knowledge of either of the language.

Secondly, user can sanitize his/her hands without even touching the sanitizer dispenser thanks to the inbuilt PIR(passive infrared) sensor that will help in sensing then dispensing.Once the user has sanitized his/her hands the

LCD will now alternatively display "Please send the command" OR "कृ पया आदेश भेज"" in English & Hindi respectively. This message will prompt the user now to send the required command from his/her phone to the mobile number configured with the SIM card in the GSM.

After receiving the correct command the door will be unlocked without any major delay.Keeping in mind the mistakes a human can make, a smart move is added in this setup which is even if he/she forgets to lock the door after a period of 50 seconds the setup will automatically lock the door & remind the user through a feedback message "You have forgotten to close the gate" OR "आप गेट बंद करना भलू गए ह " in English & Hindi respectively.

A force entry will also be detected and following measures will be taken -

a) a warning message will be sent on user's mobile number "suspicious activity detected " OR "

b) A passive buzzer embedded in the system will start beeping loudly, alarming everyone about the trespassing in the vicinity of the door.

III. KNOWING THE COMPONENTS

1. Arduino Uno:

Arduinos are very popular among the entry level hobbyists that wish to use microcontrollers technologies due to following factors:

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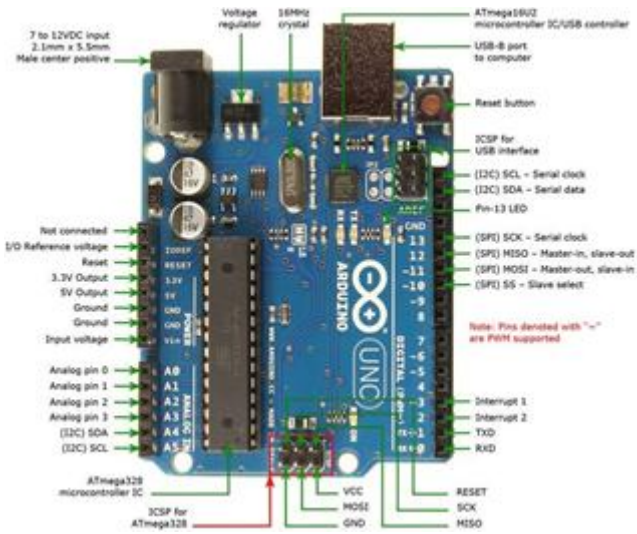
-Low cost

-Open source design

-Easy interface and cross platform IDE(Integrated Development Environment).

-Availability of shields for hardware expansion.

The board is based on Atmel Microcontrollers and AT mega328 is embedded in it which has 32kb of flash memory,2kb of RAM and 1kb of EEPROM. It also has UART (Universal Asynchronous Reception and Transmission) facility for serial transmission as well as usual timers and interrupt capabilities.Arduino can be either be powered through DC input socket(7-12V) or from USB.The connectors on the top side of the board offer an I2C interface, which actually uses two of the analog pins (A4 and A5) in the Arduino Uno.There is also a row of digital I/O pins, some marked as being pulse-width modulation (PWM) capable.Two of these, D0 and D1, double as the Rx and Tx pins on the UART. (Blum, 2019)



Major components are as follows-

1) USB Connector – this port is used for loading a program from Arduino IDE to the Arduino board. This USB port can also be used for power supply to the board.

2) Power Port – AC to DC adapter or a battery can be used for power supply to the Arduino board. The power source is connected by plugging-in the power jack of the board. An Arduino UNO board generally operates at 5 Volts, but it can be maximized upto 20 Volts.

3) Microcontroller - It is like the brain of the Arduino. It is a black rectangle shaped chip consisting of 28 pins. ATmega328P a microcontroller is used on the UNO board.

4) Analog input pins – Arduino UNO board consists of 6 analog input-pins. These pins used for reading signal from analog sensor for an example temperature sensor and then convert into a digital value for better system understanding. Arduino Analog pins can only measure the voltage, not the current, this is because of high value of internal resistance.

5) Digital pins – There are 14 digital pins labelled as - Digital 0 to 13. They can be used as both input or output pins.They act as power supply sources when we use them as output pins for the components we connect to it.They work as signal readings when used as input pins.

6) Reset Switch – It sends a signal to the reset pin of the microcontroller when we click the reset switch to run the program from the start again. If the code doesn't repeat it can be used there also to test the code multiple times.

7) Crystal Oscillator – Crystal Oscillator picks sixteen million times per second. On every single tick, one operation is performed by the microcontroller.

Example- addition, multiplication, etc. Arduino IDE and what does it consists of:

Arduino IDE provides a simple editor in which we can type our programs and upload it to the arduino board over USB.

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It consists of:

-Links towards the arduino library documentation.

-a serial monitor that allows two-way communication with arduino's USB port.

-syntax highlighting

-memory usage of program is shown

Arduino C library: (Scherz & Monk, 2016, p.957)

Most commonly used arduino library functions are as follows:

Command	Example	Description
Digital i/o		
pinMode	pinMODE(8,OUTPUT);	Sets pin 8 to be an output. The alternative is to set it to INPUT.
digitalWrite	digitalWrite(8,HIGH);	Sets pin 8 high. LOW is alternative.
digitalRead	int i; i=digitalWrite(8);	Sets the value of i to HIGH or LOW depending on voltage at pin specified.
Analog i/o		
analogRead	int r; r=analogRead(0);	Assigns a value to r of between 0 and 1023. 0 for 0V, 1023 if pin 0 is 5V.
analogWrite	analogWrite(9,127);	Outputs a PWM signal. The duty cycle is a number between 0 and 255, 255 being 100%. This must be used by one of the pins marked as PWM.
Time commands		
millis	unsigned long i; i=millis()	The variable type long in Arduino is represented by 32 bits. The Value returned by millis() will be the number of milliseconds since the reset.
micros	long i; i=micros();	Same like millis.
delay	delay(1000);	delay for 1000ms or 1 second.

Standard Arduino libraries: (Scherz & Monk, 2016, p.958)

Library	Description
EEPROM	Reading and write to EEPROM from your sketches.
Ethernet	TCP/IP communications when using an Ethernet board or shield, including DNS, DHCP, HTTP and UDP.
Fermata	A protocol for turning pins on and off, reading analog values, etc., using Serial commands.
LiquidCrystal	Interface to the de facto standard alphanumeric LCD modules
SD	Read and write to an SD card
Servo	Control a number of servos simultaneously
SoftwareSerial	Use any two pins to receive and transmit data
SPI	Serial Peripheral Interface bus library
Stepper	Control stepper motors
Wire	I2C library

Why are we using arduino Uno?

Arduino Uno is the most suitable development board for our purpose due to its size,cost,availability and the number of general input output pins that are needed for our project are embedded in sufficient quantities.

Other Alternatives:

Arduino Mega,Arduino nano with shift registers(74hc595) for extra general purpose input output pins,NodeMCU,ESP32,ESP8266,Raspberry Pi,Intel Galileo etc.

2. **GSM MODULE:**

The GSM/GPRS modem modules are essentially cellular phone modules that provide most of the features of a cellular phone, including sending SMS (Short Message Service) text messages and GSM (Global System for Mobile Communications) OR GPRS (General Packet Radio Service) data. Serial commands are sent to the

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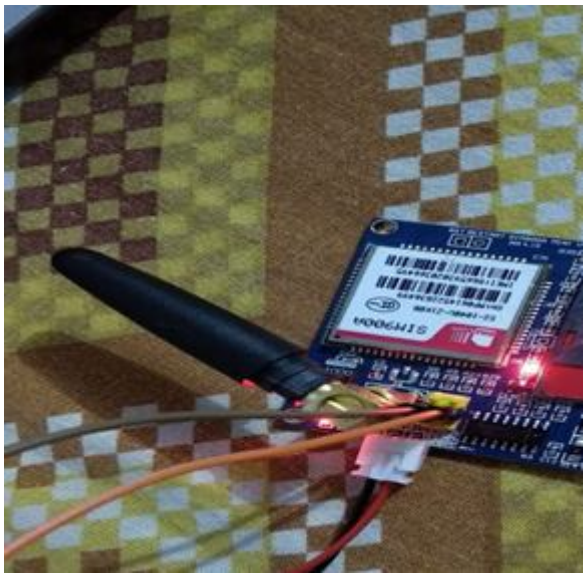
module from a microcontroller to control its operation. Attention commands are used to program the GSM module.

Some common attention commands that we used are:(Scherz & Monk, 2016, p.958)

Commands	Description
AT+CGMI	Request manufacturer information
AT+CPMS	Preferred message storage
AT+CMGF	Message format
AT+CNMI	New message indication to TE
AT+CMGL	List messages
AT+CMGR	Read messages
AT+CMGS	Send messages
AT+CMGD	Delete messages

Why are we using SIM900A?



It is suitable for our purposes as it has a circuit that supports 3.3V single chip microcomputer and there is also TTL serial support for serial transmission.

Other Alternatives:

SIM900 and SIM5100 can be used as an alternative but both of them support serial communication through RS232 and DB9 connectors, and they will need an extra power supply to power them up as they require a current of about 2A which is out of reach for the Arduino Uno.

3. **SERVO MOTOR:**

A servo motor is actually a combination of a motor, reduction gearing, and miniaturized control electronics, usually packaged together inside a very compact sealed plastic case. The motor itself may be AC or DC, and if DC, it may be brushed or brushless. What distinguishes a servo from other types of motor is that it is not designed for continuous rotation. It is a position-seeking device.

Servo motors are generally controlled via pulse-width modulation (PWM).It's easy to connect a servo to an Arduino because only three wires are involved.The darkest wire connects to GND, the center wire connects to 5 V, and the lightest wire (the pulse wire) connects to a digital pin. (Platt & Jannson, 2016)

Why are we using a Servo motor?

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Servo motor is a position seeking motor and is perfect for accurate rotations in degrees.

Other Alternatives:

Stepper motors can also be used for the opening of the latch of the door.

4. **I2C LCD:**

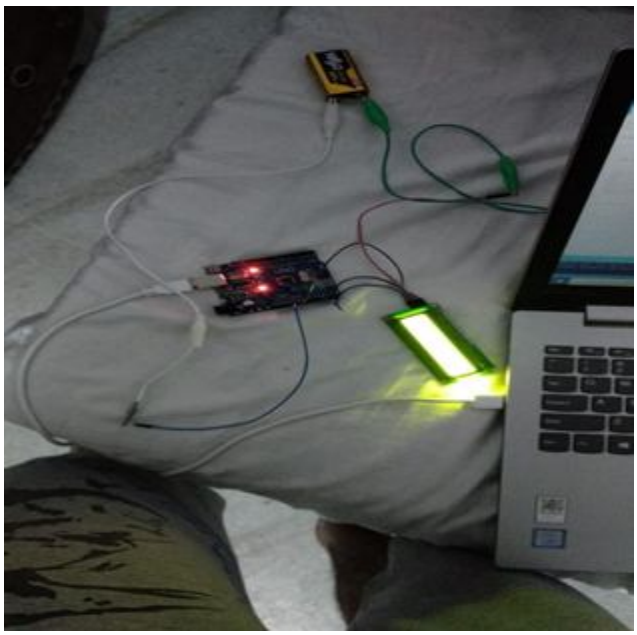
It is a 16*2 display that displays 16 characters in 2 lines. It also has a backlight that can be controlled by an embedded trimmer potentiometer. It operates on 5V.

Other alternatives:

Any protocol among UART(universal asynchronous receiver and transmitter),USART(universal synchronous or asynchronous receiver and transmitter) or SPI(Serial peripheral interface) can be used to communicate.

5. PIR SENSOR:

It is designed to detect and respond to movement outside of the component but within the range of the sensor. (Platt & Jannson, 2016)



Why are we using a PIR sensor?

PIR sensors are suitable to our purpose as they will directly detect any kind of movement in the vicinity without sending any radiations.

Other alternatives:

Infrared sensor,proximity sensor,ultrasonic sensors etc. can also be used.

IV. Some common Practices leading to failure of components

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❑ **ARDUINO**

1. Unavailability of COM port.
2. High current loads cannot be run with arduino directly.
3. It can give a maximum 400mA

Why are we using I2C?

❑ **GSM**

of current as output.

1. SIM should be inserted appropriately.
2. Mobile networks should be strong for communication.
3. Antenna should be used.

❑ **SERVO MOTOR**

1. All three wires must be connected carefully.
2. High torque loads should not be connected
3. Degree of rotation should be indicated clearly.

I2C protocol is free to use as there is no license fee. Only two transmission lines are required to communicate: One carries a clock signal and other allows data transfer in

❑ **I2C**

1. Brightness must be taken care of using an embedded trimmer potentiometer.
2. Should not be operated above 3.3 volts.

synchronisation with the clock.

V. COMPARISON BETWEEN VARIOUS OTHER POSSIBLE SETUPS TO CARRY OUT THE SAME JOB

1. Arduino with RFID: We can use Radio-frequency identification(RFID) tags with Arduino UNO and RFID card reader to open the door lock.
2. Arduino with keypad: We can use a keypad with Arduino UNO to open the door lock by entering some preset password correctly.
3. Arduino with Bluetooth Module: We can use a bluetooth module with Arduino UNO to open the door lock.
4. ESP8266 NodeMCU with web server: We can use a web server to control the door lock. NodeMCU can fetch the information over the internet using the in-built WiFi chip embedded in it.
5. ESP8266 with Blynk: We can use Blynk application that is available on google play app store for android devices and iStore for apple devices. NodeMCU will fetch the information available on the server of Blynk app using WiFi chip.

PARAMETERS	ARDUINO with RFID	ARDUINO with KEYPAD	ARDUINO with BT MODULE	ESP8266 with WEB SERVER	ESP8266 with BLYNK APP	ESP8266 with GOOGLE ASST., BLYNK APP & IFTTT
PROCESSING SPEED	FAST	MODERATE	SLOW	SLOW	FAST	SLOW
TIME LAG	LESS	NOMINAL	MORE	MORE	LESS	MORE
EXPENSE	MORE	MORE	MORE	LEAST	LEAST	MORE
USER INTERFACE	EASY	EASY	MODERATE	DIFFICULT	MODERATE	DIFFICULT
SECURITY	LESS SECURE	LESS SECURE	SECURE	SECURE	SECURE	SECURE

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TECHNIQUES AND APPLICATIONS OF IMAGE FUSION USING NEURAL NETWORKS

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ABSTRACT
This research paper describes about Image fusion technique and its application. According to title of the research paper multiple images merged them and convert that image into the single image. Fusion means detect the information and then collect that data and give the appropriate result on that. Data fusion which is used in medical industry, military. Image fusion which is used for give detail information according to the input data rather than give individual output. Single level fusion, pixel/Data level fusion, feature level fusion and Decision level fusion this are the techniques of image fusion. In the first section we are dealing with general idea of the image fusion. Second section it deals with different level of image fusion technique. image fusion techniques are used. Our main topic i.e. techniques of image using neural network which is covered in section III. Applications of image fusion using neural network which is discuss in IVth Section.

Keywords: *Image Fusion, medical, single level, pixel /Data level, feature level, Decision, Block or region based, multisensory image fusion, fused image, Spatial Domain and Frequency Domain*

I. INTRODUCTION
Image fusion it nothing but we are clubbing two or more images get the final result from it. The resulting image gives more accurate information as compared to actual images. According to the result or output we can take final decision on it. Image fusion technique is input dependent technique. Image fusion algorithm can be categorized into different type's low, medium, high. Based on processing levels they are divides into pixel level, feature level and decision level. In pixel level spatial and transform domain. In that we are dealing with pixel. In feature level they are work with exacting feature or properties taken from source image. In decision level, actual input which we are passing according to that they are classified or clustered in some categories. It helps us to take proper decisions.

Image fusion techniques are very important because it improve the performance of the object recognition systems by merging different many sources of satellite. It also the sharping of the data that correct and the enhance feature as compared to normal images which is help us to take proper decisions. The motive of multisensory image fusion gives the actual as well as accurate output without any loss of data. [6]

IHS (intensity-hue-saturation) and PCA (principal component analysis) method which is used by image fusion technique. For implementation of image fusion technique there are various algorithms and rule are available. Rules which are used by this technique are minima and maxima. Algorithm which are used by this technique are genetic algorithm and fuzzy logic. During the image fusion technique data is converted into fused data without any noisy information.

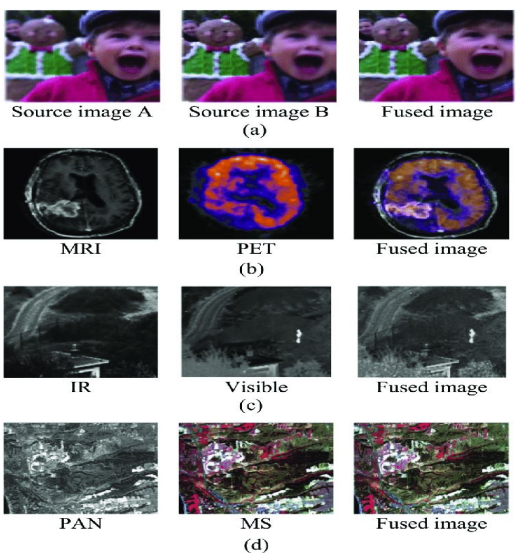

Fig: 1 [16]

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The above Fig 1 shown different image fusion applications. (a) multifocus photography- deep convolutional neural network based fusion

(b) Medical diagnosis- optimum spectrum mask based fusion (c) Surveillance –non subsampled contour let transform and intensity-hue-saturation transform based fusion (d) fuzzy integral based fusion

II. LEVELS OF IMAGE FUSION TECHNIQUES

Image can be classified into 5 different levels:

A. single level:

It is basically it is gathering information from many sources and converts into single source. Single level fusion technique i.e. output accuracy is better than input.

B. Pixel/Data level:

Pixel level is a combination of multiple sources which is converted into single resolution data. [5]

It is work with original images. It is widely used in remote sensing, computer vision and medical imaging. This is the lowest level technique for using image fusion. In that we are using average method for collecting the different data and merged into single one.

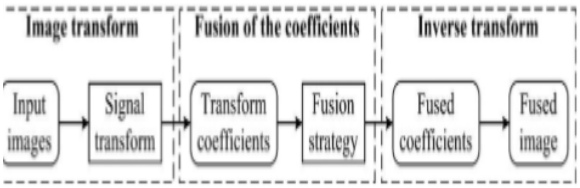

Fig: 2

From the above Figure1 there are 3 main parts of pixel levels which are image transform, Fusion of the coefficients and Inverse transform. In that there are sub parts Input transform, signal transform, transform coefficients, Fusion strategy, fused coefficients and fused image. [8]

C. Region/block based

It is based on pixel block of the image. Block level technique it is higher level technique. It has multistage for calculating according to the region.

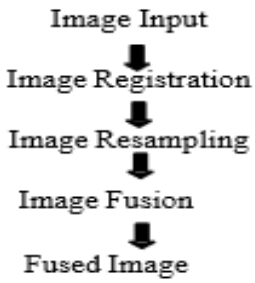

Fig. 3

From the above figure (Fig. 3) first we are passing image as an input and then registration process is occurred. After that resampling that image. Actual fusion technique is started and last step is fused the image. [6]

D. Feature level fusion

It explains feature image like if one of the flower colour or shape is changed. It may be possible that flower texture, color and size might be different from each flower. It is actually working on feature on that image. It gives enhance image according to the feature level fusion. If new feature is observed, then input then output can be enhanced image after extraction. [6]

Feature can be anything edge, line or texture from different sources. It is used for Image pre-processing for image segmentation and change detection. [5]

E. Decision level fusion

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Decision level fusion in that collecting different images from different sources and then take a decision and give proper output.

When the results from different algorithms are expressed as confidences rather than decisions, it is called soft fusion. Methods of decision fusion include voting methods, statistical methods and fuzzy logic based methods. [5]

III. TECHNIQUES OF IMAGE FUSION USING NEURAL NETWORKS

Basically artificial neural network idea which is taken from biological neuron. Images are stored into several block. Artificial neural network based on non-linear response function in between there is relationship between input and output training data. The hidden layer consists many of the neuron layers. In that they are taken input as a neuron processed on it and give the appropriate output so it helps us to take any decision from it. In that output which comes from predication without actual mathematical process

There is connectivity between input, hidden and output layer. We can say that input as i, hidden as a j and output as k. i is connected to j and j is connected k. The first is neural network based image is divided into predefined block. After that neural network go for the training and then go for the learning part.

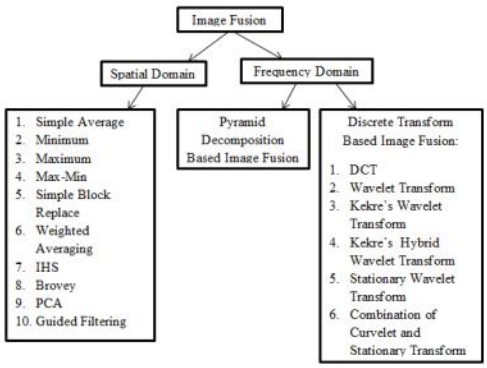

Fig.3 [15]

Above figure shown that there are main 2 types of Image Fusion Techniques.

A. Spatial Domain
B. Frequency Domain

Pyramid decomposition based technique which is the part of frequency domain technique.

A. *Spatial Domain*: is the technique which is also called as simple image fusion technique. Simple Average, minimum, maximum, max-min, simple block replaces, weighted averaging, HIS, Brovey, PCA and guided filtering are the methods which are used in spatial Domain filtering. Collecting max-min data as in the pixel format converted into the fused image. Block pixel which is based on collecting data from neighbouring element and create block according to that. Simple average technique which is used for detecting the noise from the image and improve the quality of the image. Different weights give to the all input image in weighted averaging method and it helps to increase reliability of the image. Correlated variables are converted into uncorrelated variables in principle component analysis method (PCA). Working on high contrast RGB which is doing in brovey transform.

B. Frequency Domain

Pyramid based technique which is the part of frequency domain technique. In that number of images represents the final output of that image. There are three levels in pyramid based technique. First one is based on size of that image. Filtration part which is done by second level. Last level gives the final output of that image. Types of Frequency Domain which are listed below:

- Discrete Cosine Transform (DCT) based Image Fusion: There are 6 subtypes in DCT based image fusion technique which are: DCTav, DCTma, DCTah, DCTch, DCTe and DCTcm. DCTav, DCTma, DCTe and DCTcm methods which are used together.
- Discrete Wavelet Transform Method (DWT): In this method image is pass through many series of filters. First it passes through low pass filter then high pass filter.
- Kekre's Wavelet Transform Based Fusion Technique: Equation of Kekre's Wavelet Transform is M=N*P and $2 \leq P \leq N$, where NxN: - size which is used for MxM kekre's Wavelet Transform.

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- Kekre's Hybrid Wavelet Transform based Fusion Technique: Different hybrid transform which is used for decomposing input images. Averaging used for this hybrid wavelet transform based fusion technique.
- Stationary wavelet transform (SWT) Based Image Fusion: It is advanced version of DWT (Discrete Wavelet Transform). Certain drawback of DWT which is solved in SWT.
- Stationary Wavelet Transform and Curvelet Transform Based Image Fusion: Operation on input image like high pass and low pass where done by SWT. After that fused technique which is done by this technique. This technique working on small details of the image like edge and avoided block effective based technique.

IV. APPLICATIONS OF IMAGE FUSION TECHNIQUE

For increase the visual perception of the image fusion technique is used. object identification, classification and change detection this are the fields where image fusion technique is use. [5][6]

A. *object identification:* For identifying certain object from the image this fusion technique is used. In space, satellite captured the many of the data that time object identification is used.

B. Classification: In remote sensing application classification is used. When multiple data are captured and processed that time classification gives accurate output.

C. Change detection: Storing the each and every moment of the object. Monitoring and managing provided qualitative analysis of distribution of certain data.

- Ocean surveillance: Detection, Tracking which is used by fusion technique. Ship submarines and ground based ocean based sensor platform for Ocean surveillance. Hundreds of nautical miles of Air/ surface for surveillance volume.
- Battlefield intelligence, surveillance and target acquisition: Detection and identification of potential ground targets which used by Battle intelligence. Ground based aircraft is the sensor platform.
- Robotics: Using fusion technique robot can detect object and recognize that object.
- Medical Diagnoses: Identification of any disease and tumours this functioning done by image fusion technique. Specifically use in laboratory.
- Environmental monitoring: Detection the natural activities. Underground samples are the sensor platform.
- Proper view of satellite vision in that fusion is used for remote or satellite area.

V. CONCLUSION

This paper represents the image fusion technique. Image fusion technique means collecting images and converts it into a single input. In the technical term we can say that taking multiple inputs from different sources and convert it into single one. In image fusion technique larger number of images captured by different number of sensors. As a year's goes in technology field also technology changes vigorously. Techniques of image fusion using neural network which is learn from this research paper. This paper talks about in depth knowledge about image fusion technique. In that spatial domain technique is easy to used. Real time applications of image fusion which is discuss in this paper.

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FRUIT RECOGNITION SYSTEM

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ABSTRACT
Object recognition is emerging technology to detect and classify objects based on their characteristics. Fruit recognition and automatic classification of fruits is also a domain of object recognition and it is still a complicated task due to the various properties of numerous types of fruits. Different fruits have different shapes, sizes, color, textures and other properties, but in this authors are only testing on apple,mango,orange for classification. Similarly, some of the fruits like Tangerines and Mandarin Oranges share the same characteristics like color, texture, size, etc. This project aims to find a better way of a fruit classification method using supervised machine learning algorithms and image processing mechanisms based on multi- feature extraction methods. Firstly,authors try to pre- process the training sample of fruits images. Preprocessing includes separating foreground and background, scaling and cropping the image to reduce the dimension so that the processing is fast. Then,authors extract features from the fruit's image, which includes color, texture and shape of the fruit image. Extracted features are then fitted into the SVM and KNN machine learning algorithm. Finally, the results obtained from the machine learning network are cross validated with the test sample. The output obtained will give us the prediction accuracy and class of the fruit that it has acknowledged.

Keywords— Image Recognition, Preprocessing, Histogram of Oriented Gradients (HOG), Supporting Vector Machine, K - Nearest Neighbors

I. INTRODUCTION

Object Recognition implements pattern recognition of different objects. Pattern recognition builds up from different areas such as statistics and machine learning. To achieve good object detection, classification and recognition, different machine learning algorithms and object's feature extraction algorithms are used. While using machine learning algorithms, it is not a guarantee that every algorithm gives accurate result. The achievement of accuracy can be different for different algorithms. There are many classification algorithm like RandomForest,Niive Bayesian, CNN and many more. In this paper authors discuss the two classification algorithm - K-Nearest-Neighbors (KNN) and Support Vector Machines (SVM). Support vector machine is a model for statistics and computer science, to perform supervised learning, methods that are used to make analysis of data and recognize patterns. SVM is mostly used for classification and regression analysis. And in the same way k-nearest neighbor algorithm is a classification algorithm used to classify data using training examples. In this paper authors use SVM and KNN algorithm to classify data and get prediction accuracy[1].

In this project authors are concentrating only on fruits for classification using SVM-Support Vector Machine and KNN-K_Nearest_Neighbors. A research in fruit classification has been carried out by just taking three set of fruits like Apple, Mango and Orange into consideration with accuracy. However, the trained model may not recognize the fruit images that are out of the training sample.

II. LITERATURE REVIEW

Akshay girdhar. Surprit kaur, and jasmine Gill, Sringer nature singapour 2018[2]. In this paper authors present a vegetable grading and sorting system based on computer vision and image processing.for this work they have used tomatoes as a sample vegetable.A total 53 images of sample tomato were used bt there own camera setup.Afterwards, segmentation carried out using Otsu's method was performed by separating the vegetable from the background. The segmented image, which were obtained thus used for color and shape features. At last, grading and sorting were performed using back propagation neural network. Finally the proposed method shows an accuracy of 92% and out performed the existing system.

Satpute, Simati M. Manali R. jagdale, 2016[3]. In this paper author represent An automatic fruit inspection system. this system basically collect image from camera which is placed on conveyor belt. Then image processing is done to get required features of fruits such as color, texture and size. Defected fruit is recognized based on the blob detection, thresholding is done based on color and size detection is based on binary image of tomato. Grading is done based on size and sorting is done based on color.

Zhahida Parveen, et al [4] . In this paper author designed a system Assessment of quality of rice grain by using image and optical processing. It represents a proposed system of an image processing technique using extended

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maxima operator to detect the chalky area in the rice. They also calculated the color to classify rice grains and dimensions. This experiment was carried out on 22 sample images of rice grain to test the proposed method and was validated using visual inspection.

Deepika Sharma, et al [5] This system was designed to detect the grain quality by Image processing system. Authors have proposed a system that determines the quality of food. It basically runs on the conveyor belt and then random images of grains are captured by the camera. In this process MATLAB is been used for the classification. The classification process is done based on shape, size and colour.

III. PROBLEM STATEMENT

Authors have surveyed the methods used in the recognition of fruits. In this process identification of fruit they have identify the diseases and note the issues and challenges that each method tries to address. These issues and challenges may serve as the basis for evaluating the different methods. The input images may contain fruits of one three type which discuss earlier fruits in an arbitrary position and in any number. Many kinds of fruits inherit significant variations in shape, texture and color depending on their ripeness. For example, oranges can be green, yellow. Because using just one image feature to separate fruits into classes might not be sufficient, it is necessary to extract and combine those features that are useful for recognizing the procedure. The produce might vary in background, which can add shifts hue and specular reflections. Different classifiers may produce different results,the process completely depend on the selection of the type of classifier to use must also be addressed. In further process available classifiers work on two classes only, but in the produce classification problem authors consider more than two classes, so it is a major issue to use a binary classifier. Subtracting the background may be necessary to reduce scene complexities, such as variations in illumination, background clutter, shading and shadows. Consequently, the result of the system heavily depends on the efficiency of the image segmentation method. The performance of the fruit disease recognition system also depends upon the fault segmentation. The system must perform better in situations where the system is trained with less training examples.

- First of all author need to do the survey of method used in the recognition of fruits in the identification and should note the issues and challenges that each method tries to address.
- Then one should extract and combine those features that are useful for recognition process.
- Different classifiers may produce different results, so the selection of the type of classifier to use must also be addressed.
- The performance of the fruit disease recognition system also depends upon the defect segmentation.
- The system must perform better in situations where the system is trained with less training examples.

IV. PROPOSED SYSTEM

In the Fruit Recognition system authors have used the dataset which contains three types of fruits Apple, Mango , Orange which is splited in 67%, 33% of Train and Test images. Two approaches for comparing results KNN and Support Vector Machine for classifying the fruit. authors have also used some image processing for making the results better for classification.

- Thresholding and Rescaling Intensity: The input to a thresholding operation is typically a grayscale or color image. In the simplest implementation, the output is a binary image represention of the segmented part. Where the Black pixels correspond to background and white pixels correspond to foreground. In simple implementations, the segmentation is determined by a single parameter known as the intensity threshold. In a single pass, each pixel in the image is compared with this threshold. If the pixel's intensity is lower than the threshold, the pixel is set to, say, black in the output. If it is less than the threshold, it is set to white.
- Histogram of Oriented Gradient (HOG) Histogram of oriented gradients (HOG) is a feature descriptor used in computer vision and image processing to detect objects. The HOG descriptor is a process of detection window and region of interest(ROI) is a technique counts occurance of gradient orientation in localized portion of an image.

$$\min_{w,b} \frac{\|w\|^2}{2} + C \sum_{i=1}^{n} l_{hinge}(y_i, wx_i + b)$$

- Support Vector Machine

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The objective of the support vector machine algorithm is to find a hyperplane in an N-dimensional space(N — the number of features) that distinctly classifies the data points[7]. Loss Function:

- K -Nearest Neighbors

KNN (K - Nearest Neighbors) is one of many (supervised learning) algorithms used in data mining and machine learning, it's a classifier algorithm where the learning is based "how similar" is a data (a vector) from other.

Although, SVMs look more computationally intensive, once training of data is done, that model can be used to predict classes even when authors come across new unlabelled data. However, in KNN, the distance metric is calculated each time authors come across a set of new unlabelled data set. Hence, in KNN we always define the distance metric. SVMs have two major cases in which classes might be linearly separable or non -linearly separable. When the classes are non-linearly separable, authors use kernel function such as Gaussian basis function or polynomials.

When authors talk about accuracy of both of the classifiers, SVMs usually have higher accuracy than KNN [5][6][8].Shown below are the expected accuracy

Classifier	Training Set	Test Set	Accuracy rate (in %)
SVM	10,000	10,000	98.9
KNN	10,000	10,000	96.47

Fig. 1. Accuracy rate of both classifier

V. **RESULTS**

To demonstrate the performance of the system, authors used a dataset of fruits obtained from a given dataset uses comprising 3 different categories for a total of 2515 images[7]as shown in the "Fig. 2". The dataset contained fruit images under different lighting conditions

with varying numbers of elements in an image.

Fig. 2. Data-set used in Fruit Recognition problem

This section presents experiments and quality detection of fruit samples. In this paper three types of fruits are used like orange, apple and mango which are of different colour, shape and size. Results are based on preprocessing precission of both SVM and KNN[6].

It is an simple gui based project which display the result with two buttons with No Preprocessing and with Preprocessing: thresholding.

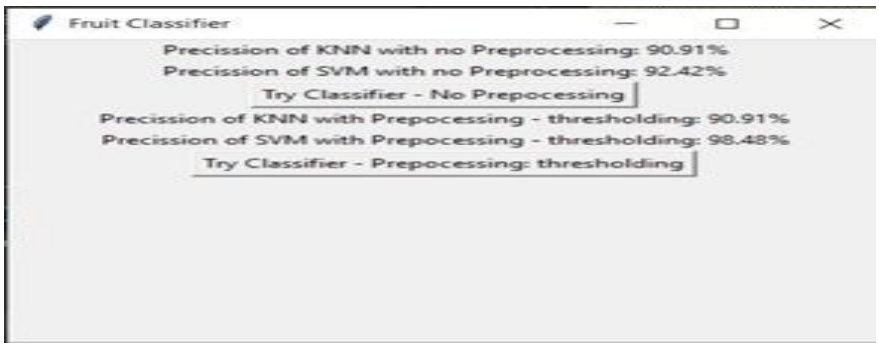

Figure 3: Graphical User Interface of the project Data per-processing is an important step that can be required to prepare raw data for modeling, to meet the expectations of data for a specific machine learning algorithms, and can give unexpected boosts in model accuracy.

Final results for fruit recognition process of given fruit samples are shown below in image below :

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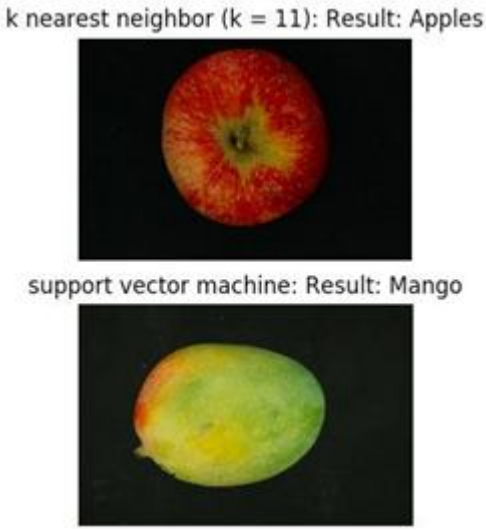

Fig. 4. Output 1

One must have a question for the value of K assigned in the output ?

So basically, The k-nearest neighbor algorithm is one of the most important form yet the most simplest of all machine learning algorithms. An object is classified by a majority vote of its neighbors, with the object being assigned to the class most common among st its k nearest neighbors. k is a positive integer, typically small. If k = 1, then the object is simply assigned to the class of its nearest neighbor. In binary (two class) classification problems, it is helpful to choose k to be an odd number as this avoids tied votes.

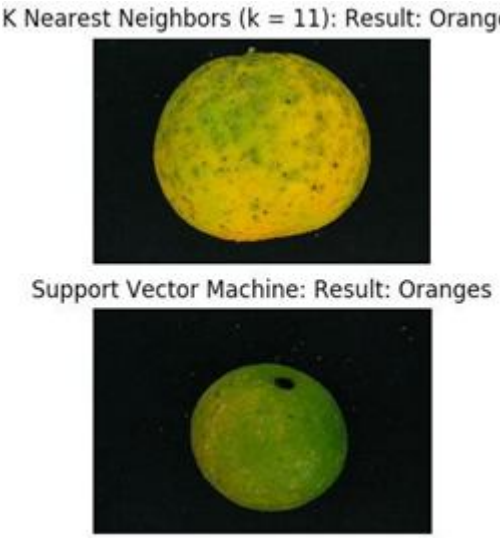

Fig. 5. Output 2

VI. CONCLUSION

Image processing is having higher impact on fruit identification and classification based applications. These innovations will reduce time taken for fruit segregation as well as man power. This paper deals various methods and algorithms used for fruit recognition and classification based on computer vision approach. This paper also explains importance of color and region descriptors for better classification. The accuracy achieved through SVM and KNN classifiers are 90.91% and 92.42% respectively.

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ATTENDANCE MONITORING SYSTEM USING RFID

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ABSTRACT
RFID based industry is one of the blooming sectors in recent times which used in various fields like education, stores, corporate world, and many other sectors. RFID is mainly used in educational sector for attendance monitoring system by using Internet of Things and Cloud Technology. It can produce real time attendance of students which can be accessed by teaching staff , attendance committee , administration panel and parents. And if there is any student who is not present he/she can be discovered immediately and an action can be taken against them

Keywords—attendance, RFID, real time.

INTRODUCTION
The majority of success in learning field is because of the presence of students in the class, but if they remain absent the knowledge they receive is lost.Here, attendance system is important to monitor the behaviour of the students .If we use this automatic way of monitoring attendance it becomes much faster , easier and accurate to record the attendance. In this research paper we are using RFID based technology so as to obtain a presence system that can run and monitor real time , so all of them (teachers , parents , faculty) can immediately find out if there is any student who skips their lecture.

Why this system?
Daily manually maintaining attendance is a mandatory task for every teacher, but because of its tiresome and time killing process, it indirectly impacts the productivity of the teachers. But with RFID attendance system, teachers can quickly and accurately record the attendance without putting much effort and at the same time can generate reports in a single click.

RFID can be introduced with the student's ID cards or attached to their uniforms, every time a student passes through a strategically placed checkpoint their presence is noted, notifying all the stakeholders – parents, management and the School ERP software.

The Biometric system makes use of physical features, such as fingerprint and face recognition to mark attendance every day. The system is secure, robust and very difficult to tamper with. Real-time updating of information to the school management software ensures that the parents and teachers stay notified about attendance.

Problem Statement
In our project, we have used RFID reader, RFID tags, Arduino UNO and mobile phones to send message to their parents. As soon as the teacher enters the class, she will scan her RFID tag on the reader. After that students will be informed that the teacher is present and the lecture has begun. The students will be given a specific time to scan their tag and when the scan their RFID tag they will be marked present. The students one by one will come at teacher's desk and scan their tag. After the time limit is over, the students who didn't scan their tag will be marked absent. Their parents will receive a message that their child is absent for the respective lecture. The aim of the proposed system is to develop RFID based attendance monitoring system.

LITERATURE REVIEW
The use of Radio Frequency identification (RFID) technology in automated industry is widely recognized by various researchers and the various organization. The committee of various faculty has done a research paper regarding the same topic which concludes to the fact of combining technology with actual situation , this proposed system was based on RFID technology. This project along with the latest IOT based system can improve efficiency and also saves human time and resources. Another research paper includes the same concern and they state that this method of attendance have a numerous advantages over the traditional one. Also this will involve students participation in class frequently.We have another group of researchers who think the same. They have an ideology of making this system permanent as it is more secure , robust and faster way to get to know about students presence in the class and if anyone fails to do so they can be immediately be informed to their parents.

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PROPOSED SYSTEM

A. **RFID**

RFID stands for Radio Frequency Identification it is a sort of wireless communication that uses electromagnetic frequency of the tag to uniquely identify the object. The mainstream uses are healthcare, shipping, inventory management, etc.

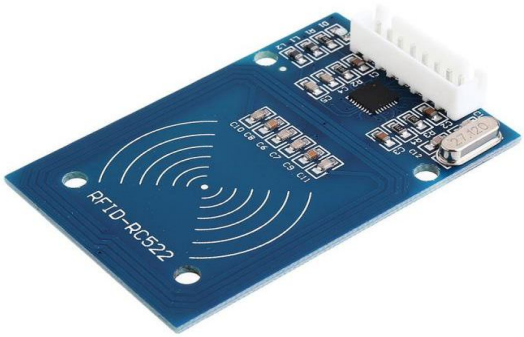

Fig 1: RFID Device

Working of RFID Technology – RFID consists of 3 parts: antenna, transcevier and transpoder, the combination these together form RFID reader. It uses radio frequency to transmit the signals which in turn activate the tag. The tag then transmit the wave back to antenna which is translated into data. Thus the process of exchanging data is identified by the RFID

B. **GSM 900A**

SIM900A GSM Module is the smallest and cheapest module for GPRS/GSM communication. It is common with Arduino and microcontroller in most of embedded application. The module offers GPRS/GSM technology for communication with the uses of a mobile sim. It uses a 900 and 1800MHz frequency band and allows users to receive/send mobile calls and SMS. The keypad and display interface allows the developers to make the customize application with it. Furthermore, it also has modes, command mode and data mode. In every country the GPRS/GSM and different protocols/frequencies to operate. Command mode helps the developers to change the default setting according to their requirements.

Fig 2: GSM Module

C. **ARDUINO UNO**

Arduino UNO is a microcontroller board developed by Arduino.cc and based on Atmega328.It is a valuable addition to electronics as it contains USB interface,14 digital I/O pins and 6 analog pins. It is also open source means the board and software are easily available and anyone can modify it for better functionalities. The software used is IDE(integrated Development Environment) which is also free to use and can be run liken any other programming language like C,C++,etc.

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Fig 3: Arduino Uno

WORKING OF THE SYSTEM

First and foremost, the faculty needs to show their RFID ID card to the reader in order to start the attendance process of the lecture. One-by-one, the students can mark their attendance by showing his/her RFID ID card to the attendance device.

The overall process generally, takes less than 5 minutes which is nothing as compared to the time required by faculty for taking the roll call in the class manually. The time frame for capturing the attendance of students can be pre-defined or fixed by college administration as per their convenience, let's say 10 minutes maximum. This implies that the students coming after 10 minutes of attendance window frame will be marked as absent and college administration would be able to keep a tab on latecomers on a daily basis.

Daily automated SMS/email can be sent to students at a pre-defined or fixed time, that the lecture is started. If a student is absent then, SMS can be sent to the parents describing the same. Weekly SMS can also be sent to parents informing the absentee of their ward in the classes. All these SMS/emails can be customized as per need of the educational institution.

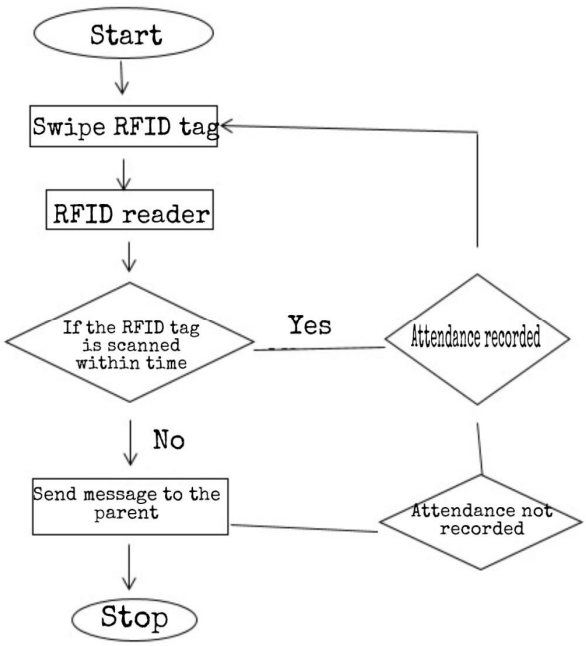

Fig 4:

FEATURES OF THE SYSTEM

1. This system is fully automated and it does not require any human interaction except setting the initial time setting
2. This system is accurate and can avoid proxy or false attendance.
3. The first of the many adv is that is saves paper and time used for traditional attendance system.

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4. Faster marking of attendance.
5. Tracking attendance will be easy
6. Parents will be informed about the child's attendance then and there.
7. This increases the security as well as the correctness of the students' data.

USAGE OF THE SYSTEM

The following system can be deployed at various fields which involves taking attendance of the people present during the particular event.

It can be mainly used for educational institute like school, college , university, etc to replace paper based attendance system with RFID.

Not only for educational purpose, this system can also be used by Multinational Comapnies where they have to keep a track of thousands of employees.

CONCLUSION

Since our project is still under development phase and to conclude that the presence by using RFID is faster than this traditional ways and the implementation of the attendance management system and the storage of data in the database enables the system to run in real time with proper accuracy and error-free which helps the professor to take the attendance much faster.

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TWITTER SENTIMENTAL ANALYSIS ON ABROGATION OF ARTICLE 370 WITH MULTINOMIAL NAIVE BAYES THEOREM

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ABSTRACT
Public reaction to the various decisiontaken by the government has been a major effect on the elections. Abrogation of Article 370 was one of the major decisions taken by the government that changed the life of the people of Kashmir and the mindset of the people all over India. Twitter is one of the trending communication platforms for micro-blogging used by people. So the researcher has used Twitter data from Kaggle to know the sentimental analysis on the text data and use Naive Bayes to get the accuracy of the data. The Naive Bayes strategies are a very notable technique for text characterization because of its fast and simple implantation, effective grating assumptions.In this article, we show the basic, heuristic answers for certain issues with multinomial Naive Bayes that results in the sentimental analysis accuracy. A multinomial Naive Bayes classifier is a sort of Naive Bayes classifier and is frequently utilized as a gauge for text grouping yet here it is applied for Sentiment Analysis (SA). The Exhaustive trials with an enormous number of broadly utilized reference data sets for text grouping affirm the adequacy of our proposed algorithm. Subsequently, accuracy can be significantly improved with Multinomial Naive Bayes classifier.

Keywords---Sentimental analysis; Textblob; government; people; TF-IDF;

I. INTRODUCTION
Abrogation of Article 370 was the decision taken by the government and is still a major content in the news because people in Kashmir and people related to Kashmir are facing issues due to this. This issue was an advantage for some but and disadvantage for others was the question that made the researcher think on this topic. The researcher wanted to know what people are thinking of this decision taken by the current ruling government. So the researcher took this topic as my research topic that is a sentimental analysis on abrogation of article 370

Sentimental analysis has become a booming subject in artificial intelligence. the classification of text data is a common and significant research field trend to get the information.The vast majority of the arrangement issues managing text have been proposed to increase the accuracy of the text classifiers.One procedure is to utilize machine learning to characterize the information and treat the nonattendance of each word as a logical attribute as in one of the underlying statistical models of language: Multivariate Bernoulli Naive Bayes model is finished. Bernoulli Naive Bayes is acceptable yet it just thinks about the appearance of words which makes it the base of the line for text grouping. In Bernoulli Naive Bayes, the word when shows up in the data, the estimation of the characteristic comparable to that word is composed possibly one in any either case zero. As an improved strategy for Bernoulli Naive Bayes, multinomial Naive Bayes was introduced. Multinomial Naive Bayes accepts that the data which is put away in an archive is a bag of words and takes word recurrence and information into a report. This paper centers around the transformation of simple multinomial Naive Bayes text classification for the Twitter sentiment analysis. With the assistance of multinomial Naive Bayes as a result that the piece has issues can works anomalous, slow, and an excess of overfitting while the informational indexes are little thus, and multinomial execution is superior to Bernoulli when compared with the Bernoulli model. In more detail, multinomial is consistently a favored technique for such a text classification (spam identification, subject classification, sentiment analysis) as thinking about the recurrence of the word, and improve accuracy than simply checking for word occurrence. The classifiers of Naive Bayes are a group of classifiers dependent on Bayes' famous probability theorem known as to make straightforward ground-breaking models, especially in the territories of document classification and disease prediction. The textual classification of Naive Bayes is frequently utilized for ordering text as it is speedy and simple to perform. Less faulty algorithms will in general be increasingly slow and intricate. We look at the explanations behind Naive Bayes, not the bad performance of others. We take a look at the NB as a linear classifier and discover open doors for development grouping. We have properly changed the assigned text to distribution, the Naive Bayeshas taken. Further, we work with the MNB classification model and examine different fundamental issues with it. The Naive Bayes algorithm is a machine learning algorithm. It is basically used to classify text, including multidimensional training data sets. A few models are broadly text characterization, spam filtration, sentimental analysis, and utilizing the NB algorithm, one can rapidly make models and rapidly predict models. To assess the necessary parameters, a limited quantity of training data is required. The NB algorithm is classified as "naive" because it assumes that

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the presence of a feature is unrelated to the presence of other features. Choosing the Naive Bayes classifier (NBC) would be more useful as a result of its rapidity. Indeed, even it is proposed that utilization NB, as opposed to different algorithms, for this size of the query, as they have a parallel map-reduce implementation for that. NBC has astounding outcomes for text data analysis. for example natural language processing.

II. PROBLEM IDENTIFICATION

The motive to make this research paper is to know what people think about the abrogation of article 370. There were a lot of controversies regarding this topic. Kashmir is a place where there is always a tense situation. There were many problems in Kashmir such as a conflict between Pakistan, China, and India for Kashmir. There are many terror groups formed in Kashmir who are against the government and want to be part of Pakistan. Kashmiris were having their flag till 2011

So in this research paper, twitter data is collected and the data is used to identify the sentimental analysis on the data and get the accuracy of the data.

III. LITERATURE REVIEW

This part of the paper is used to explain the related study of sentimental analysis on different domains such as tourism, Stock, Indian general election.

In this paper [2] Mittal, A., and Goel, A. have concentrated to apply sentiment analysis and machine learning laws to discover the connection between's "public sentiment" and "market sentiment". We use Twitter information to foresee the public mind-set and utilize the anticipated mindset and earlier days' DJIA qualities to foresee the stock market developments. To test our outcomes, we propose another cross-validation strategy for financial information and get 75.56% accuracy utilizing Self Organizing Fuzzy Neural Networks (SOFNN) on the Twitter channels and DJIA scores from the period June 2009 to Dec2009. In this paper [3] Singhal, K., Agrawal, B., & Mittal, N has studiedPolitical analysis utilizing online media is standing out enough to be noticed by numerous analysts to comprehend general assessment and patterns, particularly during voting time. In this paper, we propose a novel methodology dependent on semantics and setting mindful principles to recognize general assessment and further anticipate voting results. We crept the political tweets during the overall political decision in India, and further assess our proposed approach against the political decision results. Exploratory outcomes show the viability of the proposed leads in deciding the sentiment of political tweets.

In this paper [4] creators García, A., Gaines, S., and Linaza, have considered the Sentiment examination that has been broadly explored during the most recent years primarily for the English language. Presently, existing methodologies can be part of two principle gatherings: strategies dependent on the mix of lexical assets and Natural Language Processing (NLP) procedures; and machine learning approaches. This paper presents the utilization of lexical information bases for Sentiment Analysis of client surveys in Spanish for the accommodation and food and drink areas. A global sentiment score has been measuring dependent on the negative and positive words which show up in the audit and utilizing the mentioned lexicon database. The algorithm has been tried with short client's online audits gained from TripAdvisor.In this paper [5] Severyn, A., and Moschitti have contemplated the correlation between the outcomes of our methodology and the systems participating in the test on the official test sets, recommends that our model could be positioned in the initial two situations in both the word level subtask A (among 11 groups) and on the message-level subtask B (among 40 groups). This is a smidgen of significant proof on the pragmatic estimation of our answer.

IV. PROPOSED RESEARCH WORK

The researcher has used Kaggle to get Twitter data which contains the tweets from the period of 5th Aug to 10th Aug when the abolishment of

Article 370 was announced. There are about 190985 tweets. The dataset does not include any retweets. The tweets contain information of when it was tweeted, what was the tweet about and who tweeted, the number of replies, the number of people who liked the tweet, and also the number of replies to the tweets.

A. Data processing:

Data preprocessing is a cycle for making bad quality information into great information making it simple to measure. There are a few data preprocessing procedures utilized in this exploration which are decrease of dataset dimension, case folding, elimination of punctuation, stopword elimination, lemmatization, and tokenization Case folding is the cycle whereby every letter is changed over into lowercase. Just the letters 'a' to 'z' are allowed. Likewise, the letter is viewed as a delimiter or word separator. Eliminate punctuation is the way toward eliminating punctuation in a sentence.

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Tokenization is the way toward cutting the data string dependent on every compiler word. The standard attempts to isolate each word that aggregates a report. In this cycle the elimination of numbers, punctuations, and signs, in the matter of the fact that the character is considered as a separator of the word and has no impact on data processing. Stopword expulsion is the way toward eliminating less significant words that regularly show up on records. To abbreviate the arrangement cycle, it can wipe out stop words, for example,"which","the", "and".Lemmatization isn't utilized because it will make changes in the sentimental analysis accuracy

(1) Read.csv function of the panda is used to import the data. (2) A regular expression is used to clean the text by removing unwanted expressions and URLs. (3) The TextBlob class is used to get the sentiment function which shows the polarity that is stored in another column with the help of pandas. (4) After getting the result if the else function is used to change values if the value is greater than 0 then replace it with 1 else 0. (5) From this data we have, the 4000 sample is taken randomly with the help of sample function

(6) The two columns which we are using to check the accuracy of our data are the tweets which will be used as x dataset and polarity y dataset rest data will be deleted. (7) The test_train_split function is used to split the data into test and train data.

B. Feature Extraction:

(8)TF-IDF stands for Term Frequency Inverse Document Frequency. This is a common algorithm to transform the text into a meaningful representation of numbers which is used to fit the machine learning algorithm for prediction.erm, Frequency (TF) = (Number of times term t appears in a document)/(Number of terms in the document)Inverse Document Frequency (IDF) = log(N/n), where, N is the number of documents and n is the number of documents a term t has appeared in. The IDF of a rare word is high, whereas the IDF of a frequent word is likely to below. Thus having the effect of highlighting distinct words.

We calculate the TF-IDF value of a term as = TF

* IDF.(9)To fit and transform the TF-IDF fit_transform function is used to calculate the mean and standard deviation and apply the transformation to the trained data set of x dataset and only transform function to the test data of the x dataset.

C. Learning and classification using Multinomial Naïve Bayes Model:

(10) Multinomial naive Bayes machine learning algorithm is used because in this text data we see the frequency of the words so this algorithm is used, the fit function is used to fit the x trained data of TF-IDF and y trained data. (11) We can predict the class for new data instances using our finalized classification model in scikit-learn using predict() function with parameter as the x test data of TF-IDF.

12) K-Fold Cross Validation is a cross-validation method to assess a model where data is part of two subsets that are learning process data and validated data[6]. Models are taught by a training subset and validated by a subset of validation. For the most part, this strategy is utilized on the grounds that it can diminish computational time while keeping up the precision of the assessment. For the determination, k can be based on the size of the analysis needs. So, the study chose and also utilized k = 10 to get optimal accuracy [7]. This research utilizing ten-fold cross-validation as approval of the system model that was already built. (13) an accuracy Score function is used to get the accuracy of data and get the accuracy after each iteration and store the values and add all the values and divide by the number of folds done by the k-fold cross-validation.

V. RESULT AND DISCUSSIONS

For better visualization of the words, we used the Wordcloud package which helps to create word clouds by placing words on a canvas randomly, with sizes proportional to their frequency in the text.

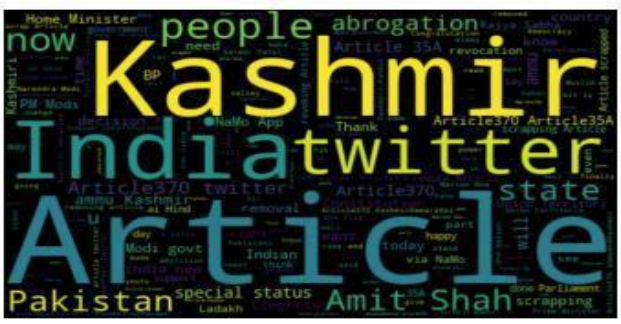

Fig no 1: Wordcloud image

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As we can see on Twitter, Article is the word's used more frequently in our data

Polarity is a float that lies in the range of [-1,1] where 1 means a positive statement and -1 means a negative statement. The

This is the Flow chart presentation of the whole process is shown in Fig3

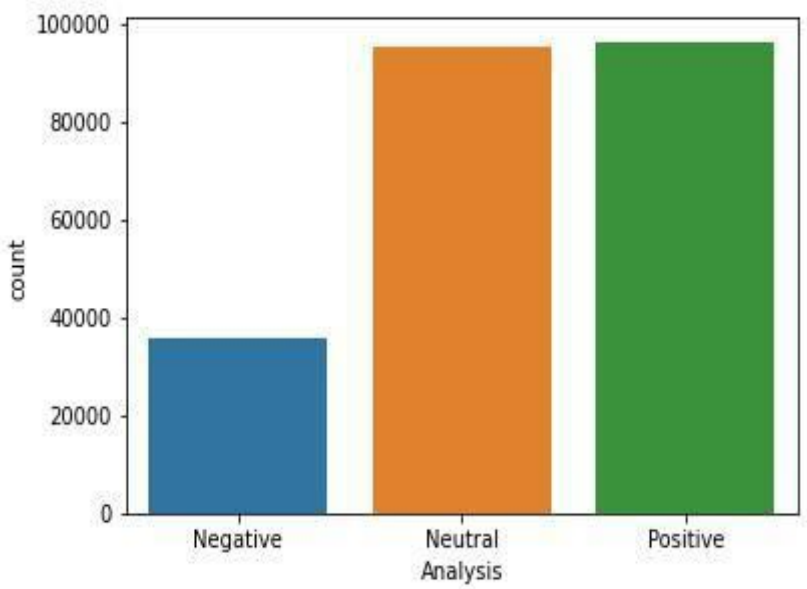

Fig no2: Count_plot results of Polarity

As we can see that the positive and neutral have the same amount of results and negative results are low as compared to the other two. After getting polarity we have change values to 1 and 0 because as Multinomial naive Bayes algorithm does not deal with a negative value.

The system is built successfully classified positive sentiment orientation and negative sentiment with the most optimal result is Score average of 72.6% using preprocessing and feature extraction with frequency based on the classification process

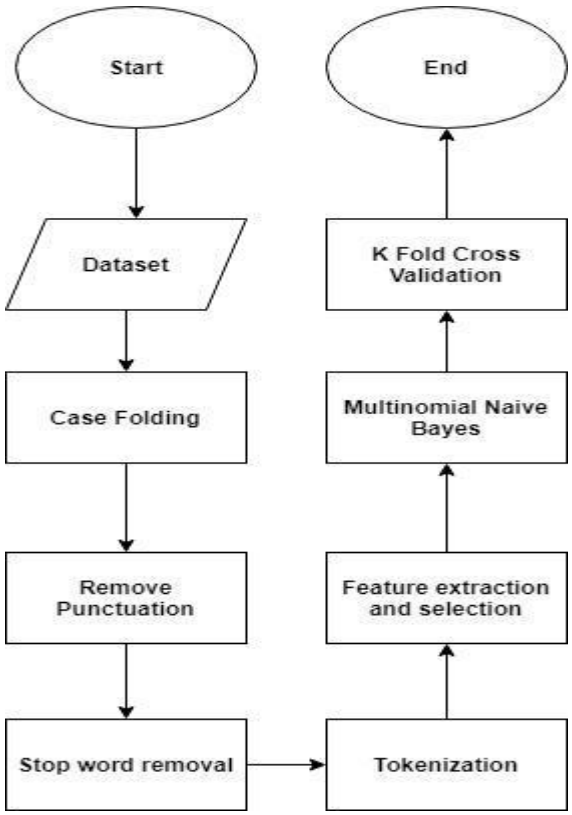

Fig no 3:Flow Chart

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VI. CONCLUSION

From this research work, we can find out that the multinomial naive Bayes algorithm is giving better accuracy of 72.6% on the random sampling of 4000 twitter data, and in this sentimental analysis there are more neutral and positive results.

There other methods that are used commonly such as CountVectorizer, Bag of words for feature extraction, and can also use NLTK for data processing and extraction. Here we have used only 4000 random samples from more than 1 lakh data. The good infrastructure of the system can import more data which can lead to better accuracy of data. Here we have used only data from Twitter there are other sources such as websites, Facebook, Reddit where we can import the data and work on that.

Multinomial Naive Bayes algorithm is used here to get the accuracy there other algorithms which can be used and get better results.

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GLIMPSE OF VIRTUAL REALITY AND ITS APPLICATIONS

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ABSTRACT
In 21st century, technology becomes huge part of human life. Technology is making our lives more conveniently. Human have ability to create something unique that we all are using today. In this paper we are giving overview of latest trending technology that is Virtual reality. We will discuss various VR devices, and applications of VR. Virtual reality can be separated into two different words: 'Virtual', 'reality'. 'Virtual' can say near and 'Reality' means experience done by us. The entire term can be defined as the creating a virtual environment thatpresentingus in such some way that we are actually experience it. Virtual Reality allows us to explore places that exist only in our dream. VR is improving our experience in various fields such as education, medical nursing field, shopping, agriculture, sport industry etc.

Keywords—Virtual reality (VR), simulation, immersive,Head Mounted Display(HMD)

I. INTRODUCTION

VR is fully innovative technology that gives a user the feeling of being in the environment and experiences it. A various video games have developed using this technology to place the user in an artificial and interactive world. In order for our brain to feel a virtual environment there are many parameters that are important for creation of virtual experience necessary for virtual reality.VR is nowadays very helpful in different domain peoples like gamers, 3d artist's, architects and real estate agents, teacher and students and even astronauts and many more. Biggest hurdle of VR is triggering the human brain into getting digital data as real. VR relies upon interaction that is completed via input devices like data gloves, joystick and alternative sorts of controller.[1-3][24]

II. VR DEVICES

- Head Mounted Display
- CAVE
- VR Glasses
- Data Glove
- 3D Mouse
- Track pads
- Motion trackers
- Body suites

1. HEAD MOUNTED DISPLAY

First HMD is created by Ivan Sutherland in 1968.HMD is a display device that you can wear on your head.HMD is not only made for gaming but they widely used in various fields such as military, engineering and medical.HMD is using various technologies to transfer virtual image to human brain. E.g. Liquid Crystal Displays. Although you might came across older models that uses Cathode ray Tube. Headset show content before use's eyes whereas a cable transfer pictures to the screen from a laptop. Google cardboard acts as a display and source of VR content is an alternative for headset [1-3][13].

2. CAVE

CAVE stands for CAVE Automatic Virtual environment. CAVE is an immersive virtual technology designed to overcome limitation of HMD.CAVE is VR environment consisting of cube-shaped VR room. When CAVE is using it should contained within a dark larger room. It is one of best VR immersive device used for interaction. CAVE is good for exploration of data and reviewing design of applications[1-3][13].

3. DATA GLOVES

A Data gloves is interactive input device. Data Gloves contain various electronic sensor which capture physical data. Data gloves also called cyber glove or wired glove. It contain motion tracker such as magnetic tracking device[1-3][13].

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4. VR GLASSES

According to[1], VR glasses are a type of eyewear which functions as display device. Here wearer can view a series of computer generated pictures which they can interact with. There are different types of virtual reality glasses such as virtual reality glasses for PC and virtual reality glasses for PC Mac

III. APPLICATIONS OF VR:

- Education
- Retail
- Medical/Health
- Agriculture
- Hospitality
- Entertainment
- Sport industry
- Tourist
- Events
- Fashion
- Architecture

1. EDUCATION

Education is one of the appealing domains of virtual reality for teaching as well as for learning. The advantage of this powerful technology is that replace memorisation to the interactive technologies to assist impart information and understanding. VR makes learning method straightforward, a lot of exciting for college kids. Thus students will gain information through real time expertise. Several students get bored with classic teaching ways. The interactive technology where cause of VR gets students keeps attentions for sessions. We tend to discover that students instantly wish to try to out the VR. VR helps students to visualize the items on the far side the lecture and books by collaborating them in realistic situation. After experience VR technology students can discuss and interact with each other effectively. VR headset is best choice for folks with the physical disabilities. Students will get even a lot of immersive experiences with coaching simulations. The App like Google Expedition is free to download on Android or IOS here academics will invest in a very ton of the affordable cardboard headsets which is able to be connected to a Smartphone [2-3][24].

In chemical engineering VR was accustomed develop virtual manufactory to seek out regarding the technology and the way effective it's.

Virtual field visits became one all told the foremost in style applications of VR technology for learning, and much of colleges have begun victimization Google Expeditions to manoeuvre students to faraway and even inaccessible elements of the world. Virtual field trips are accessible. Sadly, several students are not able to experience it, for a spread of reasons. This may result to incapacity, the expense, or transport problems, amongst alternative reasons. With VR, each student will get pleasure from the identical tour expertise along, free of charge. This kind of engagement, with 100% attending, is exclusively impossible with ancient field visits. The app King Tut VR provides the experience of ancient history [6][25].

Unimersiv is one of the platforms of VR for education. There are various VR content for schools (anatomy, visiting tour to ancient Rome, the Acropolis of Athens and Stonehenge, learning dinosaurs in VR, etc) and company training [24-25].

VR easily helps to explain every concept deeply. Learning experience with the help of VR was superb. Because it helps to learn theoretical conceptpractically [28].

Figure 1.Educational VR
Source:https://thinkmobiles.com/blog/virtual-reality-education/

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2. MEDICAL/HEALTHCARE

VR permits healthcare professionals to learn new skills or brush up certain things in a safe environment. It is used in many area of healthcare such as surgery and counselling. It's used for training of new interns as well as doctors. Benefits of VR in medical field are safety, money, skill refresh, and efficiency. To interact and communicate with patient they can use 3d virtual human avatar. VR maintain sense of realism. By using VR the medical students and doctor can learn complex procedure/operation without risking anyone's life. Repeatability is another characteristic of virtual simulation. Additionally, inclusive skills are often assessed more accurately through simulation. By using Medical VR, patients' brain related issues can be solved without pain. This is often actually beneficial because it shortens the patient's stay time within the hospital and also lowers the price of the whole treatment process[1-2][4][24] Robotic surgery may be a recent innovation during which surgery is performed employing a robotic device, e.g. robotic arm which is controlled by somebody's surgeon.

For treating burn victims now many healthcare institutions using VR. Skin grafting is more painful procedures. With the help of VRheadsetthey will concentrate on something more peacefully instead of pain.

Cancer patients can also use VR headsets during chemotherapy and make their medical treatment less stressful. [10][11][19-20][21].

Figure2. VR in Medical Field

Source:https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6798020/

3. ARCHITECTURE

Virtual reality is used by architect. Using virtual environment gets more benefits while build a construction project. With minimum amount of time looking at many factors many errors and progress can be analyse.Design and builds of new building can be explored using virtual reality headset, data gloves and input devices.By using VR users can feel environment, they can explore the every room, floor, or the look of the building as a full. Providing a buyer with associate degree exhaustive virtual illustration of your building style can create the feedback method simpler [1][3][13].

Benefits: Low start up cost, Competitive edge, avoiding revisions; create real world scenarios [24].

4. ENTERTAINMENT

Virtual Reality is a very demanding form for entertainment. Many areas fall into this category. Such as Gaming, Galleries, virtual theme parks, Theatre, virtual museum. With VR technology you can engage large audience to visit the museum. There are number of virtual reality platforms are available for viewers entertainment like3D display, CAVE system, simulators [2][24].

Museums can use VR apps for the location-based computer game entertainment.For example, British Museum used VR devices to interact adults and kids with their Bronze Age collections. Visitors within the VR headset could rehearse the traditional landscape and interact with the artifacts employing a VR controller.After the launch of such virtual applications, museum representatives note a rise within the museum attendance[1][12].

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Figure 3.VR Amusement park

Source: https://jasoren.com/virtual-reality-for-the-entertainment/

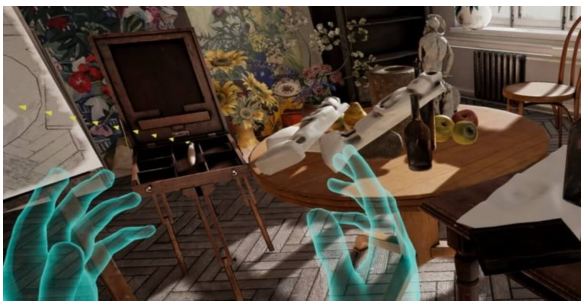

Figure 4.VR in Gallery Business

Source:https://jasoren.com/virtual-reality-for-the-entertainment/

5. SPORTS

Virtual reality is employed as a coaching aid in several sports like golf athletics, cycling etc. For designing of sporting clothes, equipment also VR can be used like shoe design. By using Virtual reality, audience can experience of a sporting event in another level. Player, who using VR sport theme get permission to be part of any competition. For the instant, VR broadcast of sporting events is proscribed. Genius agrees that we are still some Ten years away before we are able to see true VR with proper video. Within the meantime, there's no shortage of companies trying to create headway therein direction. Beyond Sports could also be a VR start-up that gathers player information from football game matches thus on builds3D simulations of the sport. By wearing the VR headsets users can explore the sport from anywhere from any place [8][24].

Most of the human beings are shifting far from TV screens, VR will revolutionize the manner we tend to watch sports and attract tons of latest viewers. By capturing matches make the use of 360° video cameras; the audience will watch the events as associate immersive expertise through headsets or mobile. Next VR is one in all the foremost start-ups that has such expertise by broadcasting most well-liked leagues like NFL, NBA, and Wimbledon through VR. Virtual reality has become vastly well-liked in American football game, with notable NFL groups. Dallas Cowboys, New England Patriots, and San Francisco 49ers this 3 NFL groups using VR technology. Virtual reality is additionally helpful for NASCARracers[7][22][23]

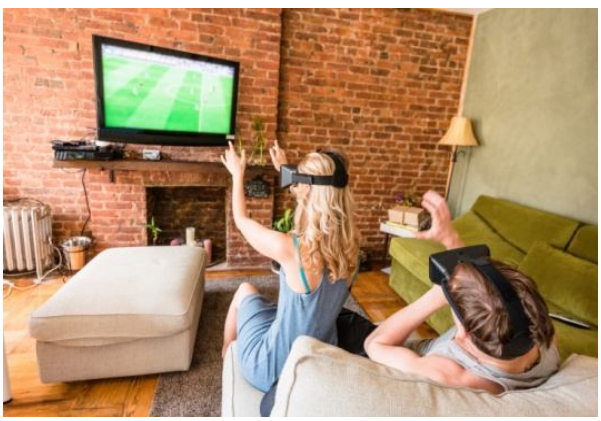

Figure 5. VR in Sports

Source:https://techcrunch.com/2016/09/15/how-virtual-reality-is-transforming-the-sports-industry/

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Figure 6.Live sports into interactive Virtual Reality Experience

Source: https://jasoren.com/virtual-reality-for-the-entertainment/

6. FASHION

VR is used by fashion industry in a variety of ways. The VR software used for creating 3D fashion portfolio, fashion store, 3D avatars to help with clothes design. Live fashion show is a one the use of virtual reality. In that scenario, 3D image was projected into a real world setting, i.e. a catwalk as a part of show [24,16].

With the help of AR you will get interactive as well as exciting shopping experience. Using AR &VRthe client gets the chance to form the proper selection whereas buying a particular material. It additionally helps them in attempting the clothes effectively [17,18].

According to [15], Best VR & AR app in fashion industry: OBSESS is one among platform that allows brands and seller to build VR shopping experiences for mobile. Client will access digital info and media related to in-store merchandise through an app. client can even discover videos and suggestion that help out in making in-store purchase decision.

In March 2018 MODIFACE, obtained byL´Oreal and it is an augmented reality-based application that permits users to simulate live 3D makeup, skincare evaluation and photo-realistic hair colouring [15].MODIFACE app is freely available on android as well as IOS. It's interesting real time facial analysis app. It's easy to use. Quickly able to find out popular brands. It gives facility to check which colours suites on various skin types, hair colours and face shape.[29]

VIRTUSIZE is a virtual fitting option that allows on-line fashion seller to show size and fit for customer.This is Best app provides more real pictures for the clothes. Instead of guessing size user know which size to get [15].

The Wanna Kick app permits customers to undertake the shoes just about that's through the app before they get. One will switch between varied colours and choices out there and select consequently. Wanna Kick is amazing technology with distinctive concept. It's well developed application. but there is one limitation user can virtually try limited shoes in Augmented Reality[30].Similarly, with the help of Wanna jewellery and Wanna Nails app customers can try Jewellery& Nail polish virtually[18].Wanna Nails app make complete nails polish process faster along with that it also provide various colours options as well as types of nail polish.This App is very easy to use[27].

Figure 7. VR Fashion Show

Source:https://ec.europa.eu/regional_policy/en/projects/poland/virtual-reality-digitises-polands-fashion-industry

7. HOSPITALITY

According to[5],Within the hospitality sector, VR has become notably necessary, as a result of rather than reading description of hotel rooms VR offers clients the prospect to experience things for themselves before they are going to really book a hotel room.

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Figure 8.VR in Hotel Industry

Figure 9.Mobile check-in App for Hotels

Source:https://www.revfine.com/virtual-reality-hospitality-industry/

8. AGRICULTURE

The agriculture business is one amongst the elemental elements of the current economy of any developed state.VR used in many fields of agriculture for research, resources, planning, production, different machinery style.VR technology used in 3DSimulation ofplants as well as for plant morphology of the expansion method [9].

Due to the characteristics of agricultural machinery style, within the development

Process, use the pc to draw tons of latest product and elements should be within themanufacturing method before we will study the merchandise performance. By virtual plant and discovering virtual farm farmers get help information of virtual crops as well as get vision of virtual farmland [9].

Equipment isn't cheap. By coaching using VR unskilled laborer get trained and work more efficiently.[26] An employee can perform pre-planting field processing or harvesting. Using VR farmers can conduct survey of soil nature, crops production etc. There are (VR+AR) technology developed its gives feature of touch. Simulation games don't lose popularity also. There's an enormous farm simulator called Pure Farming.In US farmer's union invest for learning tool. There's a boom during this area and a high demand for advertising by agricultural machinery producers. The farming simulator is on the brink of create a parallel world of farms just like the World of Warcraft. [24,26].

IV. CONCLUSION

Now in this era VR is one of the most interactive and innovative technology which applied in various domain. Currently it is started taking a vital place at several work places. We can say major role of VR is that many people can visit different places virtually experience environment immersive way without visiting actual place in person.

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STOCK PRICE PREDICTIVE DECISION USING FUZZY LOGIC

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ABSTRACT
Decision making in stock market is a tedious task. In general, technical indicators are used to study the trends of the stock price and make decision as to buy or sell the stocks based on their stock price prediction. The present paper is to deploy fuzzy inference system with four technical indicators such as Moving Average Convergence Divergence (MACD), Relative Strength Index (RSI), Stochastic Oscillator (SO) and On Balance Volume (OBV). Fuzzy rules, membership functions and recommendations are made using the Fuzzy Logic Toolbox in Matlab. Data were collected from Nifty bank for a period of one month i.e. for the month of February 2019. Technical indicators are ascertained and compared with the fuzzy inference for recommendation to decide whether to buy, sell or hold the stock. The MACD, RSI and SO values are plotted against time, whereas OBV is plotted against traded volume. If the recommendation value is below 15 then "BUY" and if the recommendation value is above 15 then "SELL".

Keyword: Neural Network and Related Topics, Forecasting and Prediction Methods-Simulation Methods, Input Output Models.

JEL Classification: C45, C53, C67

INTRODUCTION
Stock market is a dynamic, non-linear, complicated and chaotic in nature. Stock market or equity market is a public market where a large amount of capital is invested and traded every day all over the world. [1] Stock Market Prediction (SMP) is an important field of search in finance because if the market is successfully predicted then the investors may get maximum returns. [2] Stock price prediction and decision making in stock market is a difficult task. Artificial Neural Network (ANN) can be applied for SMP and for decision making, fuzzy logic results are quite promising. Since the stock market is a complex environment, fuzzy logic has been used as an application of "Artificial Intelligence" (AI), which makes it simpler as well as beneficiary to investors. [3]

REVIEW OF LITERATURE
Ebrahim Abbasi and Amir Abouec (2008) the prime objective of designing a stock price forecast model with the help of ANFIS for IRAN KHODRO Corporation with three input variables such as Trade Volume, Price Earning Ratio (P/E), Closing Price as independent variable and Stock Price Fluctuation as a dependent variable for a period of seven years. Rajendran Sugumar et al. (2014), have used ANN and fuzzy C-means clustering (data clustering) with MATLAB environment on Core 2 Duo, processor speed 1.6 GHZ (Matlab version 7.10). Stock Market Prediction (SMP) was validated through evaluation metrics such as MAPE, RMSE, MAE and MSE. The result had a high level of accuracy. Nadia Roosmalita Sari et al. (2017) examined Neural network and Fuzzy Inference System (FIS) was applied on the historical data and four external factors such as Consumer Price Index (CPI) (Negative) Interest rate (BI rate) money supply and (Negative) exchange rate accurately forecast the inflation rate in Indonesia .The system accuracy generated by NFS (Neural Fuzzy system) using RMSE analysis technique was 2.154901. which was quite satisfactory when compared with FIS Sugeno method. Chittaranjan Mangale et al. (2017) applied fuzzy logic current stock price and intrinsic stock value (which is a fundamental factor meaning "true worth of company". The fuzzy rules applied were if intrinsic value < current stock price and defuzzified crisp value is > = 1.5 then invest else non invest. The accuracy of the system was 0.77. Mohammad M. Alalaya et al. (2018) examined Amman stock exchange index prices was taken as sample set for a period of 7 years Technical indicators such as RSI, SO, MACD and OBV. The results of various models such as ANN, ANFIS and ANFIS with wavelet were compared using MAPE, MSE, RMSE.

OBJECTIVE OF THE STUDY
To build a fuzzy inference system with fuzzy logic toolbox in matlab with four technical indicators as inputs to the fuzzy inference system and to obtain results as whether to buy, hold or sell stocks of Nifty Bank.

FUZZY LOGIC
(Invented by LOTFI ZADEH)

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Fuzzy Logic (FL) is a method of reasoning which resembles human reasoning. The approach of FL imitates the way of making decisions by human which involves in all intermediate possibilities between digital values viz. YES and NO. Fuzzy logic systems (FLS) produce acceptable but definite output in response to incomplete, ambiguous, distorted, or inaccurate (fuzzy) input. Therefore, the decisions made by human includes a range of possibilities between YES and NO, such as:

Certainly YES

Possibly YES

Cannot SAY

Possibly NO

Certainly NO

TECHNICAL INDICATORS

4.1 Relative Strength Index (RSI)

A technical indicator which falls under the category (momentum) that compares the magnitude of recent gains to recent losses in order to determine over bought and over sold conditions of an asset.

RSI=100-[100/(1+RS)]

Where RS= (Average of x day^' s up closes)/(Average of x day^' s down closes)4

Moving Average Convergence Divergence (MACD)

The MACD calculates the difference between a short-term and a long-term moving average of a field.

MACD=[0.075*EMA of closing price]-[0.15*EMA of closing price]

Signal line = 0.2 * EMA of MACD. [5]

Stochastic Oscillator (SO)

The Stochastic Oscillator is termed as a measure of the difference between the current closing price of a security and its lowest low price, relative to its highest high price for a given period of time.[3]

% K=[(Close Price-Lowest Price)]/[(Highest Price-Lowest Price)] X 100[6]

On Balance Volume (OBV)

The on balance volume (OBV) technical indicator reflects movement in volume of stocks. The OBV is calculated by taking the total volume for the trading period and assigning it a positive or negative value depending on whether the price is up or down during the trading period. The relationship of two closing prices between two successful trading days must be understood.

If the second day's price closes above the prior day's close, then

OBV=Previous OBV+Current Trading Volume

If prices close lower on the second day, then

OBV=Previous OBV-Current Trading Volume[4]

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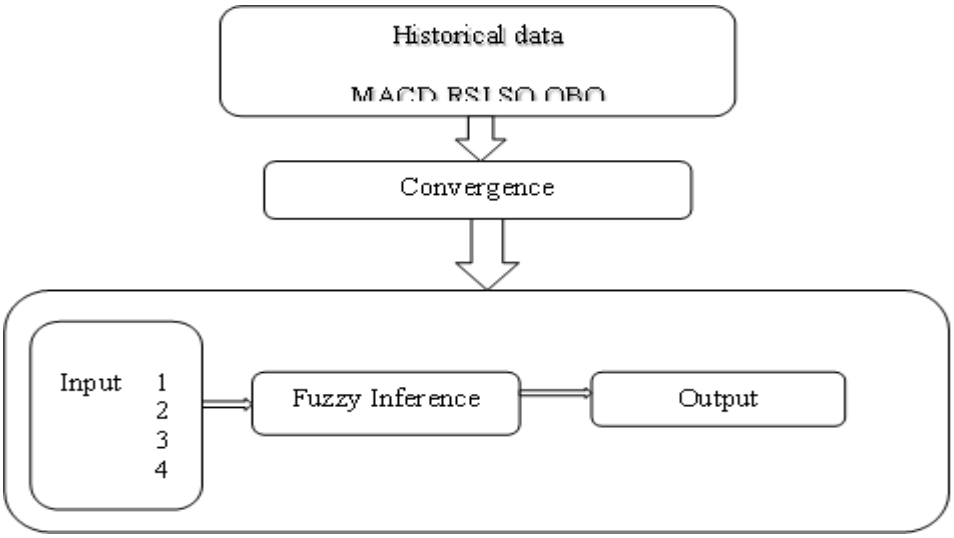

FUZZY ARCHITECTURE

Rule Base: Contain the set of rules and the IF - THEN conditions.

Fuzzification: It is used to convert inputs i.e. crisp numbers into fuzzy sets. Crisp inputs are basically the exact inputs taken by sensors and passed onto the control system for processing such as temperature, pressure, rpm's etc. [7]

Inference Engine: It determines the matching degree of the current fuzzy input with regard to each rule and decides which rules are to be fired corresponding to the input field. Next, the fired rules are combined to form the control action. [8]

Defuzzification: It is done to convert the fuzzy sets obtained by inference engine into a crisp value. There are several defuzzification methods available and the best suited one is used in order to reduce the error. [9]

TECHNICAL ANALYSIS MODULE

Technical analysis was developed around 1900 by Charles Dow (Achelis & Stephen, 2000). It is an approach used by experts to make decision in the stock market. [10] It is based on analysis of security prices: The price of a security is the price at which one investor agrees to buy and the price at which another agrees to sell. [11] In technical analysis, analysts look for patterns, trends and other factors that may appear in the financial stock market prices. These patterns and trends are used widely in order to effectively predict stocks' future performances and hence can be used to make a buy or sell decision. [12]

CONVERGENCE MODULE

The convergence module transforms the technical indicators into new auxiliary variables, which are taken as inputs for the fuzzy inference system. The output of the convergence module serves as the input variable for the fuzzy inference system. [13]

In order to open the Fuzzy Logic Toolbox in Matlab type fuzzy in the f(x)>>fuzzy.

Fig 1. Command Window

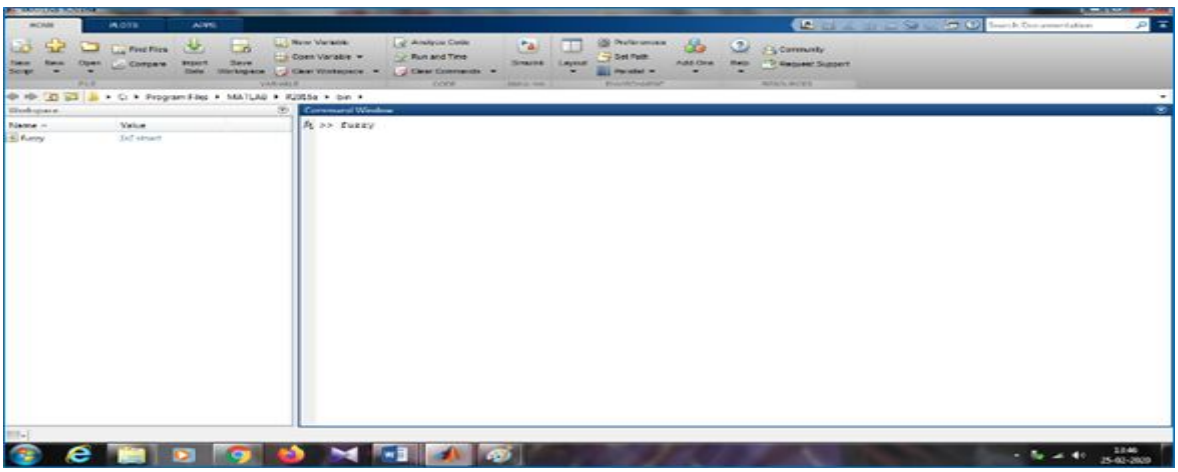

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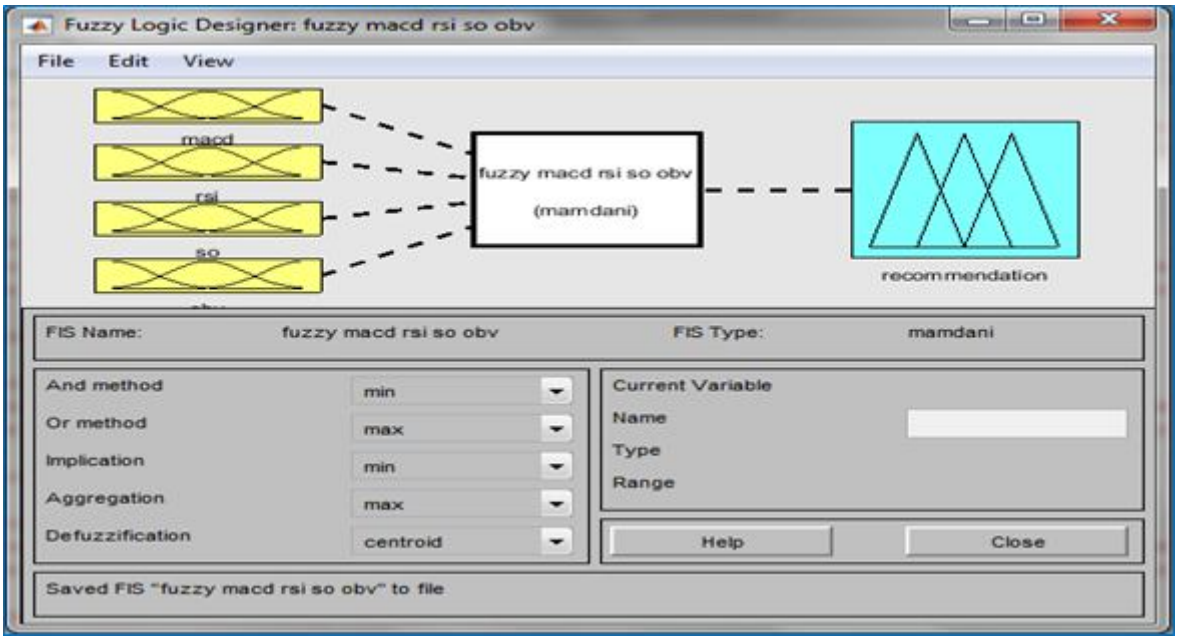
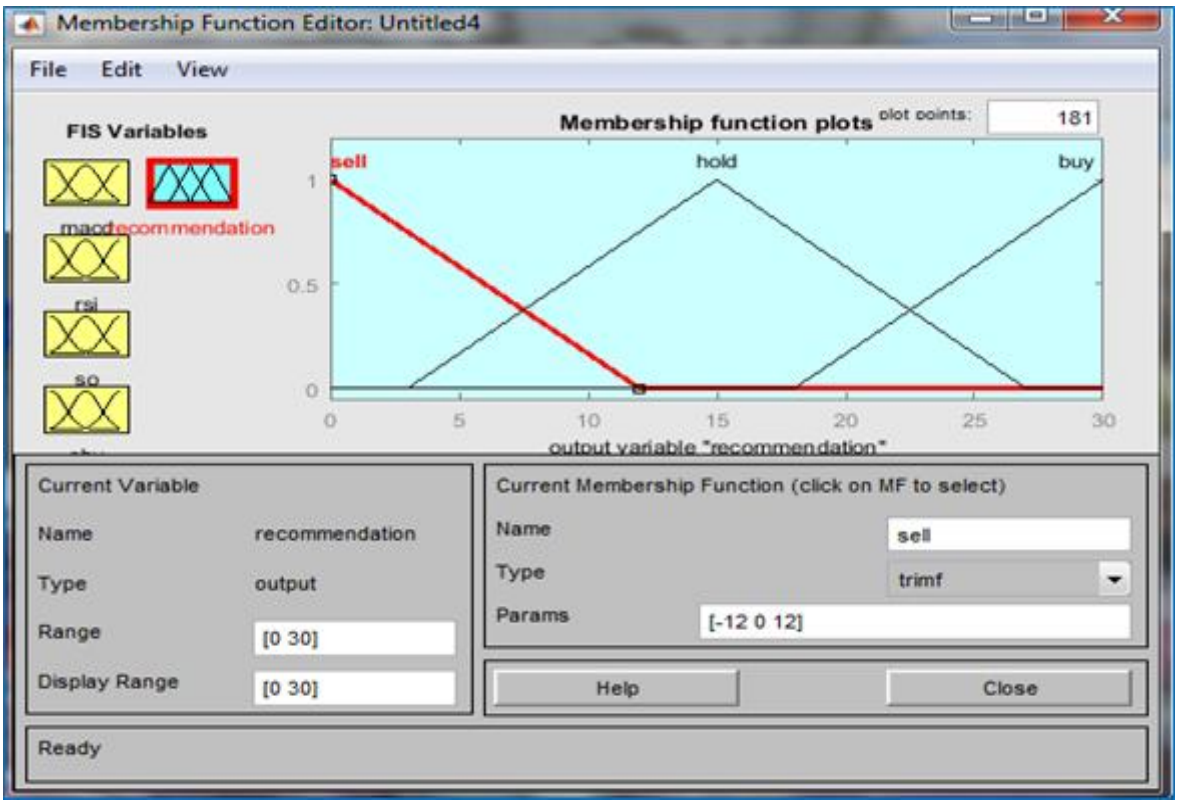
Fig 2. Fuzzy Logic Designer



In order to create “input variables” select Edit > Add variable > Input. The number of times it is repeated, that many number of input variables will be created. To name the input variable, select the variable and type the name. Select the output variable and name it. Next step is to name the fuzzy inference system (FIS), for that purpose the FIS must be saved and the file will be saved as a (.fis) file with the name given and the type of the file whether Mamdami or Sugeno must be mentioned.

Fig 3. Membership Function Editor



The next step is to create “membership function” for each and every input variable using appropriate trading strategy. The membership is the range fixed for each input and output variable. In this paper, membership function is created for four inputs viz. MACD, RSI, SO, OBV and one output i.e. recommendation as whether to sell, hold or buy based on the stock market trading strategy. The type and range of membership function must be mentioned. For this work, Gaussian and Triangular style was adopted with range 0-100 for RSI and SO.0-10 range for MACD and OBV.

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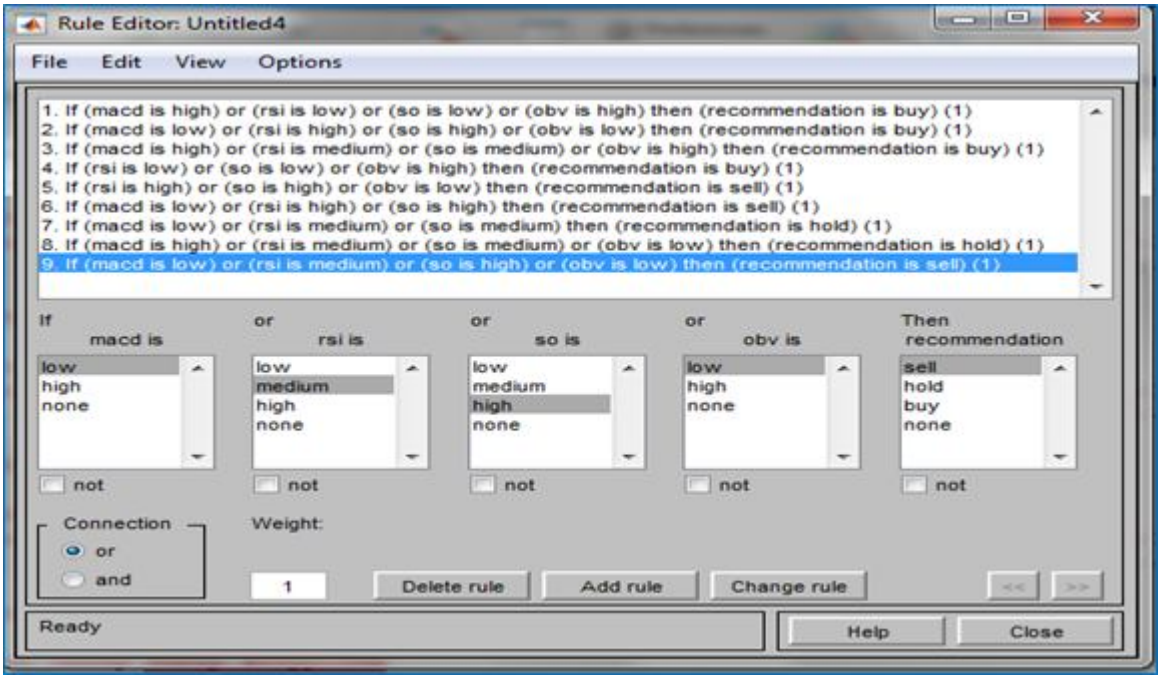
Table 1. Technical Indicators with Expert Knowledge

Technical Indicators	Sell	Hold	Buy
MACD	Below the trigger line	-	Above the trigger line
RSI	Above 70	30-70	Below 30
SO	Above 80	20-80	Below 20
OBV	Line is downward	-	Line is upward

Fig 4. Rule Editor

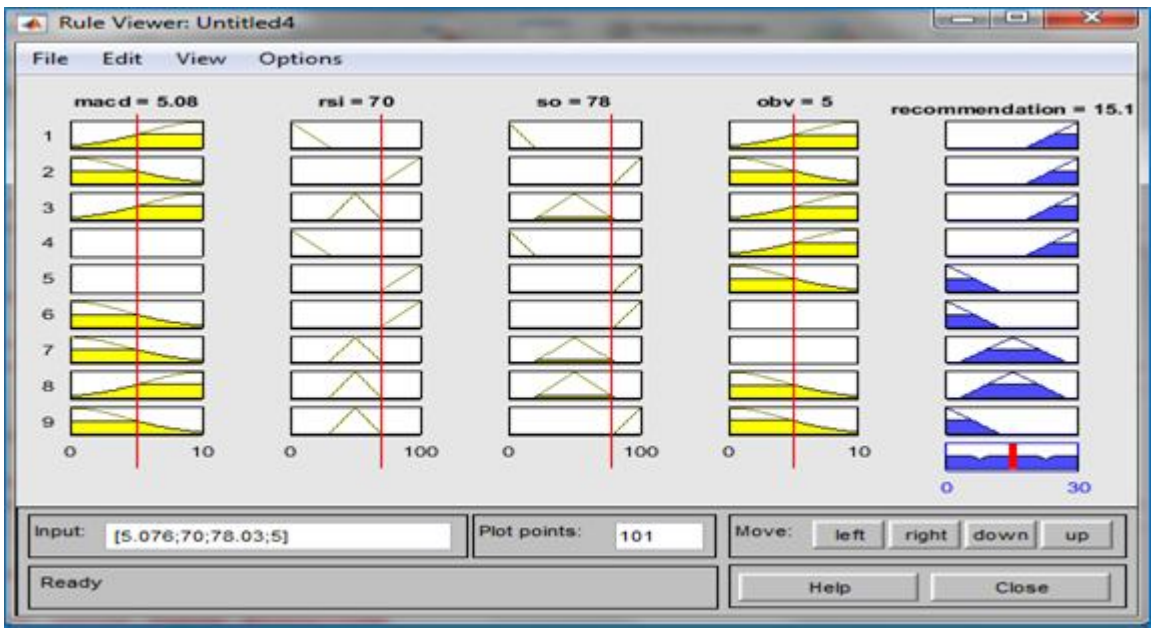


The next step is to “Add Rule” from each column select an option with “or” connection and select “Add Rule” then the rule will be added. Similarly, create as many rules as possible for obtaining better recommendation results to decide as whether to buy, sell or hold. When maximum number of Rules are added, the results will be satisfactory.

Rules can be changed by “Change Rule”

Rules can be deleted by “Delete Rule”.

Fig 5. Rule Viewer



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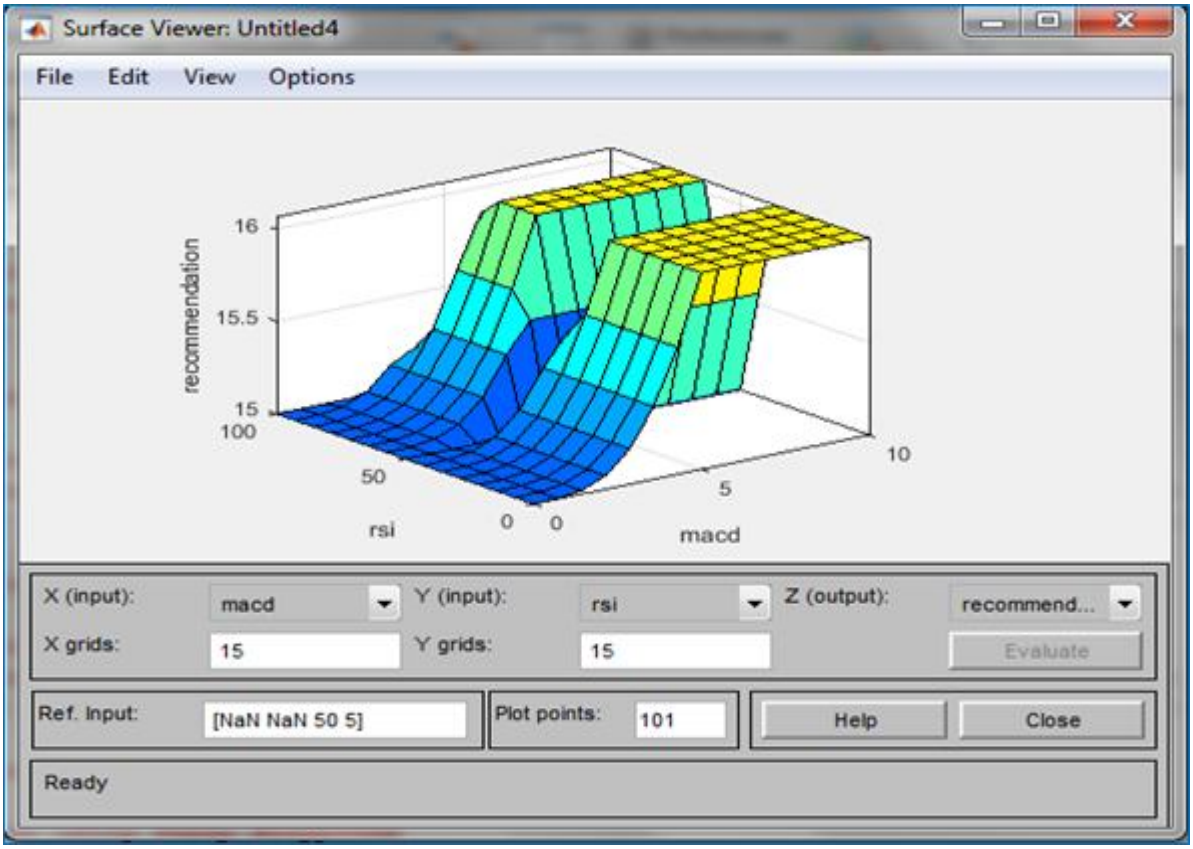
To apply and view the rules go for "Rule Viewer". By adjusting the red line on the inputs, the value changes correspondingly and the recommendation also changes.

Fig 6. Surface Viewer



In "Surface Viewer" one can view the results with two inputs and one output.

Fig 7. Nifty Bank chart with MACD and RSI

Nifty Bank Live Chart shows for the current month i.e. February 2019 from investing.com and technical indicators such as MACD and RSI are applied. The market is studied along with the fuzzy inference rules and appropriate recommendation is obtained as whether to buy, sell or hold. Similarly, SO and OBV are also applied.

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Fig 8. Nifty Bank Chart with SO and OBV

RESULTS AND IMPLICATIONS

The MACD, RSI and SO values are plotted against time, whereas OBV is plotted against traded volume.

The study proves that if MACD =5.08, RSI=70, SO=78 and OBV=5 (Using these values as inputs into the fuzzy inference system) then the recommendation = 15.1, which means "HOLD" is defined as the output membership function. If the recommendation value is below 15, then "BUY" and if the recommendation value is above 15, then "SELL".

SCOPE FOR FURTHER STUDIES

For further studies different sets of technical indicators can be applied which may also affect the stock price prediction.

LIMITATION OF THE STUDY

The present study has used only four technical indicators for creating the Fuzzy Inference System with nine rules.

CONCLUSION

Decision making in stock market is a tedious task and it aims at attaining maximum profit. Technical indicators along with fuzzy logic is highly useful for this purpose. Based on technical indicators such as MACD, RSI, OBV, SO and Fuzzy Logic Toolbox in Matlab, recommendations are made as whether buy, sell or hold.

A (.fis)file created for this work:

[System]

Name='fuzzy macd rsi so obv'

Type='mamdani'

Version=2.0

NumInputs=4

NumOutputs=1

NumRules=0

AndMethod='min'

OrMethod='max'

ImpMethod='min'

AggMethod='max'

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DefuzzMethod='centroid'

[Input1]

Name='macd'

Range=[0 10]

NumMFs=2

MF1='buy':'gbellmf',[5 2.5 0]

MF2='mf2':'gauss2mf',[3.397 9 3.397 11]

[Input2]

Name='rsi'

Range=[0 100]

NumMFs=3

MF1='buy':'trimf',[-40 0 30]

MF2='hold':'trimf',[30 50 70]

MF3='sell':'trimf',[70 100 140]

[Input3]

Name='so'

Range=[0 100]

NumMFs=3

MF1='buy':'trimf',[-40 0 20]

MF2='hold':'trimf',[20 50 80]

MF3='sell':'trimf',[80 100 140]

[Input4]

Name='obv'

Range=[0 10]

NumMFs=2

MF1='mf1':'trimf',[-10 -1.11e-16 10]

MF2='mf2':'trimf',[0 10 20]

[Output1]

Name='recommendation'

Range=[0 1]

NumMFs=3

MF1='mf1':'trimf',[-0.4 0 0.4]

MF2='mf2':'trimf',[0.1 0.5 0.9]

MF3='mf3':'trimf',[0.6 1 1.4]

[Rules]

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COMPARATIVE ANALYSIS OF OPEN SOURCE AND COMMERCIAL TOOL USED FOR PREDICTION MODEL.

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ABSTRACT
The most significant development in information technology and digitalization had adopted several applications and made a revolution in business as well as medical field. The next centuries challenges revolves around the ability to predict or discover different patterns and knowledge from big data and data science is at the center of this revolution. In this paper, tools with open-source algorithms and open-source data mining tools and commercial tools are selected and compared

Keywords — Data Science, Open Source, Business Intelligence, Statistical Package for the Social Sciences (SPSS), STATISTICS AND DATA (STATA).

INTRODUCTION

Data mining has a huge number of applications ranging from business intelligence, marketing and advertising of goods, services or products, artificial intelligence research, medical data mining, biological sciences, crime investigations to high-level government intelligence. Due to its application and complexity involved in building data mining applications, several Data mining tools have been developed over decades. Every tool has its advantages and disadvantages An open-source tools is freely available tool and the development model usually means that the tool is a result of a team effort. Data mining tools provides different data mining techniques to retrieve data from databases. Data mining tools predict behaviour, future trends, medical data prediction, knowledge driven decisions. Due to the huge availability of rich data sets, the knowledge to extract useful hidden information in these data and to act on that information has become increasingly important in today's digitized world .Thus data mining is analysis of huge data sets to find unsuspected relationships and to summarize the data.[1]. Shortly, data mining is an approach to research and analysis. [2] It is exploration and analysis of large quantities of data in order to discover knowledge patterns and rules. [3]

II DATAMINING TECHNIQUES

One of the most important techniques implemented in data mining are

a) Classification Learning:-This algorithm takes a set of data (training set) and uses it for training the algorithm with the trained algorithm, classification of the test data takes place based over the pattern and rules extracted from the training set

b) Association rules – Association rules are if-then statements that mainly help to display the probability of relationships between different data items within large data sets in various types of databases.

c)Clustering The group of similar instance into cluster takes place. The challenge or drawbacks considering this type of machine learning is that we have to accordingly first identify cluster and assign a new instance according to these cluster

Table 1: **Open source data mining tools**

NAME	R Programming	Rapid Miner	Weka	Orange
Developed by	R Core Team	RapidMiner, Germany	Univ. of Waikato, New Zealand	KNIME.com AG, Switzerland
Coding Language used	R programming language	Java	Java	Java
License	GNU GPL v2	Open-source (v.5 or lower); Closed source (free started ed. v.6)	Open-source, GNU GPL 3	Open-source, GNU GPL 3

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Version of the software	4.0.3	Rapid miner 9.6	There are two versions of Weka: Weka 3.8 is the latest stable version and Weka 3.9 is the development version	***Orange version*** 3.4.5
GUI/Command line	both	GUI	both	both

R software

The R project is a platform for the graphics, software development and analysis .R is a well-supported, open source, command line driven, statistical package With machines becoming more important as data generators, the popularity of the language can only be expected to grow.R is a text based programming by entering commands at the prompt and getting executed one by one. It is continuously evolving to create a more graphical interface where code editors interact with the package (Valero-Mora &Ledesma, 2012).Kilburn (2015) cited that R studio is a software that is developed on the basis of R programming and it provides extra features with respect to data analysis , predictive modelling and others.

Orange

Orange is an open source data mining tool which has visualization environment, analytics, and scripting environment. Orange is a machine learning and component-based data mining tool and featuring a visual programming frontend for explorative data analysis and visualization, and Python bindings and libraries for scripting. It consist of a set of components used for feature scoring, data pre-processing , filtering, modelling, model evaluation and exploration techniques. It is implemented in C++ and Python. This tools graphical user interface builds upon the cross-platform framework

WEKA

Waikato Environment which is commonly known as WEKA is mainly used for Knowledge Analysis, which is licensed under the GNU general public license. Weka stems from the University of Waikato and is a collection of packages for machine learning and is Java based. Weka provides an API so that developers may use Weka from their projects. Weka is popularly used in academic and business and has an active community (Hall et al., 2009).

RapidMiner

RapidMiner is mainly used in data science software platform that gives an integrated environment for machine learning , deep learning ,data preparation, predictive analytics and text mining. It is used for commercial and business applications as well as for education, research, training, rapid prototyping, and application development .It supports machine learning process including data preparation, model validation, visualization and optimization.

COMMERCIAL TOOLS

1. ***IBM SPSS (Statistical Package for the Social Sciences(SPSS)Modeler***

This tool is a text analysis software application and data mining tools developed by IBM.It is mainly used to build predictive model

2. **MATLAB**

This tool is used for Multi paradigm numerical computing environment. This software offers features which algorithm and create models and applications

3. **STATA**

This tool is a general purpose statistical software package. Features mainly include data management, statistics analysis ,graphics and regression analysis etc.

Table 2: Comparison Matrix of open source tools

Procedure	R Programming	Rapid Miner	Weka	Orange
Division of data sets into Training and Testing sets	Yes(but with limited partition methods)	Yes(but with limited partition methods)	Yes(but with limited partition methods)	Yes(but with limited partition methods)

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Descriptor scaling	yes	Yes	No(cannot save parameter for scaling to apply for future datasets)	No(No scaling method)
Descriptor Selection	No	yes	yes	No
Parameter Optimization machine learning/statistical method	No	Yes	Yes	No
Model Validation	Yes	Yes	Yes(can not save model, so have to rebuilt for every future datasets)	Yes
K_means clustering	yes	yes	yes	yes
Association Rule Mining	Yes	Yes	Yes	Yes
Linear Regression	Yes	Yes	Yes	Yes
Logical Regression	Yes	Yes	Yes	Yes
Decision Tree	Yes	Yes	Yes	Yes
Visual Workflow	No	Yes	Yes	Yes
BigData Processing	Yes	No	Yes	NO
User Interface	Simple in Unix operating system but difficult in windows and MAC	Difficult user Interface	Easy User Interface	Easy
Connectivity	Easy connectivity with excel and other database	Easy connectivity with excel	Worse connectivity with excel and Non java database	Better than Weka
Size of Data	One million records can be easily processed with R	50 MB data upload limit	Can process Large data sets	Powerful for data analysis and Visualization

Table 3: Comparison Matrix of Commercial Software

Procedure	MATLAB	STATA	SPSS
Statistical Analysis	Incomplete Statistical Support	Yes	yes
Handling Large Data Sets	Yes	Yes	Not able to handle and Process large data sets
Data Visualization	Yes	Yes	yes
Users	Engineering	Science	Statistical analysys and Science

III CONCLUSION

In the above matrix of comparison, it explains four open source tools and three commercial tools and their importance and comparison for data science techniques. Based on the comparison, WEKA supports on open source ; however, each software tool has its strength and weakness. While R is a closely near, R requires more in-depth technical skills to execute basic tasks. Tools like Rapid Miner,Orange, provide more visual approaches.One of the tool which is independent of language limitation is Rapid Miner and has statistical and predictive analysis capabilities, rapid miner can be easily implemented and used on any system, apart from this it also integrates maximum algorithms compared to other mentioned tools. But it does not support big data processing.

In the case of commercial tools,each tool has its own advantages and disadvantages

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DESIGN AND CHARACTERIZATION OF ANTENNAS FOR BIOMEDICAL APPLICATIONS: A SELECTIVE SURVEY

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ABSTRACT
In this rapidly growing era of communication, huge development is carried out in the field of biomedical sector. Biomedical applications require the implantation of miniaturized devices for health care monitoring. It deals with the evaluation of essential physiological parameters. Large progress in this technology is responsible for the production of innovative and unique implantable antennas. Such type of antennas plays a crucial role, as they can perform critical activities that are required for efficient communication. Nowadays, a large number of researchers have been attracted to work in this area. This paper describes the current achievements, design considerations, and various challenges associated with the presented antennas. As a stepping stone, various attributes concerned with these antennas are studied briefly. Additionally, this work compares the performance of such antennas in terms of essential antenna parameters. In the end, the entire paper concludes the basic design approaches of such antennas and explores the functional behavior characteristics.

Keywords—Antenna, Biomedical applications, FR4, ISM band, Implantable.

I. OVERVIEW OF BIOMEDICAL TECHNOLOGY
Biomedical engineering is one of the niche domains, as this field combines the basic engineering principles with the principles of medical sciences, intending to develop medical equipment and streamlines the health care services [1]. This field incorporates scientific advancements for accurate diagnosis, effective treatment, and superior-quality health care [2]. It also helps in the rehabilitation of disabled persons. Moreover, all the surgical instruments used in the hospitals are designed by biomedical engineers. Recently, biomedical engineering has solely emerged as an important field. This technology has also provided new opportunities and challenges in front of antenna designers. The important sub-fields of the biomedical sector are biotelemetry and biomedical therapy [3]. Biotelemetry deals with the evaluation of physiological parameters/ conditions of ambulatory patients over a distance, whereas biomedical therapy focuses on the employment of specific procedures for the treatment of several mental and/or physiological disorders [4]. In the past decade, different strategies have been proposed by specific researchers [5]. A large number of researchers are working towards this domain. Several biomedical bands such as Industrial, Scientific, and Medical (ISM), Medical Implant Communication Service (MICS), Wireless Medical Telemetry Service (WMTS), few others have been established [6]. The frequency bands in the range of 902-928, 2400-2483.3, and 5725-5850 GHz are classified as ISM bands. MICS band includes 402-405 MHz, whereas WMTS band specifies 1427-1432 GHz frequency range.

II. ROLE OF ANTENNAS IN HEALTH CARE SECTOR
In this biomedical sector, antennas are considered as the most important tools as they have the strong capability to transmit health-related data from the patient's body to the outside world. These devices are also employed for glucose monitoring, endoscopy, pacemaker communication, and blood pressure monitoring, etc [7]. Therefore, compact-sized antennas are in great demand for such kind of applications. Fig. 1 shows the working principle of the antenna for health care monitoring [20]. All the components along with the antenna must be integrated to constitute the system. Several antenna design approaches for biomedical purposes have been proposed in the recent past [8, 9]. Huge efforts have also been made to implement these antennas. The design of a high capacity antenna based on ambitious requirements is a challenging activity for antenna designers. The main challenges faced by the designers working in this domain are size, biocompatibility, power consumption, bandwidth, and so on [10]. Various substrates are used for designing such types of antennas. Each substrate differs in conductivity and permittivity values. Design specifications of the antenna structures are crucial for the examination of fundamental frequencies.

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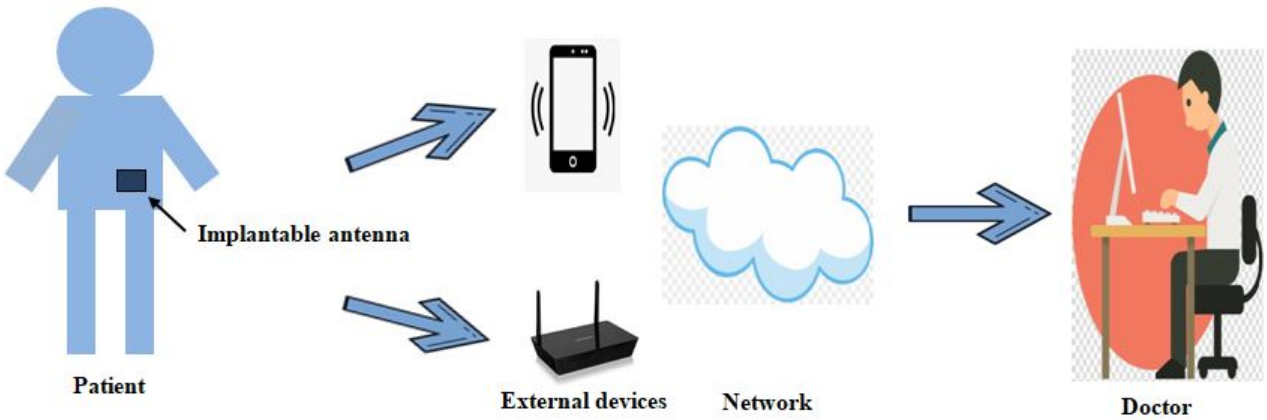

Fig. 1 Use of implantable antenna for health care monitoring system [20]

This paper presents the design criteria of a few already developed antennas that show resonance at different biomedical bands. The content of this paper is divided into five sections. A brief overview of biomedical technology is presented in Section 1. The role of antennas in the health care sector is discussed in Section 2. A comprehensive literature review on different design approaches is elaborated in Section 3. A comparison of few already available antennas is done in Section 4. In the end, the conclusion is shown in Section 5.

III. VARIOUS ANTENNA DESIGN APPROACHES

In this section, several types of antennas are discussed, that are useful for biomedical applications. Nowadays, the interest of researchers in designing miniaturized antennas for health care devices has significantly increased. This literature review presents the adopted design criteria and the important findings of the existing work that was carried out by different researchers belonging to the antenna design community. It provides enough motivation to design and implement compact antennas with enhanced functionality. A few selected antenna designs are presented and summarized below:

Lee *et al.* (2008) had described the configuration of a wideband implantable planer inverted–F antenna (PIFA) of overall volume 791mm^3. The proposed antenna was composed of two meandered strips that were so arranged to form a new π-shape structure. The recommended structure was etched on Rogers 3210 substrate of thickness 1.9 mm and dielectric constant 10.2. Return loss values were evaluated when the implantable antenna was immersed into different biological tissues such as skin, pork, muscle, eye tissue, heart, and small intestine and then a comparison was made. The wide-bandwidth of 120 MHz (353-473 MHz) was attained in the MICS band. It was experimentally examined that a designed π-shaped antenna can be applicable for implantable biotelemetry [11].

Kumar *et al.* (2014) had presented a novel implantable monopole antenna of size 15 mm x 24.5 mm for ISM band applications. The antenna was implemented and simulated at 2.45 GHz and fed with a 50 Ω coplanar waveguide feed of strip width 1 mm for suitable impedance matching. The laboratory-fabricated prototypes were tested by conducting the measurements inside the tissue-equivalent models. Results illustrated that at the resonant frequency of 2.45 GHz, simulated and measured gains attained were -7.7 and -8 dBi. Performance characteristics were examined from the radiation patterns, current distribution plots, return loss characteristics, and gain values [12]. The designed antenna is shown in Fig. 2.

Kumar *et al.* (2014) had investigated the performance of a crossed-type triangular slot antenna of size 10 x 12 x 0.65 mm^3. The designed prototype was based on a biocompatible alumina ceramic substrate. The performance was examined by testing the antenna in free space as well as the human body mimicking environment. Examination of specific absorption rate distribution inside a human body tissue body was also done. It has been claimed that the antenna can be selected as a suitable candidate for 2.45 GHz ISM band applications as it exhibits suitable miniaturization, lower return loss, and high gain in comparison to other implanted antennas [13]. The realized antenna structure is presented in Fig. 3.

Kumar *et al.* (2014) had evaluated the characteristics of dual V shaped implantable antenna for ISM band applications. The manufactured antenna was fabricated with a 1.6 mm thick FR4 substrate of size 28 x 33 mm^2. Simulations and measurements were performed by circumfusing the designed antenna in a human body phantom. Measurements showed that 10 dB bandwidth examined was 8.2 % and 7.1 % at the frequencies of 2.45 GHz and 915 MHz, respectively. Therefore, it was suggested that the antenna behaves as the best candidate for medical devices [14]. The design is shown in Fig. 4.

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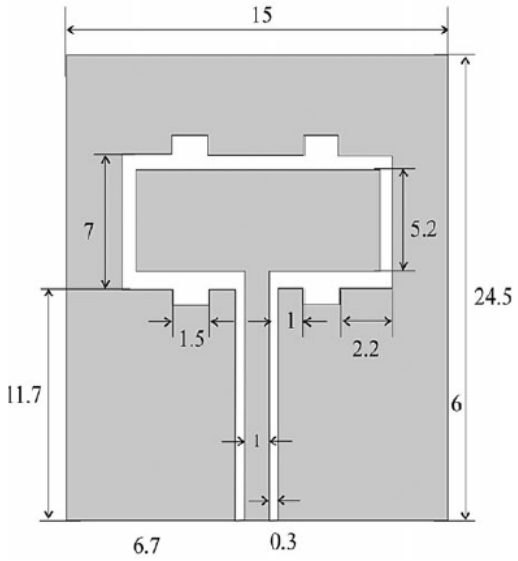

Fig. 2 Implantable rectangular patch antenna [12]

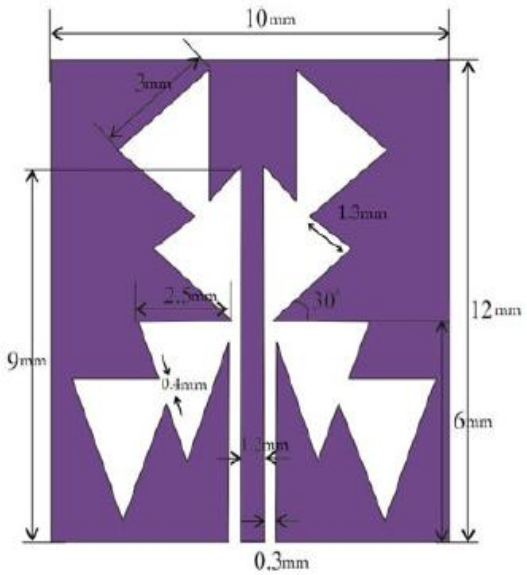

Fig. 3 Crossed type triangular slot antenna [13]

Kaur *et al.* (2015) had investigated various types of antennas using different substrates for medical applications. Biomedical applications mainly require the implantation of miniaturized devices for proper therapeutic and health care monitoring. Glucose monitoring, neurostimulators, endoscopy, defibrillators, and retinal prosthesis, etc are the few examples of medical applications that utilize the facility of remote monitoring through an implantable unit [15].

Salim *et al.* (2015) had reported the design procedure of a reconfigurable spiral-shaped antenna. The introduced antenna of size 32 x 50.3 x 1.8 mm^3 was modeled and simulated with HFSS software. Based on the optimized dimensions of few design parameters, the designed structure was fabricated and then tested. Defected ground structure was used in the antenna design. Surface current distribution plots were also presented. The bands examined from the results were in the range of 402 MHz to 406 MHz and 2.4 GHz to 2.5 GHz. It was demonstrated that measured and simulated results showed good accord [16]. Fig. 5 illustrates the designed spiral-shaped antenna.

Kumar *et al.* (2016) had designed and discussed a CPW fed implantable antenna of size 14 x 12 x 0.8 mm^3 to provide sufficient bandwidth. The antenna was realized on a high permittivity Alumina ceramic (Al_2O_3) substrate to cover the important ISM band. The antenna characteristics were evaluated by embedding the device in phantom tissue fluid. The authors had claimed that a wide bandwidth of 180 MHz was achieved by incorporating truncated clover slots and feed line. In addition, size reduction of 72 % was achieved [17].

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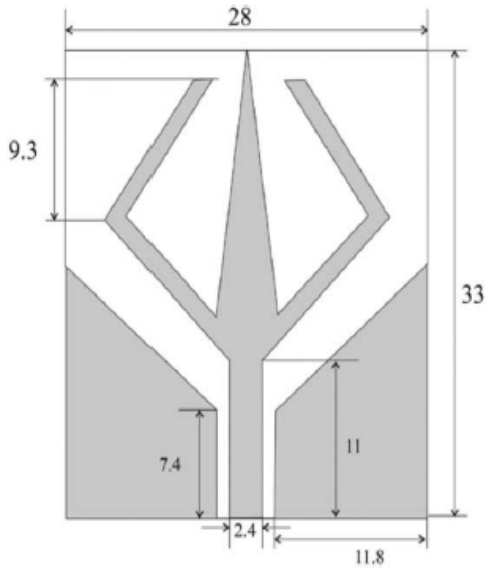

Fig. 4 CPW-fed monopole antenna [14]

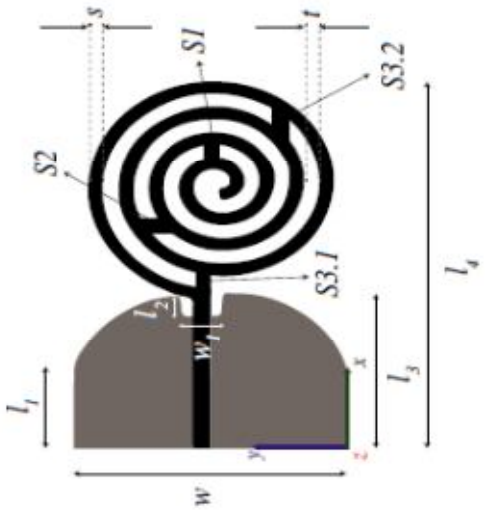

Fig. 5 Spiral shaped monopole antenna [16]

Li. *et al.* (2016) had described the functional characteristics of a circularly polarized implantable antenna in which Rogers 3010 substrate was used. The whole structure including the superstrate had an overall volume of 10 x 10 x 1.27 mm^3. Measurements of the antenna were done in the cubic model, voxel model as well as in muscle mimicking liquid. Unequal Cross-shaped in the ground structure was etched that showed significant impedance bandwidth and axial ratio bandwidth improvement. The peak realized gain was -22.33 dBi at 2.45 GHz when the antenna was tested in the human body environment [18].

Sukhija *et al.* (2017) had investigated the performance of two-sleeve patch antenna for ISM band applications. Modeling and simulations were done on Empire XCcel simulator version 5.5. Two sleeve radiating element was placed on a chosen 1.6 mm thick FR4 based substrate. The size of the ground was 17.20 x 29 mm^2. The behavior of the suggested antenna was studied by preparing phantom liquid. Results demonstrated that fractional bandwidth of 27.58 % in the range of 2.131 GHz to 2.813 GHz (S11 $\leq$ -10 dB) was accomplished [19]. Fig. 6 shows the fabricated microstrip antenna.

Sukhija *et al.* (2017) developed a U-shaped Meandered slotted microstrip patch antenna for biomedical applications. The antenna was designed on a 1.6 mm single-layered FR4 substrate of size 35 x 29 mm^2. Meandered slots in the design helped to reduce the size of the antenna. Results were monitored in free space as well as in the muscle model. Measured S11 characteristics and radiation patterns were presented and compared with simulated values. It was found that the S11 value was less than -10 dB at the operating frequency and was

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also proved that the antenna can be suitable for remote health monitoring systems [20]. Fig. 7 shows the realized meandered-slot antenna.

Kumar *et al.* (2020) had highlighted the design of a FR4 based compact sized antenna with meandered slots. Simulations were done with the help of ADS software. Antenna of size 35 x 25 x 1.5 mm^3 was reported to resonate at 2.45 GHz with return loss ≤ -10 dB and efficiency of about 90 %. Results at the user-defined frequency were achieved by using a U-shaped structure. The effect of placing meandered slots at different locations on the radiating element was also studied [21].

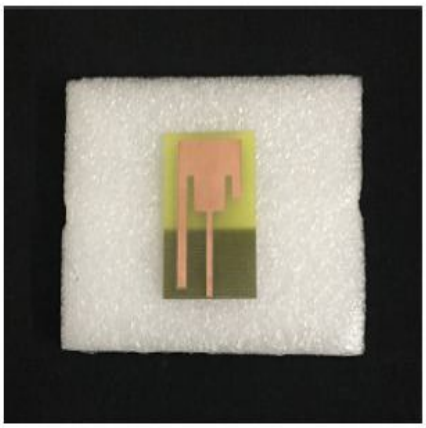

Fig. 6 Microstrip patch antenna [19]

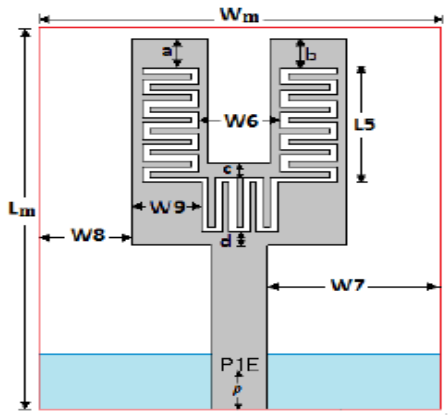

Fig. 7 U-shaped Meandered slot antenna [20]

IV. COMPARISON OF FEW EXISTING ANTENNAS

Ref. no.	Substrate type	Antenna size (mm^2)	Designed structure	Band covered
[1]	FR4	38 x 38	Fusion of Minkowski, Giuseppe Peano and Koch curves	ISM (2.45 and 5.8 GHz)
[4]	FR4	34 x 34	Amalgamation of Giuseppe Peano, Cantor Set and Sierpinski Carpet fractals	2.45 GHz ISM band
[5]	FR4	34 x 34	Fusion of Giuseppe Peano and Cantor set fractals	ISM (2.45 and 5.8 GHz)
[10]	FR4	38 x 38	Integration of Minkowski and Circular-rectangular fractals	ISM (2.43 GHz) WMTS (1.42 GHz)
[11]	Rogers 3210	22.5 x 18.5	Planer inverted-F antenna	MICS band (353-473 GHz)
[12]	FR4	15 x 24.5	CPW-fed monopole antenna	2.45 GHz ISM
[13]	Alumina ceramic	10 x 12	Crossed type triangular slotted antenna	2.45 GHz ISM
[14]	FR4	28 x 33	Dual V-shaped monopole	2.45 GHz ISM

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			antenna	
[16]	Macor / FR4	32 x 50.3	Spiral-shaped monopole antenna	MICS (402-406 MHz) ISM (2.4-2.5 GHz)
[17]	Alumina ceramic	14 x 12	Clover slot antenna	2.45 GHz ISM
[18]	Rogers 3010	10 x 10	Circularly polarized implantable antenna	2.45 GHz ISM
[19]	FR4	41.5 x 29	Two sleeve micrstrip patch antenna	2.45 GHz ISM
[20]	FR4	35 x 29	U-shaped Meandered slot antenna	2.45 GHz ISM
[21]	FR4	35 x 25	U-shaped Meandered slotted patch antenna	2.45 GHz ISM band

V. CONCLUSION

In this modern world, biomedical applications require compact-sized antennas with superior characteristics. In this presented work, different antenna designs proposed by distinguished researchers are studied and compared. It includes a comprehensive survey on various existing antennas that work for biomedical applications. From this survey, challenges faced by several antenna designers and researchers are pointed out. A brief summary of all such antennas along with their findings and shortfalls has also been discussed. Additionally, some important parameters are narrated in this study.

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SMART AND VERTICAL IOT BASED AGRICULTURE SYSTEM: FUTURE OF FARMING

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ABSTRACT
Today, the entire global world is required to operate in order to fulfil the demand -supply needs of the population with less human intervention. The time has arise where all the operational needs related to the consumable products need to be managed by the smart devices connected to everyone. The countries where they have less geographical area are mostly depended on the external resources for the demand-supply requirement. Hence, the important domain which is currently a challenge for the less land-based geographical country is to fulfill the demand of food products through IOT based services termed as smart farming. Currently, it is required to open myriad opportunities leading to smart agriculture system which is enabled with lots of data that can be analyzed in order to achieve a vertical based agriculture system. In this paper, we discuss the literature review of the field of vertical agriculture systems.

INTRODUCTION: Smart agriculture means how the farming can be enhanced with good productive using IOT based devices. Example, the farmers may require a simple analysis of how much water is required, fertilizer requirement, fertility of the soil. All this data obtained can help farmers to decide the requirements of the cultivating the crops in a better way. Vertical farming enabled with smart IOT devices leads to fulfill the scarcity of the food products which few countries have to export from the external parties. Today, the Covid-19 scenario had disrupted many countries to fulfill the supply chain of different food products to the external countries.

In 2050 , due to the increased in the population , the supply chain management would be increased[1]. The latest technologies such as artificial intelligence, data analysis, cloud computing can be important attributes for diagnosing the large amount of data obtained through sensors involved in the smart agriculture system[2].

ADVANTAGES :

- Avoids the dependency on weather conditions
- Increased in the crops cultivation
- Better analysis of the crop production
- less use of farming equipment
- No large land-space requirement

DISADVANTAGES:

- Labour costs with skilled workers
- Technoloy dependency
- Time required for large crop production
- Lack of Technology knowledge

Applications of Smart IOT agriculture system:
There are many applications such as water management, crop quality management and many other areas where large amount of data can be utilized. The major application of smart based agriculture depends on the data monitoring which is gathered from the different types of sensors deployed in the system[3].

Countries and Companies involved in smart farming:
Countries like Australia,Thailand, USA , China , Malaysia are involved in the implementation of IOT policies and their implementation in different domain of the agriculture sectors to enhance the production and demand requirements across the globe.[3]

Future : It is assumed that by 2050, growing population all over the world will demand large demand of food production around 70 % . Climate change, forest destruction, crop failures will lead to a large increase in the demand of food production. In order to survive and fulfil the demand supply, smart technology would be very essential in the agriculture field.[4]

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VEGANISM – THE NEW STATUS QUO OR JUST A FAD?

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ABSTRACT
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Abstract¬¬— The past couple of years has seen various trends emerging, from cold-brews to Ayurveda lifestyle to Ketogenic diets. Of these, Veganism has been steadily gaining popularity among people of all age groups. This paper aims to explore the various reasons people go Vegan and find out whether Veganism was prevalent among the larger audience from the very beginning or is it just a new fad that is short-lived, like so many before it.

Keywords— Veganism, Vegan, Flexitarianism

I. INTRODUCTION

Terrified after watched a screaming pig being slaughtered, British 14-year-old Donald Watson decided to give-up meat and later dairy too. In 1944, when an adult Watson realized that other people too shared his views about a plant-based diet, he coined the term—'Veganism'.

According to the Vegan Society, Veganism is "A philosophy and way of living which seeks to exclude - as far as is possible and practicable - all forms of exploitation of, and cruelty to, animals for food, clothing or any other purpose; and by extension, promotes the development and use of animal-free alternatives for the benefit of humans, animals and the environment. In dietary terms it denotes the practice of dispensing with all products derived wholly or partly from animals." [1].

There are various types of veganism:

- Dietary vegans, who do not eat any products derived from animals.
- Ethical vegans, who also refrain from buying animal based products like leather, silk, wool, etc. and products tested on animal like cosmetics, certain medicines.
- Plant-based vegans who consume only natural food, i.e. they cut out vegan junk food too.
- Raw vegans, who consume only raw vegan food like fruits, nuts, certain vegetables and grains.
- Flexitarians consciously try to avoid meat, although not completely and make efforts to embrace as many facets of Veganism as possible [2].

Veganism has been on rise since 2014, especially in the past 2-3 years, and this paper attempts to determine whether Veganism is just a short-lived craze or is it here to stay.

To achieve this, the survey method has been used as the primary data collection method. In addition to this, a number of articles and research papers have been referred to get a broader perspective on this topic.

II. LITERATURE REVIEW

A. Revamping Veganism

The past few years has seen Veganism undergo a complete makeover. The old stereotypes have been broken and it is being seen by people in a new and better light. Where before it was thought of as something that only hippies followed, now, people of all age groups, gender and nationalities are leaning towards it. It has been rebranded as healthy and pro-environment.

This excitement has been caused due to a number of reasons. Social media, magazines, documentaries have contributed majorly. Facebook and Instagram are brimming with enticing photos and stories of vegan food, vegan lifestyle and the various vegan products available in the market. People are no longer shunned or ridiculed for being vegans. Instead, they are respected and seen as role models [3]. This was witnessed in a recent British Court ruling where the judge decreed that ethical veganism, as a philosophical belief, should be protected against workplace discrimination. This decision was influenced by a vegan who claimed unfair dismissal on grounds of being a vegan [4].

The Vegan movement has been labelled as 'Modern' and 'Cool' in part, due to the growing number of athletes and celebrities who are embracing it [3]. Constant updates on the web has helped propagate it further.

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'Veganism' has become the new hot topic on Google (Number of searches for this word has increased drastically) [5]. Vegan food has been modernized and made 'interesting' and 'fancy' by restaurants all around the world. No more does a vegan diet seem restrictive or only consisting of the so-called boring fruits and vegetables. Vegan food has gone beyond 'greens' and now consists of vegan desserts, nut milks, 'jackfruit' bacon, vegan cheese and so much more [6]. There are substitutes for all kinds of meat, fish and eggs using ingredients like soya, tofu, tempeh, nutritional yeast, nuts, flax seeds, jackfruit, etc. From upscale and posh to street and junk, there are vegan option for everyone. Along with this, vegan clothes, vegan cosmetics are also gaining popularity in the mainstream markets.

B. Veganism trends and statistics

Trends show that veganism is self-perpetuating. As greater information on animal industry and plant-based eating is available and more alternative products are introduced, greater number of people are finding veganism appealing and accessible. These people are then sharing more information about the vegan diet, leading to an escalation of the trend [3].

In US, there has been a 600% increase in people who are going vegan from 2015 to 2018. In UK this number has increased by 350% in the past decade. The percentage of vegans in Italy has nearly doubled between 2016 and 2018. There has been a 400% rise in vegetarianism in Portugal. Australia, the third-fastest growing vegan market has seen a 92% rise in the number of vegan product launches from 2014 to 2016. In 2017, Veganism was a top search trend in Canada. Asia too has witnessed a growth in popularity of plant-based diets [7].

III. METHODOLOGY

A. Data Collection

The aim of this paper is to determine whether Veganism as a movement has only recently begun to rise. In order to do this, the primary data collection method selected was the Survey method. Since this is a cross-sectional study, it involved administering a questionnaire to a group of people and obtaining data at a single point in time. The questionnaire was circulated as a Google form via mail and other social media platforms. Random sampling was used to select a sample, so the form was sent to people at random. Questions pertaining to the research hypothesis were included, along with some additional questions since the objective of the paper was to partially do an exploratory research to discover various trends in Veganism. Fixed-alternative questions were used with a mix of determinant-choice questions, checklist questions.

Secondary data was also collected by referring to a number of articles that provided information related to Veganism, particularly ones that highlighted Veganism trends. This was done to gain a deeper understanding of the topic and to obtain statistics that validated the hypothesis.

B. Data filtering

The data collected through survey was sorted and filtered to include only those responses that indicated that the respondent is vegan, trying to be vegan or following a partially vegan diet like dairy-free vegetarian or whole plant-based diet. This was done to find out trends among those who are Vegans.

C. Hypothesis testing

The null hypothesis (H0) for this paper states that "More number of people are not going Vegan in the past couple of years." while the alternative hypothesis (H1) for this would be that "More number of people are going Vegan in the past couple of years." To determine whether to accept the null hypothesis and reject the alternative hypothesis or to accept the alternative hypothesis and reject the null hypothesis, chi-square (X2) test or the Goodness of Fit test was used, which requires frequencies arranged in a frequency table. We made a table containing columns of observed frequency and expected frequency for two time periods i.e. four years and below, and above 4 years. Using this we obtain a "p-value" or the probability value. To calculate the p-value we first compute X2 and df or the degree of freedom which number of categories minus 1. Using these 2 values p-value is looked up in the chi square table. If the p-value is less than 0.05, then the result is said to be significant, i.e. the variables are not independent.

D. Generating graphs

Graphs were also generated in Excel to determine other related trends in Veganism. For example, graphs were used to find the most popular reason for going Vegan, primary influences for opting Veganism and the percentage of people who gave up each category of item from the questionnaire like meat, dairy, leather, etc. Graphs were also generated to find the percentage of people who claimed to be vegan vs. those who would recommend Veganism to others.

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IV. ANALYSIS

A. Chi-square test result

TABLE I

Chi-square test result (p-value generated)

	Observed Frequency	Expected Frequency
Vegan since 4 years or less	45	29.5
Vegan for more Than 4 Years	14	29.5
Total	59	59
p-value	0.00005440	

After the chi-square value is computed, the p-value obtained using the df, which is 1 in this case, is 0.00005440. Since this number is much less than 0.05, the results are said to be highly significant and the variables are interdependent. This means that our null hypothesis, "More number of people are not going Vegan in the past couple of years." is rejected and the alternative hypothesis, "More number of people are going Vegan in the past couple of years." is accepted.

B. Reason for going vegan

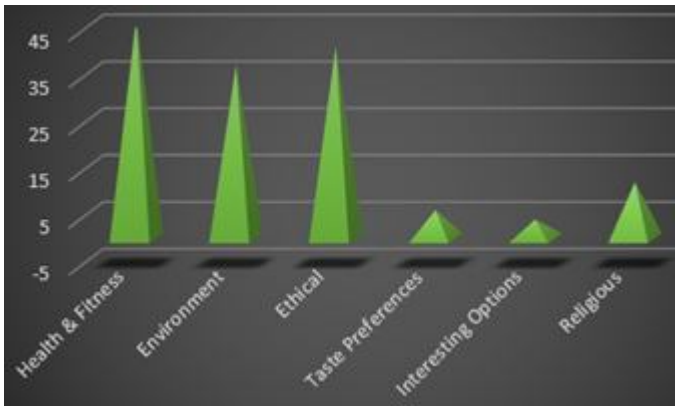

Fig. 1 Reasons why people choose veganism

The column graph shows health and fitness as the primary reason for going vegan with ethical and environment as close secondary reasons. This shows that Vegans aren't ones who only seize the moral high ground. People are now choosing veganism as they have become more aware about its health benefits and its impact on the environment i.e. its low carbon footprint. The popularization of Veganism in media and introduction of vegan items in majority restaurants have given people a viable alternative to animal products. Thus, there are also some responses for "interesting vegan options" and "taste preferences" in the survey. As most respondents were from India where majority of the population is composed of Hindus, quite a few responses reveal Religion as a reason for being a vegan too.

C. Sources of Influence

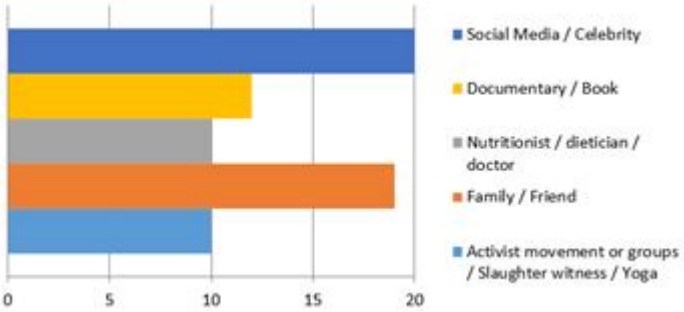

Fig. 3 First thing that got people interested in veganism

The above bar graph clearly highlights the major reason for veganism going mainstream i.e. Social Media and Celebrities. These have contributed as highly significant sources of influence, especially for youngsters. The second major source is family and friends which indirectly equates to getting influenced by social media posts of friends and family and mouth-to mouth publicity. While not the first, documentaries and books are also noteworthy influences.

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D. Rise of flexitarianism

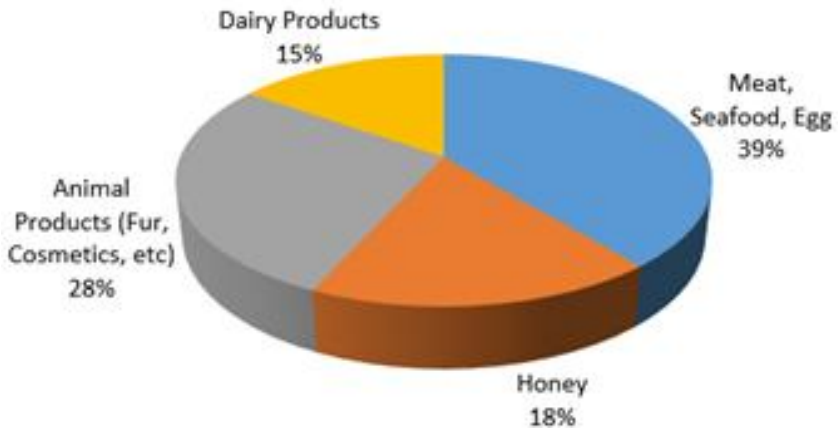

Fig. 4 Items rejected by vegans

In the above pie chart we see that majority vegans focus on avoiding non-vegetarian food and animal-based products or products tested on animals like leather, silk, fur, cosmetics, while fewer vegan decide to give up dairy and honey. This is what is called as Flexitarianism, wherein people are not fully vegans but actively try and embrace veganism as far as possible by either giving up animal products but still eating meat sometimes or by following a vegetarian diet while still consuming dairy and honey for their perceived health benefits. The above figures clearly show support for this new trend of flexitarianism.

E. Growing popularity of veganism

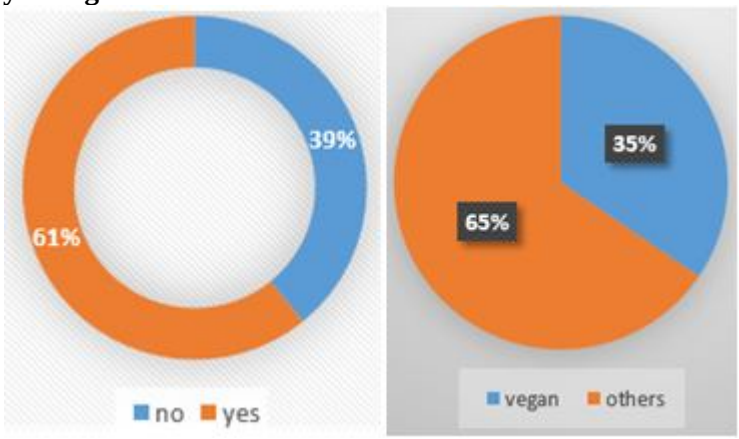

Fig. 5 Would people recommend Veganism to others? (Left); Number of people who are or trying to be vegan (Right)

The above two charts have been derived from the entire sample and not the filtered sample of vegans (as mentioned in part B of methodology). According to these, even though only 35% of the respondents claimed to be vegans, 61% i.e. more than half of the respondents were willing to recommend veganism to others. This shows that although people are not going vegan yet, many are starting to believe in it benefits and beginning to show support for it.

F. Errors and bias

In every research, there is a certain degree of error and bias that creeps in. In this case, one primary source of error may be random sampling error, that is, the sample selected may not be a true representation of the entire population since the number of respondents were below 500. Order bias can arise due to the sequence of questions. To avoid this, funnel technique was used by starting the questionnaire with general questions and then moving towards the more specific ones.

V. CONCLUSION

The research shows immense support for our hypothesis thus proving that Veganism has begun to emerge as a trend only in the last few years and the major credit for bringing Veganism to the masses goes to the social media platforms that have allowed for refashioning of the Vegan movement as “chic” and “heath-giving”. The fact that people have begun to recognize veganism as pro-human, pro-animal and pro-environment substantiates that veganism is not just a passing fad, but here to stay.

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SAMPLE SIZE DETERMINATION FOR MOBILE PHONE WASTE STUDY IN MUMBAI CITY

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ABSTRACT
E-waste generation has been increasing rapidly over the last decade. Excessive discarding of mobile phones is the culprit, due to factors like constantly changing technology and designs, and decreased lifespan of mobile phones. It is more important than ever to assess this problem and devise ways to forecast and reduce it. This paper aims to compute an appropriate sample size from a population in Mumbai city in order to facilitate further research on e-waste generation.

Keywords - Electrical and electronic equipment, E-waste, Cochran Formula

I. INTRODUCTION

E-waste or electronic waste constitutes of all electrical and electronic equipment (EEE) that is unwanted, not working or has almost reached the end of its useful life. In today's era of rapidly evolving technology and hardware, the lifespan of a mobile phone or the number of years a person wishes to use it has reduced considerably. Most of these gadgets are discarded or thrown away. Fewer phones are recycled or refurbished. Various studies have been conducted to analyze and forecast e-waste generation. However, to arrive at any valid and conclusive result, it is important to select an appropriate sample for the research.

Technological advances made in the telecom industry, continuous release of new mobile phone models with improvements made to the existing model has all contributed to the increase in mobile phone waste. Awareness about various options after a mobile reaches its end of life, like recycling, refurbishing, has risen, but this has not enough been enough to combat the ever-growing problem of mobile phone waste generation. With technology and hardware becoming obsolete at an increasing pace, scope of recycling or reusing phones, or even its constituent parts has decreased.

Recycle, repair or reuse of mobile phones would not only reduce e-waste generation and its impact on soil and groundwater, but it would also reduce the greenhouse gas emissions emanating from the manufacturing of new mobile phones using virgin materials.
Sample size calculation is a part of the early stages of any study. Determining an ideal sample size is very crucial. Population size, objective of the study, accuracy requirements, significance level, all of these affects the size of sample selected. Too small samples increase the number of false positives. An insufficient sample can be detrimental to a research. At the same time, very large samples are unnecessary and wasteful as well, consuming more than required efforts and resources of both the researcher and the participants. They also increase the magnitude of statistical differences, misleading the researcher.

Selecting an appropriate sample size may seem trivial at first, but it can greatly affect the outcome and accuracy of the results.

II. OBJECTIVE

E-waste generation, as a result of discarding or replacing old mobile phones with latest models, is a major problem. To understand the extent of waste generated due to this, the frequency with which people throw away old mobile phones must be determined. The aim is to ascertain the sample size required to compute the number of people who discard their mobile phones every two years.

III. METHODOLOGY

Data from 1000 mobile users in Mumbai city was collected using the survey method. Individuals using mobile phones of various different manufacturers are considered. The survey includes questions to find out the number of years after which individuals change their mobile phone, reason for changing and what they do with their old mobile phone.

A. Determining Sample Size

A sample is simply a part of the population that is selected for a research. To calculate an ideal sample size, it is necessary to first define the desired level or precision and confidence level. Level of precision is the error margin, while confidence level or risk level is the probability that if a test was repeated multiple times, same result would be obtained, i.e, it indicates whether the chosen sample represents the true population value.

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Sample size can be determined based on the sample size used for a previous similar research, published tables or even formulas can be used to calculate the sample. When the population is small, sometimes entire population is used as a sample. For larger populations, Cochran formula is used. There is a slightly modified formula for smaller populations as well.

B. Cochran Formula

For the purpose of this study, since the population size is extremely large and not much is known about the population, Cochran formula will be employed. Cochran formula is used to calculate the sample size for large populations, given a required precision level, an estimation of the proportion of particular attribute in the population and desired level of significance.

$n_0 = Z^2pq / e^2$ where

n0 is the sample size, e is the precision level, Z is the z-value computed using a Z table and required confidence level (1 - level of significance), p is the proportion of the population with the attribute and q=1-p

IV. RESULT

In this study, it is estimated that 50% of the population in Mumbai city discards their mobile phone every 2 years. Thus, p would be equal to 0.5 and q would also be 0.5 (1-p). The desired margin of error is set to 2.5% and level of significance to 10%. The z-value for 90% confidence level would be 1.645. Replacing these values in the above formula the computed sample size would be,

$n0 = ((1.645)^2 (0.5) (0.5)) / (0.025)^2 = 1082.41$

Therefore, 1082 mobile users should be sufficient from the target population for this survey.

V. CONCLUSION

Given that the number of mobile users, in Mumbai city, considered for this survey is 1000, it can be said that the sample size for the e-waste study to determine the number of people who use their mobile phones for not more than 2 years is an almost ideal sample. This sample can further be utilized for conducting various different e-waste studies. Apart from finding the frequency with which users discard their mobile phones, primary reasons for increase in mobile waste in Mumbai city, awareness among the the city's population about the correct treatment and management of mobile waste, gender studies, i.e., determining whether a person's sex influences mobile phone waste generation and management habits can also be discovered.

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VECTOR TECHNIQUES FOR UNDERWATER SIGNAL PROCESSING

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ABSTRACT
This paper we present the design and implementation of small scale acoustic signal processing system using vector techniques. The acoustic sensors capture the signals from the environment under observation, do the digitization and communicate to the processing system in real-time. A technique called beamforming is employed to accumulate different sensor data to assimilate the spatial characteristics of various target objects. The data is then subjected to spectral processing to extract the spectral characteristics of the targets using the Fast Fourier transform (FFT) techniques. The acoustic signal data is simulated for the prototype network implementation. As the sensor data is available real-time, the processing has to be done in most time optimized manner. So the implementation is done on a PowerPC processor based embedded single board computer. The AltiVec technology, the vector processing feature of PowerPC is exploited in the implementation to achieve maximum performance in optimum processing time.

Keywords- FIR filter, AltiVec, spectral processing.

I. INTRODUCTION
In the current world surveillance is done for different reasons and achieved by different means. This project we are focusing on the surveillance of underwater costal area. This surveillance is done to study about different environmental changes like impact of industrial and nuclear waste in the sea water, climate change and sea level increase etc.. Now a days the coastal areas are much prone to security breaches. So surveillance is done for military reasons also. This can be used for the military intelligence and so that we can identify any of the security breaches through the coastal area. The security breaches can be movement to suspected vehicles, drug trafficking etc. The underwater signal processing is a challenging area which involves the extraction of useful data amidst various noise and distractions and usage of correct tools[1]. These research areas includes the study area covering the weather, creature tracking, climatically changes with a long term goals[2].

Underwater signal processing involves capturing the images under the water in sea beds and processing with various image processing techniques. The various commonly used processing includes solution either hardware based or software based. MATLAB image processing function to gain better accuracy is proved to be an effective software based solution. This proposed system includes a summary of a hardware based solution for processing the underwater images captured.

II. PROPOSED SYSTEM
The main focus of the proposed study is to showcase the performance improvement that we can achieve using the altivec technology. For this we have to consider the computational advancement of the microprocessor and the programming optimization.

The computational power of microprocessor has been increasing day by day. Many factors decide this increase in performance such as faster electronics, smaller transistors, increased die size and many more improved design and reorganizations. The result will be very complex architectures. The complex architectures has to be supported by the programming languages which are existing now or we have to develop new languages which will exploit all the features of advantages of new design. AltiVec is such an extension in the microprocessor. To access or to exploit the advantages of altivec we have to rethink about the existing program. The vectorization concept has to be introduced into the program.

In this paper we discuss the environment in which we are using the Altivec technology and the speedup gained by it. The algorithms which are used in this study are matrix multiplication, Finite Impulse Response filter and Fast Fourier Transform (FFT) algorithm. The high processing time was a challenging area of research in such a real time systems. The proposed system will process the signal received from a linear array of sensors and process with a Digital Signal processors and display the processed results that improve the processing time of the signals. The proposed system uses the capabilities of the AltiVec technology. The AltiVec technology helps to process the signals in a vectorised manner. This will increase the processing power of the signal processing system.

In the proposed system the signals are processed in such a way that the loops in the conventional programming method is unrolled and improved. So we use a Vector Signal and Image Processing Library (VSIPL) and

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AltiVec library for the implementation. In this paper we are discussing about acoustic signal processing system. The main parts of the system are (A) Signal Assimilation, (B) Signal Processing, (C) Spectral analysis.

A. SIGNAL ASSIMILATION

In this paper we are considering a underwater environment for the surveillance. This section explains about the signal reception using a linear array of acoustic sensors[3].We have selected the acoustic sensor whose performance is high in spite of great turbulence comparing with other physical sensors. It also is used widely to cover wide areas while comparing with radar. This is because the sound waves have a lower attenuation and long propagation distance in turbid water relative to other means of sensing[4]. The string of ``dumb nodes'' which is outfitted with intelligent microprocessors are constructed like arrays with a front-end processor.

B. SIGNAL PROCESSING

In this section we are explaining how the signals are processed in the most time optimized manner. The system uses a signal processing technique called beamforming for processing. This is an proven signal for processing radio and sound waves using sensor arrays in straight signal transmission and reception having its application areas in the field of radar, WSN, sonar etc. The beam patterns transmitted and received are used for the spatial selectivity. Receive/transmit gain (or loss) is calculated that represents the improvement with respect to the omnidirectional signal transmissions.

The beamforming is done using a technique called delayed addition. Delayed addition is used to add up all the signals coming from a target in a continuous manner. That is, consider an array of sensors with n number of sensors. In conventional delay-and-sum beamforming algorithms the signals are sampled across an array and delayed to steer in a specific direction which is later added with the phased signals. Geometry is used to transform the direction to add the delay at the correct node.To explain the concept, consider the figure1. Let a target is moving and its first signal is reaching the first sensor of the array at the instant of time t. The second sensor will get the signal at time $t + \lambda$ and the third at $t + 2\lambda$ and so on. The nth sensor will get the signal only at the time $t + n\lambda$. Where λ is the time delay to reach one signal from one sensor to another.

Filtering: The first step to do the data processing is, filtering of the received signals. For this we use Finite Impulse Response (FIR) filters[5]. In filtering a perfect linear phase response is generated by passing the signal without phase distortion through an FIR filter. FIR filters can be implemented using the fast convolution with FFT algorithms. The only disadvantage is that they require more multiplies for a given frequency response, so they require a longer processing time. This situation can be handled by the introduction of Single Instruction Multiple Data (SIMD) Processor. We are thus introducing our Power PC with MPC 7448 processor which has the AltiVec technology in it. The reason why we are using filtering is to fix the frequency band for the signal. So we use a band pass filter to fix it. Only after that we are using the FIR filters. The implementation of the FIR filter is also done with AltiVec Library and the VSIPL instruction.

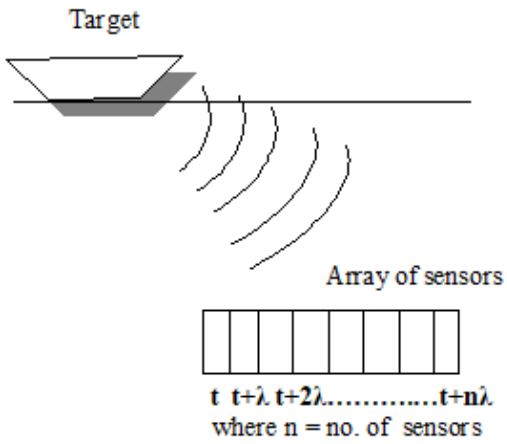

Fig. 1. Beamforming

C. SPECTRAL ANALYSIS

Spectrum analysis is the process of identification the frequency domain plotting of a period domain signal using the Fourier transform. The efficient algorithm for calculating the Discrete Fourier transforms(DFT) and the reversal is the Fast Fourier transform (FFT)[6]. The process of conversion includes the process of converting sequences of distinct values into frequencies. The conversion process DFT is a slow process if the computation

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is directly performed. So an quick process was referred called the FFT in a naive way which takes only O(N2) calculations is enhanced by O(N log N) calculations. This has proved its advantage in a huge data sets which reduces the time in an exponential way N/log(N).

Data Analysis: To do the processing part we are using the vector processing method. This is because the vector processing can improve the response time of the system. Instruction pipelining is used to reduce computation time. Latency is the small amount of time taken by each to complete it's instruction but overall the speed will be fast. Vector processors advances the concepts of pipelining the data as well as to increase the speed and the decoding time. For implementing the vector processing we are using the processor MPC7448 with vector ability.

AltiVec Technology: In this four independent pipeline execution units as maintained to execute the instructions [7]. Any two instructions can be combined for a unit clock cycle to increase the speed which is taken from the queue. This uses a determined register files with 32 instructions which is of 128 bits each. The elements in that instructions helps in preforming parallel execution which is called as SIMD (Single Instruction Multiple Data).The vector may be multiple of 4 depending on the data size. AltiVec technology extends the PowerPC instruction set by supporting additional 162 new "vector" instructions. The new instructions like sum-across, multiply-sum and data manipulations helps in gaining the performance. Permute, merge and splat operations enhances the data manipulation techniques.

III. RESULTS

PowerPCtm RISC microprocessor is used in Motorola's high-performance vector parallel processing AltiVec technology. The extended features to increase parallelism has proved efficiently in the areas of digital signal processing (DSP) and multimedia. The various set of algorithms like FFT, inverse DST and digital filter helps in analysis the behavior and process signals. AltiVec emulator is used in testing the algorithm with and without the AltiVec instruction set. AltiVec-enabled trace generator helps in generating the results using the cycle-accurate performance simulator. The factor 1.61 up to 11.66 is set as a factoe and it's proved a result of 1.82 up to 10.25 factor reduced dynamic instructions [8]. The algorithms which we have studied have shown tremendous performance improvement using altivec.

Algorithm	Scalar (mS)	AltiVec (mS)	Scalar/ AltiVec
FFT	14.883	2.336	6.371
Matrix Mul	4.800	1.34	3.58
FIR Filter	7.98	2.11	3.78

Table 1. Performance comparison

IV. CONCLUSION

The AltiVec instruction set which was studied in this can be used to implement DSP algorithm in an improved processing speed. The speed can be achieved by varying the factors like the datatypes used, the parallel execution and the overhead during packing and unpacking the instructions. But on the other side the performance improvement that comes with the help of AltiVec will compromised with the cost in the code development. The code has to be coded manually as the compilers has to be developed which remains an eye opening in the area of development.

V. COMPLIANCE WITH ETHICAL STANDARDS

Acknowledgements: Not applicable.

Funding: Not applicable.

Availability of data and materials: The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request. The study was does not involve any particular human participants or animals for the survey.

Authors' contributions: Idea, data collection, data analysis, and manuscript editing was done by the corresponding author. Other authors have read and approved the final manuscript.

Ethics approval and consent to participate: Not applicable.

Consent for publication: Not applicable.

Competing interests: The authors declare that they have no competing interests.

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SPEECH TO TEXT APPLICATION (NATURAL LANGUAGE PROCESSING AND PYTHON)

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ABSTRACT
As the time is progressing it is the need of the hour that machines understand human language. Making a separate machine for this tedious task would be cumbersome process. Designing an application which will make any mobile or computer produce spoken speech into visual text seems like a possible solution. This paper gives detailed analysis about speech to text application build using python and concept of Natural Language Processing (NLP). Python is a well-designed programming language with modules such as Speech Recognition which provides efficient ways to work with NLP. Discussing in detail about how to build an app using KivyMD, this paper contains screenshots of the app designed.
Further, this application can be integrated to a Computer Numeric Control (CNC) machine to write whatever we speak on a piece of paper using a pen. The voice driven CNC machine can print the dictation in printed form with minimal grammatical errors.

Keywords—Speech to text, Python, Speech recognition, KIVY MD, Natural Language Processing.

INTRODUCTION - SPEECH TO TEXT
The Speech is way through which humans communicate and express themselves. By combining different words, phrases, statements and grammar, proper speech can be formulated, which helps us to give a structure to our ideas and thoughts that can then be presented in the form of text. The Speech helps an individual to exchange and communicate his or her ideology with the society. Analysing this important aspect of our communication is crucial. Since ancient days there has been several studies conducted to figure out how words originate from our vocal cords. Now when we have detailed analysis about it, we can step ahead and study about how to use speech with machines so that not only humans but also digitally operating devices understand what we speak. Humans are interacting with machines more than anyone else in today's time. Hence making computers understand what we speak is important. But it is not easy, as speech differs from person to person. There are differences based on pronunciation, intonation, voice modulation, vocabulary and so on. This requires the machine to be intelligent enough so as to differentiate among the spoken data and produce desired results. Hence, we need artificially designed intelligence that is nothing but the Artificial Intelligence (AI). The AI has Deep Learning (DL) which has given a path to Natural Language Processing (NLP). This enables us to write a set of instructions which will convert speech into digital signals as computers understand digital signals only. With time, we have progressed from Audrey in 1950 to Alexa, Siri, and Cortana in 2020 working on our fingertips, analyzing human speech and making machines perform accordingly.

One of the first speech recognition systems was developed at Bell Laboratory during 1950s. Initial systems were confined to particular vocabulary and were able to work with single speaker. They were unable to handle large data and thus had low accuracy. As the time evolved, we gave way to highly accurate, multi user speech recognition systems such as Alexa, Siri, Cortana, and many more. These systems have wide ranges of vocabulary and some of them are available in multiple languages as well. The main reason is that they can handle huge volume of data that has been trained for hundreds of hours [1].

The Speech is a form of signal. Any form of analysis and alterations performed on speech is regarded as signal processing as we are working with speech signal. Speech- recognition has applications in fields such as home-automation, voice translators, health care facilities, voice searches and so on.

Speech differs on the types of utterances that have to be recognised by the speech recognition system. The Classification of the speech recognizers depending on how the words have been uttered can be done as follows:

Isolated Words
There are pauses between the utterances of two or more consecutive words, that is, the words are isolated from each other. The pauses are used for processing speech signal. These systems usually have two states Listen/Not-Listen states, where speaker has to wait between two utterances [2].

Connected Words
These are words that have lesser pause duration between two or more utterances.

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Continuous Words
The utterances of words for continuous speech recognition is in a continue manner, that is, similar to natural speech. These systems require special features for determining boundaries between consecutive utterances prior to analysing them [2].

Spontaneous Words
Automatic speech recognition system for spontaneous words is designed to understand words such as 'uhm' and 'umm' spoken between the recognizable words in natural speech. All the unrehearsed and mispronounced words are covered under this category [2].

Python a well-designed programming language that has a module called Speech recognition, which provides a convenient way to work with NLP. A cross platform app can easily be designed by using the package, namely, Kivy MD. By combining both of them, a speech to text application can be designed. When the application is run, the system takes speech as input through the input source (microphone). Then, the speech is processed and sampled to identify the speech.

NATURAL LANGUAGE PROCESSING

Concept of NLP

A sub-domain of Artificial Intelligence (AI) contains Machine Learning (ML) that further holds the concept of Deep Learning (DL). It further has given a path to the concept of NLP. As the name suggests, it uses computers to understand and manipulate the natural language. This concept allows computers to interpret speech.

NLP has two classifications, viz. Natural Language Understanding and Natural Language Generation. Using NLP, computer will listen to the natural speech spoken by the person and then it will execute the program to analyse and process it. Finally, the output will be generated either it can be in the form of text or in the form of natural speech reproduced. The NLP for speech recognition works on analysis of linguistic parameters of speech such as [3]:

- Phonology: It refers to the systematic arrangement of sound
- Morphology: It defines the study for the internal structure of words
- Semantics: It defines the links between different words in the sentence are analyzed to understand the meaning of the statement
- Syntax: Here, words and phrases are arranged together in such a manner that a meaningful statement is formed
- Pragmatics: It deals with how different words, phrases, symbols in the given text may have divergent meanings according to the context in which they are said.

Overview of how NLP works

The input is given in the form of speech signal. This speech signal is analyzed by the developed program to produce the expected output. The speech signal is transformed into Mel spectrogram by feature extraction. When we speak, pressure is exerted on to the air through which sound travels. The pressure exerted differs according to the word spoken. This makes the air particles vibrate at certain frequency. Analysis of the frequency pattern is done using Fourier transform to develop a Mel spectrogram which will be used for developing an acoustic model. The Spectrogram model is used for a recurrent neural network that produces an acoustic model.

The Recurrent Neural Networks (RNNs) is a type of Artificial Neural Network (ANN). They perform the same task for every element of a sequence with prior outputs feeding subsequent stage inputs. They have layers of artificial neurons also called as nodes. Each node has a weight associated to it that can alter the input signal at each level according to the output.

The RNNs perform the same task for every element of a sequence, with prior outputs feeding subsequent stage input. RNNs are trained to develop an Acoustic model. RNNs processes the audio features step by step, making a prediction for each frame while using context from previous frames.

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Fig. 1. Block Diagram of output from RNN [4]

The Figure 1 shows how a RNN (Recurrent Neural Network) model works. Firstly, the input sequence like spectrogram of audio is fed into the RNN. The network gives a distribution of outputs for each input step (The results are recorded chronologically [5-11]).

With the per time step output distribution, we compute the probability of different sequences. By marginalising over alignments, we get a distribution over outputs [4].

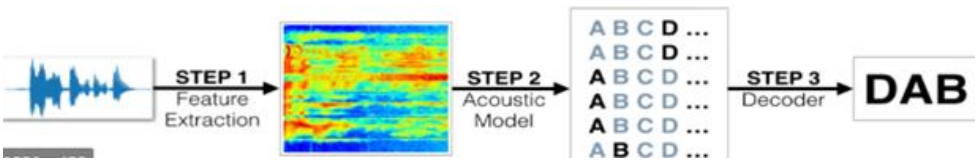

Fig. 2. Speech to text analysis diagrammatic representation [4]

Feature Extraction
The speech recognition software will analysis the sound through various parameter such as pitch, variation, and strength of voice [5].

Acoustic Models
This model is a computational file that contains different forms of sound which make up a word. It shows the relationship between audio signal and other basic language units that create the speech. These computational and mathematical representation is known as Hidden Markov Modeling (HMM's model) [5].

Decoder:
The neural network breaks down the speech in various neurons. We have a different type of algorithm that decodes these neurons through these algorithms so that we can get superior results [5].

Language Model:
The language model in speech recognition helps differentiate between words and phrases that sound similar. When we integrate the evidence of language model with pronunciation and acoustic model, we can solve the problem of ambiguity.

Speech to text application using python
Python has an inbuilt module called Kivy MD (Material Design). This provides all the necessary classes for designing a user-friendly cross platform application.

By combining kivy MD with speech recognition class, a user's friendly speech to text recognition application may be developed.

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The major and the initial component of speech recognition is speech. The speech is given to the system in form of signal known as speech signal, as cited in an erstwhile section. The microphone is used to receive input from the user and it also converts speech to electrical signal which is then processed through an analog to digital convertor.

Speech Recognition Module in python

Speech Recognition class is available in python for speech analysis. It has several packages available for analysis of speech.

The packages available are [1]:

- apiai
- assemblyai
- google-cloud-speech
- pocketsphinx
- SpeechRecognition
- watson-developer-cloud
- Wit

In the present application, we have used the Speech Recognition package as it is easy to use and it gives the best possible result. Speech recognition class has the Recognizer class which encapsulates the main task.

It has seven packages within it i.e. [1]

- recognize bing (): Microsoft Bing Speech
- recognize_google (): Google Web Speech API
- recognize_google_cloud (): Google Cloud Speech - requires installation of the google-cloud-speech package
- recognize_houndify (): Houndify by SoundHound
- recognize_ibm (): IBM Speech to Text
- recognize_sphinx (): CMU Sphinx - requires installing PocketSphinx
- recognize_wit (): Wit.ai

The Google Application Programming Interface (API) has been used in the present application due to its high efficiency. Out of the seven packages cited above, only recognize_sphinx works offline with the CMU Sphinx engine. The other six packages require an internet connection, but have relatively lower efficiency [1].

The Google API is compatible with the NLP algorithm and its packages. It returns text to the recognizer class which prints it to the main screen as output.

Working of Python Program

Installing the required modules is the first step in program execution that includes Installing of the Pyaudio and speech recognition engines. The Pyaudio has a class called as microphone that sets the input source of the code as microphone under the class microphone and defines it using the listen method. So, whenever our function is executed the input will be taken through the microphone.

The input is transferred by calling the method recognizer_google under speech recognizer class. As of now, the Google API allows to convert speech to data at 60 words per day without any cost. Beyond 60 words a minimal fee has to be paid for using google services. Here the analog speech signal is converted to MEL spectrogram for analysis. The Google API is developed on NLP models. It returns the text to the function which gives us the required output on our screen. Next, the class KivyMD is inherited. In that class, the different functions needed in the app from the KivyMD class are inherited. The features such as MDrectangleFlatButton from KivyMD are reused. Similarly, the MDThemePicker function from KivyMD picker feature are reused for adding theme changing function in the app.

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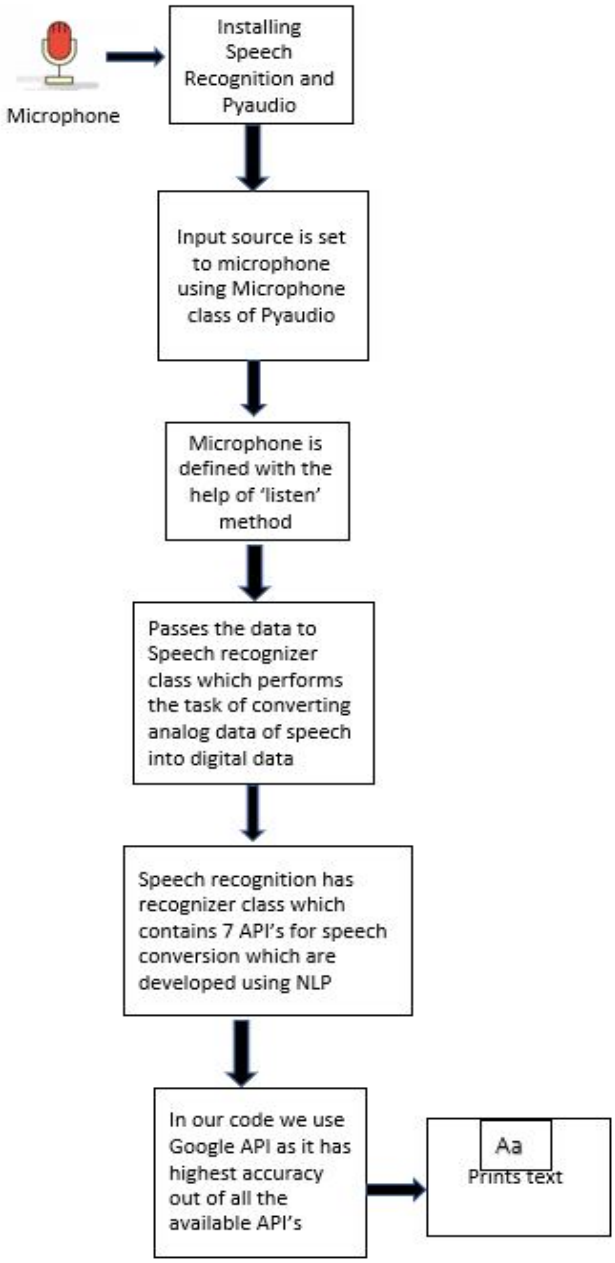

Fig. 3. Working of Python code

Interpreation of Code for Speech to Text application

To begin with, we first import all the libraries required for applications.

```
from kivy.uix.screenmanager import Screen , ScreenManager
from kivy.uix.label import Label
from kivymd.app import MDApp
from kivymd.uix.button import MDRectangleFlatButton
from kivy.core.text import LabelBase
from kivy.lang import Builder
from kivymd.font_definitions import theme_font_styles
from kivymd.icon_definitions import md_icons
from kivymd.uix.behaviors import TouchBehavior
from kivymd.uix.button import MDRaisedButton
import speech_recognition as sr
from kivy.core.window import Window
from kivy.uix.boxlayout import BoxLayout
from kivy.properties import ObjectProperty
from kivymd.uix.picker import MDThemePicker
```

Fig 4. Libraries that have to be imported

In figure 5, method for navigation drawer is illustrated. Here, screen manager function of kivy.uix.screenmanager is used to switch between different screens of the app. In screen manager three screens

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are designed. In screen 3 a button is defined using MDRoundFlatButton using which the MDThemePicker function is called for changing the theme and other color settings of the app. The Pos_hint is used for giving the position of the button on the screen of the app.

```
NavigationLayout:
    x: toolbar.height
    ScreenManager:
        id: screen_manager

        Screen:
            name: "scr 1"

            MDLabel:
                text: "Say Something"
                halign:"center"

        Screen:
            name: "scr 2"

            MDLabel:
                text: "About App"
                halign:"center"
        Screen:
            name: "scr 3"
            MDRoundFlatButton:
                text:'Change Theme of App'
                pos_hint:{'center_x':0.5, 'center_y':0.5}
                on_release:app.show_theme_picker()
```

Fig 5. Defining Navigation Drawer for the app

The Figure 6 shows the function for speech recognition. This is the main part for speech recognition in python. In this firstly microphone class of Pyaudio is used for setting the input source to microphone. Then whenever the machine gets an input using the while loop, the text is printed. Under while loop, the microphone class is again used with listen method, that is, it sets that the microphone has to act as a listening source to get the input from the user. Further using Try and Except method the output is printed. The Recognize_google(audio) as seen in the figure is used for passing the audio input to Google API which returns the text that is put under print () to put it on the screen of app.

```
def record(self):

        with sr.Microphone() as source:
            print("Say something");
            while True:
                audio = r.listen(source)
                print(" ")
                try:

                    x=print(r.recognize_google(audio));
                except:
                    pass;
```

Fig 6. Speech recognition function

KivyMD for designing user interface of the app

The KivyMD is a collection of Material Design compliant widgets for use with Kivy, a framework for cross-platform, touch-enabled graphical applications. The latest version is 1.104.1, for using kivyMD in this project, installed using pip install kivyMD in command prompt.

The different modules of kivyMD that have been used to design the user interface of the app are:

- Navigation Drawer
- Bottom navigation drawer
- Menu
- Screen
- Toolbar
- Themes
- Buttons

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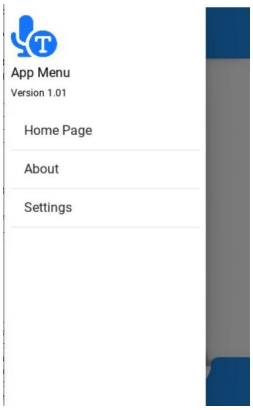
Fig. 7. UI of app

In Figure 7, illustrated is Navigation Drawer, bottom Navigation Drawer, Menu, and Buttons functions as in KivyMD. A user-friendly app has been created in this project. On clicking the microphone icon speech recognition class is invoked and the speech to text conversion takes place.



Fig, 8. Navigation Drawer in the app

In Figure 8, it is illustrated that by using Navigation Drawer function of KivyMD, a Navigation Menu is created. By using screen manager function available in kivyMD, one can switch between the three options available. The three options are 1) Home Page where speech to text conversion takes pace, 2) About screen where, what the app is about, is displayed, and 3) Settings screen where the user gets an option to edit the theme of the app. The menu for changing the theme of the app is displayed as shown next.

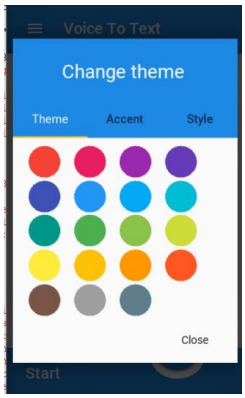


Fig. 9. Change theme option in the app

Challenges and application of speech recognition

Challenges of Speech Recognition

The factors that hinder speech recognition systems' accuracy are rate of speech, background noise, and environment factors [12]. Sometimes, the output is not continuous in nature or it may be interrupted due to utterances of words such as 'umm' and 'uhh' that are nothing but slight pauses in natural speech. An automatic speech recognition system should be such that it identifies the slight pauses and irrespective of those, gives

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accurate and continuous outputs. A system should be such that it can eliminate the unrequired background noises on its own.

Applications of Speech Recognition

Speech recognition has become an inevitable part of our lives. Its application ranges from using Siri and Alexa on our mobile phones to voice automated lights in our rooms. Speech recognition has a wide scope in future. Combining speech recognition with a text writing machine such as a CNC machine will make the task of stenographers easier as all the information will be jotted down on piece of paper using a machine that too in written form. Currently, speech recognition is used in data entries, education system, healthcare, military, home automation [12].

The Speech to Text application as compared to other contemporary applications

Python has inbuilt library known as Pytorch available for developing our own program using neural networks. The drawback with developing one's own NLP model is that accuracy will be less and to increase it the data needs training for more than 100 hours in one go. To understand Natural Language Processing and get a hands-on experience with it, the Google API is a suitable alternative. It serves the purpose and gives a detailed overview of speech to text translation system

There is another method of speech recognition, that is, by writing a code to invoke the inbuilt speech to text conversion in the mobile phones. But it doesn't help one to learn about app development. Using kivyMD in python the app of this project has been developed that is not only user friendly but also easy to comprehend.

Evaluation of the application and parameters used for evaluation

Usage of a mobile app depends mainly on its accuracy, speed and ease of handling the application by the user.

A user's friendly user interface is developed as an app in the present project. There are features available for changing the theme and color settings of the app according to the convenience. A navigation drawer is available for quick and easy access of options. For easy speech to text conversion, a microphone button is placed near the bottom of the app, which can be accessed conveniently using the thumb.

Speech to text conversion (English Language) is quite accurate as the app uses Google API. The output is accurate with high repeatability under the constraint that there is minimal possible background noise and the speech is clear in nature.

However, the speed of response is another important field for evaluation of the system. The output speed depends on the internet speed to which the device is connected as it is linked to Google API. There is a scope for increasing the response time by keeping background noise levels to zero and ensuring good internet connectivity.

FUTURE SCOPE OF SPEECH RECOGNITON WITH CNC MACHINE

The speech recognition system with a CNC machine to produce the output not only in the screen of our device but also on a piece of paper using pen will be the topic of an ensuing paper. Further application can be derived for differentially-abled persons to experience real time support [13].

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THE CATALYTIC EFFECT OF COVID-19 ON THE ONLINE GAMING INDUSTRY IN INDIA

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ABSTRACT

The paper focuses on the growing and emerging trends in the online gaming industry in India. Various factors contributed towards the growth of this nascent sector of the Indian economy and there are different untapped opportunities in this sector. There was already an increasing traction in this digital segment and COVID led lockdown accelerated the growth for this industry as users were more inclined towards consuming the gaming content over any other form of entertainment. Different forms of gaming, their playing hours and mode of consumption were analyzed along with both micro and macro factors nudging the industry towards a positive growth. Secondary market segment such as online game streaming and different dedicated platforms were also taken into account.

INTRODUCTION

The global outbreak of COVID-19 sent a wave of disruption across all countries. The conventional, way of operation was completely redefined with masks and hygiene being the lexicon of every individual, the world tried to sail through such turbulent times. India was severely impacted by the virus and recorded a steep decline in GDP with a negative growth of 23.9% [(2)]. Major sectors then started to focus on remodeling their fundamentals and analyze consumer trends.

Theatres were shut since March 2020 [(3)] and the online gaming sector provided the consumers, other means to connect and interact. The already emerging industry proved to be resilient during the situation and continued to grow. Coupled with digitalization, many teenagers, young adults, and even middle-aged people shifted their focus towards this side. Individuals adapted to the new normal and showcased their skills on different platforms. This paper takes a deep dive into India's gaming industry trends before COVID and analyses the significant spike in new users. As situations start to normalize, the impact of COVID will have started to reverberate for a longer time. Simultaneously, the online gaming industry can take this opportunity to realize their untapped potential and make the most of this pandemic's catalytic effect.

PRE COVID

With the advancement in technology and greater penetration of the internet, the gaming industry saw rapid growth in its consumer base. Steam, a cloud platform that provided a digital game distribution service wherein the consumers could download/purchase their games, saw a continuous increase in sales [(4)]. E-sports reached heights as it started organizing events/tournaments, which strengthened the community [(5)]. The International, being one example, is the biggest e-sport tournament hosted, its prize pool being 25 million. The entire prize pool money was through the in-game purchase of the game DOTA2 [(6)]. Various e-sport events are being hosted around the year, contributing to the addition of new players into the industry. Other than the existing gaming platforms, i.e., PC, console, the third kind of platform was emerging, which is mobile gaming [(7)]. The predictors did not expect the rise of this platform in the gaming aspect. It was common for gamers to want a high-end system for a completely immersive experience, which wasn't possible in mobile gaming.

However, as advanced technology standards, smartphones were readily available to the people; they preferred to spend their time playing games on the mobile instead of downloading it on their PC or getting a console [(8)]. Mobile gaming started with simple games such as Tetris, Snake, and saw advancements with time, and newer; challenging games were available in the app store. Games such as Candy crush, subway surfer was available almost in all the mobiles. The industry then saw the addition of mobile versions of PC games such as PUBG and Fortnite made available to the people who shot up mobile gaming revenue [(9)]. Mobile gaming was accessible to people of the age group. In contrast, PC and console gaming had a fixed age group that catered to; this advantage helped the mobile platform outpace the PC and console.

DURING COVID

As the pandemic halted the significant sector's growth globally, it also impacted the gaming industry to some extent. Major gaming events such as E3 2020, The international, ESLOne, had to be postponed or canceled [(10)]. This significantly impacted the indie developers who use such platforms to develop potential partners to fund and support. In contrast to many other sectors that were heavily impacted by the pandemic, the gaming industry continued to see significant growth in revenue and engagement in esports. The pandemic kept millions of

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people in their homes, searching for different forms of entertainment. The surge observed in the gaming industry was pretty simple to explain; people were stuck at home with much time at their disposal.

The gaming industry giants- Twitch, Valve, Microsoft, flourished in the environment created by the pandemic [(11)]. The Nintendo switch's sales grew by 24%, while the new game launched by Nintendo named "Animal Crossing: New Horizons" sold over 13 million copies since its release in the later March [(12)]. The viewership also gained a massive wave; people preferred to watch people playing games instead of playing them. Twitch- the most popular video streaming platform, saw a 50% increase since March [(13)]. Youtube gaming also saw a rise in the number of online streamers and its viewers. Esports became the substitute of sports as cable networks started filling their prime airtime with officially licensed video games of Major league baseball, NBA, FIFA. This led to an increase in engagement in the community. Indian Youtube streamers heavily contribute to increasing engagement as people prefer to lay back and watch them play and have fun. Apart from these factors, the availability of heavy specifications, cheap, smartphones, and easy availability of smooth internet, adds to the favor of the industry.

Growing Trends and Insights

From an independent survey conducted, consisting of 143 individuals of different demographics which included players/experts who are in the online gaming segment for a long time and general daily users who have different motivations to be part of this nascent industry.

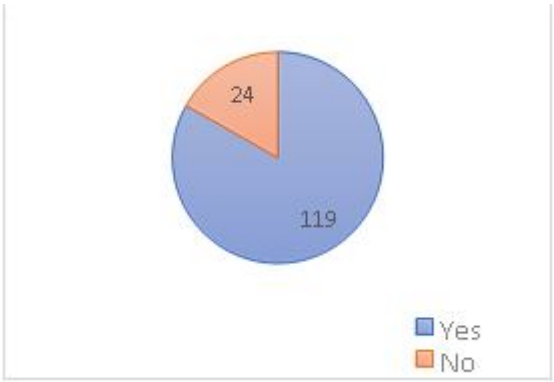

Figure 1: *Part of the sector before the lockdown*

[Figure 1] denotes the engagement of individuals with e-gaming prior to the COVID era, 119 (83.2%) of the individuals were part of this segment in some or the other way. The trend stresses upon the already growing appetite of Indian users in the online gaming sector. Out of the 119 respondents 64 (53.7%) reported that every day their average daily time was in the range of 1 to 3 hours, there were 24 (20%) individuals who reported a daily time of below 1 hour, 22 (18.3%) of the individuals reported a time between 3 to 5 hours and remaining above 5 hours.

The 119 respondents who were already engaged with the e-gaming scenario, 90 (75.6%) individuals reported a significant rise in their gaming hours during the covid led lockdown.

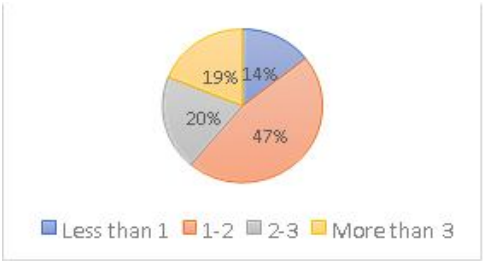

Figure 2: *Increase in the gaming hours during lockdown*

[Figure 2] denotes the trend that started to take place after the lockdown was imposed. Out of the 90 respondents who reported a surge in their daily playing hours, 42 (47%) reported a surge between 1 to 2 hours of playing time, 18 (20%) reported a rise between 2 to 3 hours of playing time, 17 (19%) reported a rise of above 3 hours and rest below 1 hour. The trend dictates that people were more inclined to consume e-gaming as a mode of entertainment in some or the other form during the lockdown. As individuals started to consume more

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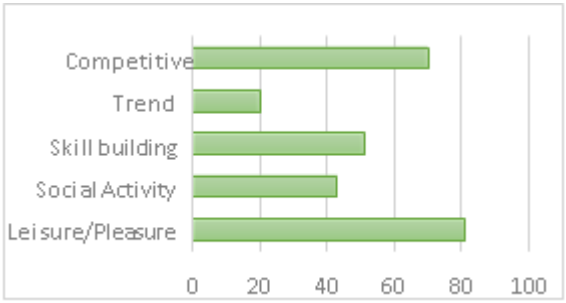

Figure 3: *Various Reasons for Gaming*

e-gaming content and related activities, the 119 avid users listed different reasons behind their consumption of the e-gaming activities. [Figure 3] visualizes the different reasons, out of the 119 respondents, 81 (68.3%) of the users were motivated as they found gaming a leisure activity, 43 (35.8%) of the users were inclined towards e-gaming content due to their social circle, 51 (42.5%) even considered gaming as a skill and wanted to further polish their area of expertise, 20 (16.7%) were inclined due to the rising number of trends in gaming such as the likes of Among us, PUBG, FIFA, Fall Guys etc. 70 (58.3%) were highly motivated as they considered gaming as a competitive field in all domains, e-sports, fantasy sports, online poker etc. These reasons solidify the fact that gaming can serve a dual purpose of being an activity for leisure with your social circle and also be a lucrative opportunity in the competitive environment. The various modes of consumption of the gaming content was also listed out by the 119 respondents, 57 (47.5%) of the users preferred the mobile platform, 64 (53.3%) of the users preferred PC/Desktop/Laptop as a medium, 71 (59.2%) preferred console as well and 6 (5%) preferred tablets. The modes of consumption were not limited to a single device for an individual as depending upon the need the users can easily choose/switch between the devices to access specific content if conditions desired. Apart from engaging directly with e-gaming content there is a growing appetite for the users to consume supplementary content as well such as game streaming which can be accessed using different digital pathways and following particular users on youtube, facebook gaming, twitch etc. Out of the 119 respondents, 78 (65.5%) of the users were engaging with gaming streams online and preferred dedicated platforms for the same. Users are also inclined towards consuming livestreamed content of major competitions such as ESL championship which was livestreamed on the

OTT platform Disney + Hotstar this year.

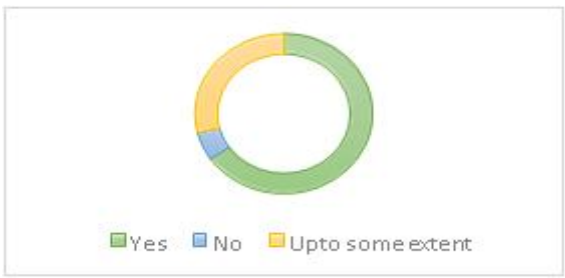

Figure 4: *Growing Buzz For E-Gaming*

[Figure 4] showcases the trend of gaming in their immediate or external circle in some or the other way. Of the 143 respondents, 94 (65.7%) of the users reported a direct higher activity towards gaming content, 41 (28.7%) of the users reported a growing traction to some extent but n ot in a major way and rest reported no buzz around the subject.

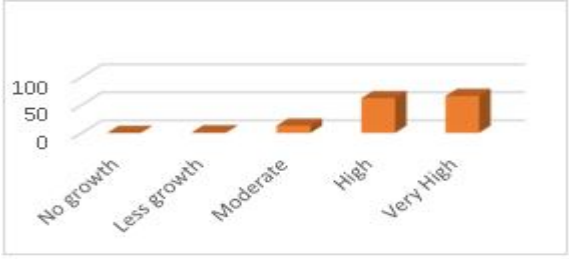

Figure 5: *Growth of The Online Gaming Industry in India*

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[Figure 5] denotes the trend in growing opportunities and activities in the online gaming segment in India. The 143 respondents are aware that the industry is still nascent and can drive major growth in various domains with the right resources. 66 (46.2%) of the respondents believe the industry can achieve very high or exponential growth in the coming years, 62 (44.1%) of the users feel a high growth margin for the industry in the coming years, 13 (9.1%) users feel a moderate growth trend in the coming years and rest believe low growth or no growth in the industry.

Post-COVID Scenario

The COVID led lockdown in India let too many retreatments in the entertainment sector. The only one that kept thriving was the online gaming ecosystem of India, with theatres and other outdoor forms of entertainment segments left to remodel themselves completely. People will have a hard time shaking off the lockdown blues. According to Vikash Jaiswal CEO of Gametion Technologies, which owns the popular app of Ludo King reported that before the lockdown, the average daily users were rangebound between 13 to 15 million and monthly active somewhere between 60-63 million users. Later, during lockdown, daily active users spiked up to 50 million users and monthly active users clocked at 185 million. Vikash Jaiswal also felt that the steam in the online gaming industry was there to stay.

With India's major push towards enhancing the country's local markets, the scope is also focused on strengthening the online gaming ecosystem. The famous gaming arm of Paytm, which is Paytm First Games, has over 200 games on its platform. The conventional way they follow is to outsource the game making process to the local players in the Indian market; they then run the game on their platform. This move by India will open more opportunities for the local talent to outshine. On 2nd September 2020, India announced a ban on the most popular game Player unknown's battlegrounds (PUBG). A report submitted by Sensor Tower, PUBG, has a combined over 175 million installations, which account for 24% of the total installation in India. Losing such a great market share, the existing players will look for new platforms to migrate. As there are many other options in the market such as Call of Duty: Mobile which is also developed by the same Chinese developer company Tencent. A strategic move to prevent people from jumping to more Chinese apps has now created more opportunities for the local developers here in India to deliver some quality content and help the local online gaming community grow. Few days after the PUBG ban the Bengaluru based leading Indian mobile game publishers nCore announced the release of their new game titled "FAU: G". The game is developed to push the local move encouraged by the Government of India. These trends suggest a push towards untapped India's potential in the online multiplayer industry is here to stay.

There was a constant cloud of doubt around playing video/games in India. But the COVID imposed lockdown tipped the balance in favor of the industry. As not just the millennial generation continued to engage in this entertainment form, many people in the age bracket 30-50 years of age also tried their skills in various games. This bonded the family members in a very fruitful way and slowly, people starteed to realize the potential of India's gaming industry. Akshat Rathee founder of the Nodwin Gaming which organizes a wide variety of offline and online forms of events to help assemble the best of talents in the country in an interview said that after COVID the esports fraternity would continue to grow at an incredible pace. Even during the lockdown with offline tournaments not feasible, Nodwin powered Disney + Hotstar streaming services to broadcast the online tournaments. In June 2020, an ESL tournament powered by Nodwin Gaming was broadcasted on Disney + Hotstar which garnered many viewers [(14)]. Nodwin along with other online gaming platforms plans to host such large-scale events to keep gaining traction. Post -COVID the offline tournaments will help to expand the industry fruitfully. With their RS 222 Crore sponsorship deal with IPL (Indian Premier League), a heavyweight event in the cricket industry, it strengthened the position of Dream 11 [(15)]. Dream 11 continued to dominate the market share in the fantasy game sector. With many people logging in every day, the deal with IPL helps promote Dream 11 more positively.

A survey carried out by KPMG in the year 2019, forecasts a positive growth for the online gaming industry [(16)]. According to the report the revenues have nearly doubled in the last four years. Further at a CAGR of 22.1 % from FY 18-23, the industry projects reached a new milestone of INR 118.8 Billion. With all these positive cues for the Online Gaming Industry, there are still many scenarios and hurdles that need to be crossed before the industry experiences a positive breakout. These scenarios need to be dealt with by analyzing consumer trends, taking external entities' help to continue to have growing support. The following roles and questions will be crucial for the industry to consider and answer as India is in the unlocking stage:

Sponsorships: There are quite a large number of sponsors that help make these events possible. India should also keep an eye on the big players such as Adidas, Nike, Puma, etc. to boost their presence. Akshat Rathee the founder of Nodwin Gaming feels that day is not far enough.

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Role of Media: Major Indian companies are still playing catch up with the Online Gaming Industry. To be recognized in the global network and move towards the local push in India,

Media will act as a crucial catalyst as the industry moves forward.

Advancement in Technology: As we move ahead, the progress in technology will continue to be a disruptive force and the industry needs to adapt accordingly to meet the consumer needs. The focus is now to provide the users with an immersive experience employing virtual reality (VR) and augmented reality (AR).

Fan Engagement: Popular titles like Dream 11 and various eSports have a close relationship with real-world sports segments such as cricket, Football, Kabaddi, Basketball, etc. As more fans of different sports are attracted to the platforms, the more the industry's growth will be.

A career in gaming: Players across the country break the barriers and take part in competitive events to earn a plethora of cash prizes and make a name for themselves. Many new gaming startups are starting to emerge to help grow the gaming ecosystem in India.

Professional teams/Individuals even take it to streaming services such as Youtube and Twitch accounts, which help them showcase their skills and boost engagements. Many eSports athletes spend hours on developing and honing their skills and making their name in the community. Clubbing it together with pointers such as cheap data rates in India, a growing number of digital users and affordable smartphones are incubating these aspirational individuals effectively.

As the gradual reopening phase is in full action, many people are now adapting to the new normal. Individuals are now returning to the offices, work offices, and other activities. Soon the targeted age groups of millennials will return to their respective educational commitments. The industry needs to track these trends and be dynamic in retaining the existing users in the long run. The games can offer more incentives, cash prizes, and more engaging activities to sustain the uptick. Also, the companies need to answer some crucial questions as they move ahead:

- *How can they reel in more influencers and personalities under their umbrella to keep the popularity high?*
- *Which strategies can they focus to retain the active users?*
- *How to keep a check on the new users?*
- *Which events and platforms can they utilize to garner a large number of people?*

Post-COVID will be the defining moment for the online gaming industry in India. Coupled with India's digital growth and local boost, the industry has the untapped potential which is waiting for the right catalyst to spark the fuse. Simultaneously, they should not take the user surge in this pandemic for granted; they should take advantage of the opportunity and focus on growth and retaining a broad set of active users.

Political motivation: Union education minister to support young players in online gaming is organizing a national level "hackathon" to showcase the talent of young minds in India concerning online gaming. Our respected Prime Minister Narendra Modi recognized the need for this "hackathon" that involves young Indian students to encourage more and more innovation in the gaming industry. The government is working on supporting the students in online gaming to generate more and more employment opportunities for them. Looking at the vast potential in the gaming industry government has asked Indians to tap into it and lead the international digital gaming sector by developing games in the future that are inspired by the Indian culture and folk tales.

This motive positioned games about Indian culture and values within the broader strategy of" Ek Bharat, Shreshtha Bharat" an initiative started by our respected prime minister in the year 2015, which aims to promote national pride and unity by celebrating the history and traditions of India's states and union territories. An excellent example is the recent development of a game based on Indian folklore is Raji: An Ancient Epic, this was developed by Pune based studio Nodding Heads

Games and was launched on Nintendo Switch. [(18)]

Demographics: When it comes to wallet share people first have to fulfill their basic needs and then use the disposable income to satisfy their luxuries needs (For Example: Watching a movie in a theatre, Attending a concert, etc). Games like any other form of entertainment, do not need disposable income, therefore it is essential to understand the role of mobile games in the life of an online Indian consumer. This is where the demographics come in,50% of Indian gamers are under the age of 25, and since most in this age group lack

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disposable income free mobile games on the app store becomes a boon in the form of entertainment. At Play Games 24*7- India's largest gaming business, they have studied how demographics map to engagement and monetization. This study claims that the gamers show most of the engagement under the age of 25 but the revenue is generated by the age group above 25. Over the next decade, this age group under 25 will cross the barrier of 25 and might have enough to spend on games this will generate massive revenue for the gaming industry. (17)

Secondary Markets Effects: Giants like Reliance and Airtel have very different and innovative strategies towards gaming. While Jio is offering casual games, Bharti Airtel is more focused on Esports. Gaming, along with numerous attributes, has a heavy dependency on mobile internet. The current scenario concerning the telecommunication industry bleeding away will have a massive impact on the internet user and the gaming industry. A patchy internet connection can ruin the gamers' experience and may directly impact the gaming sector's revenue. Telecoms are concentrating more on high data games and they are trying to dispense with the need for equipment but rather offer games on the Pay-TV SetTop box. With the increase in smartphone buying hands in Tier-2 and Tier-3 cities of India, the telecom tariff wars have made internet data affordable to the people in the semi-urban areas, especially to the millennials ideal target for the gaming industry. The Indian giants, Reliance Jio and Bharti Airtel, are heavily building around this gamers' ecosystem and are reaping benefits for the long run. These telecom companies also generate significant revenues from Advertisements and subscriptions. RIL believes that gaming in India will be bigger than music, movies, and television shows put together! (19)

CONCLUSION

With users reporting an uptick in their gaming hours during the lockdown as other forms of entertainment remained shut. This consumer behavior of the online gaming segment is set to increase further as people feel more connected socially and consider gaming as a form of stress reliever. Alongside competitive growth and lucrative opportunities is making the users consider it as professional e-sport option, with skill building and rise in local and global competitions will further accelerate the growth in this segment. As users reported a growing buzz around this segment, a greater percolation of affordable gadgets such as smartphones, laptops, desktops, consoles etc. This will motivate more users to get onboard as greater part of the population is yet to get introduced to this growing sector. Companies and content providers need to re-design their strategies to retain a greater number of regular users and keep them engaged. With more political and secondary market influence the industry is on the cusp of a breakthrough.

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PERCEPTION OF POST GRADUATE STUDENTS TOWARDS E-LEARNING IN THE 'NEW NORMAL': AN EMPIRICAL INVESTIGATION

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ABSTRACT

The technological driven society at present always seems to be in a state of flux with a plethora changes percolating every now and then. One such striking revelation in the current technologically empowered era has been the berth of information and communication technology (ICT). The landscape of education has undergone astounding metamorphosis by the successful integration of ICTs in the process of teaching and learning. In fact, ICT enabled learning has gained massive popularity among several countries which has also been embraced by both youths and senior teachers. The value of such technological bolstered learning has been felt very strongly by academicians and students all over the globe in the ugly aftermath of Covid-19 which jolted the whole world, especially the education sector. To keep education afloat, the institutions are resorting to E-learning which requires teachers and students to be at home and engage in teaching-learning process, serving twin objectives of keeping the domain of education upbeat as well as adhering to the precautionary measures to combat Covid-19, thus proving to be a win-win situation. The objective of the present research study is to examine and analyze the perception of post graduate students towards E-learning.

Keywords— Information and Communication Technology (ICT); Covid-19; E-learning; Post Graduate Students; Kolkata

I. INTRODUCTION

The ambit of technology is witnessing a seismic shift with each passing day as radical changes are persistently percolating in the domain of technology. In the contemporaneous era, technology has become a buzzword and it is a no-brainer that all our lives are dependent to a large extent on technology which is undergoing stunning metamorphosis every now and then. One of the spectacular advancements in the landscape of technology has been the successful integration of information and communication technology in the teaching-learning process which has established itself as an important medium of instruction delivery. Institutions worldwide are now blending information and communication technology with traditional modes of instruction delivery in order to ameliorate the teaching-learning process. Such innovation in technology has made an inexorable impact on the landscape of education where institutions at the present era are witnessed to have a penchant towards e-learning. Undoubtedly e-learning is fast gaining the upper hand and is being embraced prodigiously. E-learning is commonly known as online learning or open learning and has its association with advanced learning technology (ALT), which deals with both technologies as well as learning methodologies using multimedia technologies. Truth to be told, the advent of distance education marked the turning point in the milieu of education as it paved the way for e-learning. E-learning overcomes certain barriers like attendance, travelling and costs. It also allows higher participation and better interaction. E-learning is however different when compared to Distance Learning. Albeit, the two terms 'open learning' and 'distance learning' are often used interchangeably, there exists some differences between the two. Open Learning is a philosophy, whereas distance learning is the mode used for translating it into reality as two are complementary to each other. The concept of distance learning may also include the teachers and learners to be present in a virtual classroom where instructions are delivered via multimedia technologies. It falls in the category of blended learning which involves a concoction of face-to-face learning and use of ICTs. Whereas online learning is facilitated completely online via multimedia technologies like video-conferencing, chat rooms, computer based communication, e-mail, electronic forums, etc. E-learning also supports a plethora of e-resources that can be accessed at any time by the students, teachers and other professionals, thereby, bolstering the teaching-learning process.

The urgent need and ineluctable relevance of e-learning has been strongly felt in recent times after the emergence and potential outbreak of Covid-19 pandemic wreaked havoc. The government of all countries

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enforced lockdowns to curtail the deadly virus and as a result is stymied the ever smooth trajectory of education. India was no different as the lockdowns enforced from the middle of March, 2020 brought the whole country and all external activities to a standstill. This proved to be a deadly blow for the students and their future keeping them at bay from their education and thus a cloud of uncertainty was hovering around. Soon after, the institutions in India resorted to e-learning and granted permission to all schools, colleges and universities to conduct online classes for their students to keep the sacrosanct element of education afloat. It has been witnessed that both the students as well as the teachers have embraced the concept of e-learning with mirth during these testing times. This makes the domain of e-learning an interesting subject of research and study. Probing into the perception of students towards e-learning is in fact the essence of our purported endeavour. Here, in this current research study, we aim at finding out the perception of post graduate students towards e-learning. A sample of 252 post graduate students have been selected for survey in the metropolitan setting of Kolkata for the purpose of our study.

II. LITERATURE REVIEW

An intimate analysis of literature review would actually reveal that there exists very scarce amount of literatures on the subject of our present research study. We find it extremely arduous to come across previous researches which have blended the keywords 'e-learning' and 'perception.'

Therefore presentation of literature review would be a rather herculean challenge.

When talking about e-learning the first thing to strike our mind is probably internet. Accessibility to internet is a crux factor when it comes to e-learning. According to data furnished by Print (2020), it is reported that only a quarter of India's diversified population have access to the internet. More than 75% of households in India do not have access to internet. This is primarily because of the major rural-urban divide. According to a book written by K.V.S. Madaan, some crucial factors influencing accessibility issues are timing constraints, socio-cultural status and poverty.

Attitudes and behavioural intentions towards the usage of ICTs or any other technology has been explained by the theories of consumer behaviour in the past. For instance, Rogers & Shoemaker (1971), opined that consumers go through several stages when it comes to conviction of knowledge and confirmation of decision before ultimately adopting a product or service. However, it is imperative to have a general awareness regarding the product or service before it is finally adopted (Guiltinand & Donnelly, 1983).

The Perceived Ease of Use (PEOU) of a technology is another major factor affecting the perception towards e-learning. PEOU has been defined by Davis (1989), "the degree or extent to which a person believes using a particular system would be effortless."

Convenience is another major factor influencing perception towards e-learning. It is noteworthy to mention that convenience is utmost essential when talking about adoption and use of any technology. If a consumer does not find the use of such product or service to be convenient there are high chances of consumers rejecting it.

Wegner et al., 1999, highlighted that students have more positive attitude towards e-learning

III. OBJECTIVES

1. The examine the perception of Post Graduate students towards e-learning by identifying the most dominant factor of e-learning by using Factor Analysis
2. To determine if gender demographics have any influence over e-learning behaviour

IV. DATA AND METHODOLOGY

As discussed earlier there are very few pieces of literatures prevailing in our subject of research study. Nevertheless, we have made an attempt to do an intimate research on secondary resources by reading previous research studies in this particular domain of study. We have also accessed various online sites as well as few books for gathering information regarding ICTs and e-learning in India.

For the purpose of primary data collection, a close-ended questionnaire has been used as a pivotal instrument. There are a total of 28 questions distributed across 6 segments across attitude and behavioural intentions, multiple functions, perceived ease of use, convenience, accessibility and cost. Most of the questionnaires were mailed while some were randomly administered to a total of 252 students, all of them pursuing or have pursued post graduate courses across various disciplines from different college and universities. Initially, we had surveyed close to 280 post graduate students, but due to some erroneous responses those questionnaires had to be rejected. We have used a Five-Point Likert scale for measuring the concepts, where

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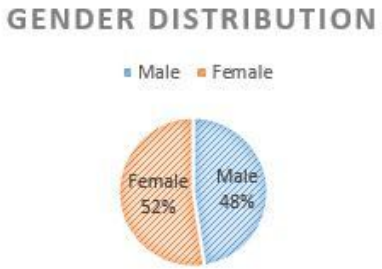
(1=Highly effective/important and 5=Highly ineffective/unimportant). We have used IBM's SPSS to process and analyze the data.

The diagram below shows the representation of gender distribution. As is observed from the figure, from a total of 252 respondents used in our study, 52% (n=132) are female while 48% (n=120) are male. Thus, the proportion of female to male is almost moderately balanced.

Figure 1: Gender Representation



Since the primary objective of our endeavour is to explore the perception of Post Graduate students towards e-learning by identifying the most dominant factors by using Factor Analysis, we have conducted Factor Analysis. But before conducting a Factor Analysis, we have conducted the KMO and Bartlett's Test for checking the adequacy of the sample size and also to find out whether it is worthwhile to conduct a Factor Analysis.

Table 1: KMO and Bartlett's Test of Sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.786
Bartlett's Test of Sphericity	Approx. Chi Square	808.564
	df	28
	Sig.	.000

As per the results, the KMO test confirms that the Factor Analysis conducted is appropriate. Ideally the values should be greater than 0.6. This is explained by the KMO Test statistic which is 0.786 (larger than the acceptable value of 0.6). The significance value is perched at 5% level, showing that p=0.000 which is ($p<0.05$). Hence it is worthwhile to conduct a Factor Analysis on the eight determinants responsible for shaping the integrity of green products.

The KMO and Bartlett's Test is followed by Total Variance Explained (TVE). According to TVE, the results will show the number of factors obtained provided that Eigen values are greater than 1 (Eigen value>1).

It is proof of the fact that Factor (Component 1) explains 46.445% of the variance and (Component 2) accounts for

29.6300% of the total variance explained. The two factors have a strong degree of interdependence and hence decrease moving downwards.

The results of Factor Analysis has been depicted below in the form of a table obtained.

Table 2: Results of Factor Analysis

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.787	46.445	46.4455	2.787	46.445	46.445	2.413	40.213	40.213
2	1.778	29.630	76.075	1.778	29.630	76.075	2.152	35.862	76.075
3	0.630	10.508	86.583						
4	0.337	5.611	92.194						
5	0.262	4.368	96.562						
6	0.206	3.438	100.00						

Extraction Method: Principal Component Analysis.

We have arranged the two components in the manner depicted in the table below

Table 3: Arrangements of Components

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Component I	Component II
Multiple Functions	Perceived Ease of Use
Attitude and Behavioural Intentions	Convenience
	Accessibility
	Cost

The 6 variables as observed are disintegrated into 2 factors. Each factor is a compilation of closely knitted variables. We can rename Component I as Primary Factors and Component II as Secondary Factors related to perception towards e-learning under the 'new normal.'

We also aim to find if gender has any role to play regarding e-learning behaviour. To serve this purpose, we have conducted a Chi-Square Test to check for the association between gender demographics and e-learning behaviour. The results obtained has been represented in the form of a table below. From the table below, it is evident that the value of Chi-Square (p=0.205) which is greater than the acceptable value of 0.05. The significance level being more than 0.05 would essentially mean that there is no relationship between gender and e-learning behaviour of Post Graduate students.

Table 3: Representation of Chi-Square Tests

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	3.171[a]	2	.205
Likelihood Ratio	3.217	2	.200
Linear-by-Linear Association	1.106	1	.293
N of Valid Cases	252		

We have also conducted the Cronbach's Alpha test to find out whether all questions or variables fit the questionnaire used in the study. The table below shows the reliability statistics for 28 variables distributed in segments of e-learning starting from Attitudes and Behavioural Intentions to Accessibility. The standardized Cronbach's Alpha value is 0.828, which is acceptable value, showcasing that the questionnaire along with its variables fits perfectly into the proposed modelling.

Table 4: Reliability Statistics for All Varibales (n=28)

Cronbach's Alpha	Cronbach's Alpha based on Standardized Items	N of Items
0.828	0.828	28

V. FINDINGS & DISCUSSIONS

In our study, we have surveyed more than 250 respondents (252 Post Graduate students) in the city of Kolkata. The results of our study, bring us to some interesting conclusions. The questionnaire has been used as an instrument to collect relevant responses about the perception of post graduate students towards E-learning and based on the responses collected belonging to various segments of the questionnaire, we have been able to get hold of the proclivity of learners towards e-learning. We had conducted a factor analysis to enquire about the perception of post graduate students towards e-learning by identifying the most dominant factors. The results have been depicted in the Factor Analysis conducted as we see 6 variables parameters obtained which explains the measuring base to find the perception of post graduate students towards e-learning. As per our results, we had obtained 2 major components which have been rearranged as Primary Factors and Secondary Factors. The 2 Primary Factors (Multiple Functions) and Attitude and Behavioural Intentions) are absolutely crucial especially during the present times of Covid-19 which is instrumental in shaping the perception of Post Graduate students towards e-learning. In fact, both these two Primary Factors have an inexorable impact on perception towards e-learning.

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While most of the respondents had given their opinion that e-learning serves multiple functions like diagnostic and problem solving skills, results in better synchronization and provides with individualization of learning with self-pace. It was also remarkable to examine the perception of post graduate students towards e-learning. Most of the responses had a very positive and favourable attitude towards e-learning. Talking in the context of e-learning especially during these times of Covid-19, this viewpoint towards e-learning basically stems out from the fact that post graduate students feel that e-learning is the perfect alternative towards traditional learning techniques which fulfills the challenging needs of the present times, accommodates different styles of learning and increases their desires towards e-learning.

While all the parameters of our study, i.e. attitude and behavioural intentions, multiple functions, perceived ease of use, convenience, accessibility and cost, justifiably concludes the acceptance of e-learning model in the learners but it is actually the twin parameters of attitude and behavioural intention and multiple functions that play gargantuan roles respectively especially during these testing times of a global pandemic, thereby proving its worth. All the other parameters like perceived ease of use, convenience, accessibility and cost also have their own respective influence on the perception of post graduate students towards E-learning. We have also conducted a Chi-Square statistical test to find out whether Gender demographics have any relationship with perception of post graduate students towards e-learning or not. According to our results, there is no relationship between the two. Albeit this result might vary with similar kind of research being conducted.

VI. CONCLUSION

done in the current era. The successful integration of ICTs with learning has revolutionized the landscape of education. The emergence of e-learning was a much needed tonic to serve this purpose which has surely proven its impeccable value during these testing times. The halt triggered by the Novel Coronavirus has certainly posed a stiff challenge for educators and students but the threat has almost been blunted, courtesy, the impregnable ICTs and the concept of e-learning. Though, e-learning might have its own malaises in the form of start-up costs, accessibility issues and performance evaluation, nevertheless, it is a potent tool of fostering the teaching-learning process and currently showing its full worth, thereby, challenging the traditional techniques of teaching.

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AN ETHNOGRAPHIC STUDY OF DARKNET

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ABSTRACT
With the advent of the technical era, the tunnel of the World Wide Web became denser and more sinister. Some portion of the WWW is full of derelict URLS, stolen credentials, malware, phishing kits, forbidden drugs, weapons, and other illicit goods that are traded among anonymous buyers and sellers. It is notoriously known as "Darknet". Open exchange and the use of virtual cryptocurrencies made the darknet more popular among criminogenic users. Darknet requires the use of special browsers providing access to anonymous networks and the most popular browser among all to enter the darknet is TOR. An ethnographic study of this paper highlights the recent incursions of Darknet along with its existing dark shadows on society. It also accentuates the bright side of the Darknet that attempts to provide a think tank to academicians, researchers and many individuals of the society before they use any browser or services that supports anonymity and privacy. It will definitely help us to minimize the adverse impact of the darknet on society.

Keywords—Darknet, Anonymity, Cryptocurrencies, TOR, privacy

I. INTRODUCTION
Back in the 1960s, when ARPANET was flourishing with its glory of communications over the internet, two organizations in the US Department of Defence tried to develop a secrete encrypted network that would protect the sensitive Communications of the US Spies. The ultimate aim to design such a communication network was to enable human activists and people to communicate and collaborate, remotely and securely. But soon in the 1970s ARPANET discovered an illegal use of this network when the students of Massachusetts Institute of Technology and Stanford University traded drugs using its Artificial Intelligence Laboratory. With a fear of losing privacy, ARPANET was divided into MILNET(Especially used for Military Operation and communications) and Civilian network(used by the general public). This civilian network took the form of the internet. After the release of the Internet in the 1980s, the world became more and more connected. In 2000, Ian Clark, a computer scientist implemented his project into a free software called 'Freenet' and made it available to the public. In a short period, several copies were downloaded. After a continual development of the software several versions were released, and slowly it became fundamental support for 'Darknet'[1]. When an internet user switches to pure darknet operations, Freenet becomes very difficult to detect from the outside world. The transport layer of this network uses a special routing mechanism termed as 'Onion Routing' [2,3]. It's a process in which a message is encrypted after every transfer through a node or a router. These layers of encryption are similar to the peels of an onion. Due to these multiple encryptions, the identity of the sender and receiver remains unknown. In 2002, Tor- The Onion Router, a private Internet browser, was finally released to the world. With Tor, people can freely browse online maintaining anonymity. The hidden imprints and anonymity led many Nation-State Actors, State-Sponsored Hackers, pornographers, scam artists, drug, and gun dealers to find their home for some clandestine activities. And slowly the Darknet became the hub of international criminal activities [4,5].

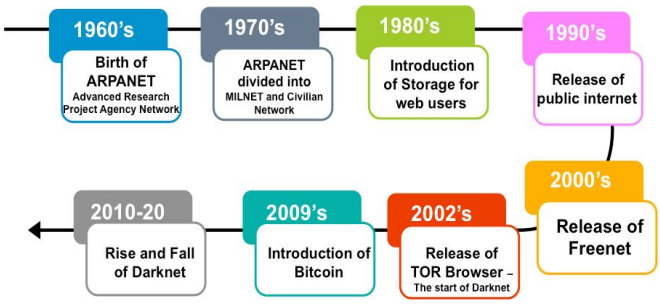

Fig 1: Timeline of Darkweb

II. LAYERS OF INTERNET
The Internet is an ocean of information. Every individual read topics according to their interest and gain information. It's a mesh of variety of networks (some are guided by VPN whereas some are open) and many

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other devices connected to share information all over the world. It is divided into three categories: Surface web, Deep web, and Dark web.

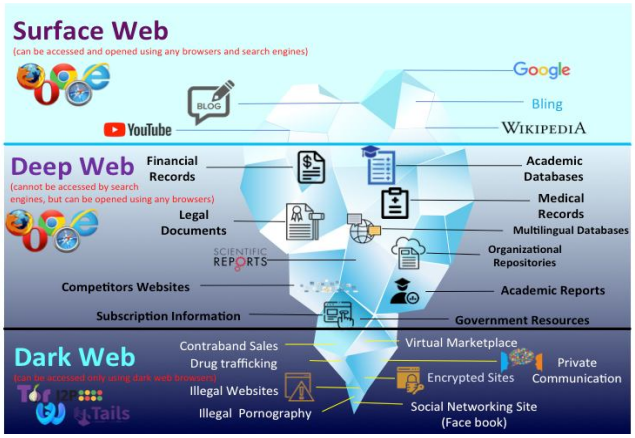

Fig 2: Layers of Internet

A. Surface Web

The surface web is that stack of information, which is readily available to all people and searchable with any standard search engines such as Google or Bing or Yahoo. Normally pages defined under surface web are said to be 'indexed'. It is also knowns as **'Clearnet' or 'Visible net'**. The interesting thing is that the surface web is merely 10% of the whole web [6,7].

B. Deep Web

Some pages of the web require credentials to access like emails, cloud service accounts, banking sites, subscription-based online services, companies' internal networks and their databases, education and certain government-related pages, etc. Such pages are neither indexed nor visible on access by any search engine. They do not use common domains like .com, .gov, and .edu,. The layer of the internet that consists of such pages is termed as '**Deep Web**'[6,8,9]. The estimated size of the deep web is beyond 90%.

C. Dark Web

The third layer of information and pages that are not indexed but hosted anonymously. Such information is accessible through "overlay networks", which run on top of the normal internet and provide hidden access. Special software or browsers are necessary to access the dark web because a lot of its information is encrypted. The most popular browsers are TOR(The Onion Router) and I2P[10].

Considering the infographic of Ocean surface and Iceberg as shown in fig: 2, the Surface web can be imagined as the area of an iceberg that is above the ocean surface whereas the portion of the iceberg below the ocean surface is the deep web, Dark web would be the deepest point of the submerged iceberg. The deep web and dark web are functionally different, but these two terms are mostly used interchangeably.

III. SUPPRT OF TOR AND I2P

The dark web is a concealed subset of the deep web that is requiring a specific browser to access. It is used to describe a collection of websites, which are visible only through the Tor or I2P browser[11,12,13].

TOR browser routes all web traffic through the TOR network. It consists of 'n' layers of encryption that pass through multiple relay points in between. From an entry point till the final destination i.e. an exit node, data traffic bounces through randomly selected middle relay. TOR websites and browsers identify user's connection but efficiently protects his/her identity. This feature of anonymity increases the number of users on the darknet. TOR supports the search of '.onion' websites that are available only in anonymous TOR browser.

I2P (Invisible Internet Project) is another anonymous communication system available. It uses I2P router on user's device, which enables temporary, encrypted, one-way connections with other I2P routers. Web traffic passed along with these connections are protected by a cryptographic method called as 'garlic encryption'. Anonymous websites of I2P are called "Eepsites". These sites have an extension '.i2p' and are hosted using built-in tunneling application. I2P serivces also supports SAM (Simple Anonymous Messsaging-a chat application), Susimail (a web based email client) and I2P Snark (a Bitorrent Client).

Because of the obscure nature of the web and anonynous supports of browsers, the Dark web is mainly known for its activities linked to criminal intent or illegal content [2]. The dark web has many gray shades of activities. It is badly known for its hidden marketplaces, sale of illicit items ranging from drugs, weapons to extinct

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animals, malware, human trafficking, and pornography. The anonymity of the dark web is more inclined towards criminogenesis. Many Government Law Enforcement and private cybercrime agencies are working hard to shut down such websites. But it also has its bright side. The dark web is also famous for its secure email services, blogs, clubs and many forums. Many Reporters recommend the use of 'TOR' for bloggers, journalists, and activists in countries where open discussions on certain topics are banned. Facebook and BBC news channel have also recently launched its 'TOR' version. There are also some SINs- Strategic Intelligence Networks that help people to manage through a crisis. In this paper, we would like to flash a light on such activities and highlighting a few recent attacks of Darkweb.

IV. DARK SHADOWS WITH SOME RECENT INCURSIONS OF DARKNET

Darknet's activities are more inclined towards infringement. Some shadowy domains of the darknet and few recent attacks of the darknet are listed here:

A. Virtual Marketplace

Due to anonymity, security, and privacy the dark web showed its potential to host an increasingly large number of malicious services and activities. And soon it became famous among illegal traders. A virtual market, also known as a dark web Marketplace specialized in the trading of illegal and illicit goods that includes drugs that require pharmaceutical prescriptions, stolen credentials, weapons, extinct animals and many more. The report published by Positive Technologies showed that crypto miners, hacking utilities, botnet malware, RATs(Remote Access Trojan), and ransomware Trojans are widely available in the shadow cyber services market, while the highest demand is typically for malware development and distribution [14].

Customers associated with such markets transact with the use of cryptocurrencies. It's a digital or virtual currency designed to work as a medium of exchange. Bitcoins, Monero and litecoins are some of the common cryptocurrencies.

Bitcoin is the most commonly used digital decentralized cryptocurrency that uses anonymous, peer-to-peer transactions. Traders across the marketplaces are using bitcoins as a medium of payment. Bitcoins are further exchanged in traditional currency, or "mining" them. Every financial transaction of a bitcoin is recorded in a public ledger, called the blockchain. The information recorded in the blockchain is the bitcoin addresses of the sender and recipient. An address does not uniquely identify any particular bitcoin; rather, the address merely identifies a particular transaction.[15]

With the incredible efforts of many governments and law enforcement, several virtual market places are shut down. One of the most wanted marketplaces "Silk Road" was taken down by the US Federal Bureau of Investigation. However, after few months SilkRoad2.0 quickly regained all the fame in the Darknet and that resulted in the conviction of Ross Ulbricht, the owner of SilkRoad. He later sentenced to life in prison without the possibility of parole. But the roots of anonymity are so strong that SilkRoad3.0 is popped up and that where we are today [12,16]. Due to this Silk Road became a case study for many researchers, academicians, and cybercrime investigators to hunt for more marketplaces.

From 2015-2017, Worldwide law enforcement investigations seized a few more leading marketplaces namely, AlphaBay, Bloomsfield, and Hansa. With a fear of getting indicted, some marketplaces were closed down with exit scam. The most recent seizure in May 2019 was of WallStreet Market which had around 10,000 listings.[17]

According to Digital Shadows, There are still few Automated Vending Carts (AVCs) that exist in the dark web that trade credit cards, credentials and access their trades. These AVCs remained unaffected by all other international seizures.[18]

B. Child Pornography

The majority of traffic to hidden Dark Web sites using TOR is for viewing and distributing images of child abuse and purchasing illegal drugs. According to the research of Dr. Gareth Owen and Nick Savage, at the University of Portsmouth, a huge amount of TOR traffic was related to child abuse and pornography [12,14]. Many law enforcement authorities have taken efforts to eradicate child pornography websites. They had taken covert measures to shut down the leadership of these websites, also arrested the organizers and core members. Despite many efforts by private cybercrime agencies, these websites are still popping up. It's been observed that child pornography websites have been operated and maintained with high secrecy based on the anonymity that the darknet provides.

In February 2015, the FBI took down the infamous Dark Web site 'Playpen', which hosted more than 23,000 child pornographic images and videos and had more than 215,000 users [12,19].

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In November 2016, U.S. Immigration and Customs Enforcement's Homeland Security Investigations and the High Technology Investigative Unit of the Child Exploitation and Obscenity Section (CEOs) seized "Giftbox Exchange" along with a subforum "Babies & Toddlers". This site was organized into different forums for posting different types of child pornography which were categorized by age of the minor victims, It had more than 72,000 registered users and 56,000 posts. In addition to operating the site on the TOR network, the owner Mr. Falte and his co-conspirators used other advanced technologies for encryptions to ruin law enforcement efforts.[12,19]

The most recent seizure of the child pornographic website is the shutdown of 'Welcome to Video' [20]. This site is said to the world's "largest dark web child porn marketplace". Users of this website could purchase videos using cryptocurrency and an annual membership was priced at 0.03 bitcoins. The international investigations led by the IRS-CI (Internal Revenue Service, Criminal Investigation (IRS-CI) is the United States' federal law enforcement agency), U.S. Immigration and Customs Enforcement (ICE)'s Homeland Security Investigations (HSI) and the NCA. A federal jury in the District of Columbia accused a South Korean national named Jong Woo Son. The Korean National Police of the Republic of Korea, the National Crime Agency of the United Kingdom assisted and coordinated with their parallel investigations.

C. Coronavirus Pandemic and Dark Web

With an intensified sense of fear caused due by the global pandemic, marketplaces on the dark web have seen a rise in Covid-19 related products such as N95 masks, gowns, gloves, the drug chloroquine, and other services. Sought-after have all been listed on these marketplaces. Security software firm IntSights found blood allegedly belonging to recovered coronavirus patients was even being offered for sale.[21,22]

Besides, many services and products, phishing kits are also being offered at discounts in "coronavirus sales". A threat intelligence analyst Liv Rowley at Blueliv, a computer, and network security firm stated in her BBC report that – Such discounts are offered because many cybercriminals believe that Pandemic is the right time to earn money and spread these phishing kits.

D. Zoombombing

In 2020, the outbreak of the coronavirus led to the worldwide pandemic, and the entire world got halted. It forced many people from various organizations, enterprises, schools, and universities to stay at home and work remotely. Since then video conferencing became an ultimate solution to connect with remote people, workers, customers, employees, and students. 'Zoom' was the more popular video conferencing software among all. In April 2020, many users of Zoom experienced a persistent "Zoom-bombing"[23,24], a new kind of attack within which unsolicited participants enter video meetings and shout slurs and threats in an endeavor to disrupt their meeting. Zoom bombing had left online lectures vulnerable to many universities. These attacks have brought attention not only to the dearth of security on video conferencing platforms, but also the ignorance towards the software vulnerabilities [23,24,25]. US-based Cyber-intelligence firm 'Cyble' reported that several free Zoom credentials, approximately half-million being offered on hacker forums on the Dark web around April 2020 as some way for hackers to extend their notoriety. However, this company was able to obtain about 530,000 accounts for about US$0.002 each, Credentials were ranging from email and password to meeting IDs, names, and host keys [26,27]. Full credentials could be used in a range of activities from Zoom-Bombing to Business Email Compromise (BEC) attacks. During these incidences, it has been observed that these attackers usually created bots to hammer sites with automated login attempts, leveraging credentials from past data breaches. Once the bot hits the correct combination, its operators gain access to the account. Unfortunately, search for such vulnerabilities and the source on the dark web remained obscured.

E. Data Leakage

In May 2020, the leak of nearly 2.9 crore job-seekers' details were discovered by 'Cyble'. Its founder Beenu Arora informed about the leakage of Aadhaar card data on the dark web. A firm has been trying to trace the source of the leak and identify the perpetrators. Meanwhile, Cyble researchers have received anonymous advice that the jobseekers' data leak was the results of an unprotected Elasticsearch instance - a tool that collects data from a large range of locations on the internet with the necessities of the person searching, and allowing the user to analyze large chunk of knowledge in real-time from everywhere the web [28,29].

In November 2020, During the routine observation of the darkweb, Cyble also discovered a data leakage of around 20 million customers of BigBasket, an online grocery shop in India. Details of this leakage included full names, email IDs, passwords, contact numbers (mobile and phone), full addresses, date of birth, location, and IP addresses of where users have logged in from have been put up for sale on the dark web for $40,000. [30,31]

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V. FLIPSIDE OF DARKNET

Darknet is not completely illegal although it has its ominous overtones. It has great potential in a variety of domains. There are plenty of services available on the darknet that doesn't break any law of cybersecurity.

A. Book and Chess Club:

There are many reading communities on the dark web for years. Other than general books, more controversial or forbidden books are made available in the form of book clubs. Even Ross Ulbricht, the founder of SilkRoad had his famous book Club where people discussed literary classics like Ralph Ellison's 'Invisible Man' alongside more controversial books like 'Anarchist Cookbook'. However, Ulbricht's online book club is no longer operational, but there are many more exists on the dark web, Such as 'Jotunbane's Reading Club' and the 'Imperial Library of Trantor'. These sites not only allow users to download illegal copies of popular books but also allow them to have active discussions on certain reading materials. The most popular books available on the dark web are Hacker, Hoaxer, Whistleblower, Spy, Gabriella Coleman's history of Anonymous; Cypherpunks by WikiLeaks founder Julian Assange; and Anarchism and Other Essays by Emma Goldman. All book clubs keep reading the history of all users hidden from other marketers.[15,32]

The dark web also has a chess club named "The Chess". It includes unlimited games against players from around the world and some pen forum to talk about the strategies of this game. There is no cryptocurrency fee and it is fully anonymous.

B. Strategic Intelligence Network

Considering another flip side of the dark web there exists few SIN, Strategic Intelligence Network. It is packed with information on how to deal with any sort of crisis anywhere on earth, from natural disasters to riots or any kind of war. It provides information about the resources and tools to be used in such scenarios. The pathways to lead such SIN is through the surface web. One of the SIN that has its reference on Facebook listed below:

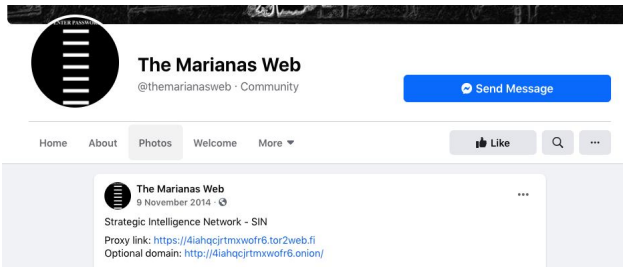

Fig 3: Presence of Mariana's Web (SIN) on surface web

C. Social Media and News

Many countries around the globe namely China, Iran, North Korea, Saudi Arabia, Vietnam are known to be the most censored counties. China has the most censored Internet censorship system; it blocks YouTube, Facebook, Twitter, Wikipedia, and many other media channels. Instead, it has its search engine, video hosting platform, and social media sites. Iran has its own tightly secured intranets for schools and universities. Many western platforms and services are forbidden to citizens. Citizens who deliberately access these sites and services over the regular internet will first receive a warning and further may lead to prosecution. As a result of these restrictions, citizens from such countries found their way on the dark web. Anonymity is the only thing such citizens want to have.

In 2014, Facebook, a giant social media platform launched a TOR hidden service. This version is pretty secure; it not only protects the user's local traffic and but also its location. It's also designed to circumvent censorship and surveillance to protect the user's identity from repressive regimes like Iran or China [33,34].

In 2019, BBC(British Broadcast Channel) launched a 'Dark web' copy of its news channel. The sole intention behind this launch was to thwart censorship attempts of many countries. As it is accessible with TOR, it helps users to obscure their identity and what data is being accessed. It helps many users to avoid government surveillance [35].

D. Secure email services

There are several heavily encrypted email services available on the darknet. ProtonMail is among the best known. This end-to-end encrypted service was developed by MIT and CERN scientists and has a presence on the surface web. Like many other aspects of the darknet, these email services provide the most secure and anonymous way of communication. For example, one might set up ProtonMail to create a darknet chess account or an account for some blogs.

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E. Other Beneficiaries

There also exist some forums for journalists, national activists, political protestors, bloggers, and whistleblowers to express their views. For these individuals, the Dark Web provides a way to elude censors and keep them safe from the prying eyes of the state.

Back in 2013, The Guardian revealed that the National Security Agency (NSA) had been monitoring the phone calls of American citizens both within the US and between the US and other countries, whether or not they were suspected of a crime [31]. Journalist Edward Snowden leaked many of the revelations that helped to unmask NSA surveillance. The Dark Web has proved so useful to whistleblowers that the CIA – Central Intelligence Agency itself launched a Tor-based site to receive leaks from its sources. [36]

The dark web is a deep valley of knowledge for some academic researchers. Resources of the dark web such as Sci-Hub offer free access to millions of academic research papers. The American Journal of Freestanding Research Psychology (AJFRP) became the first free and open Darknet academic journal.

VI. AWARENESS STATISTICS OF DARKWEB IN WOLRD WIDE

TOR/I2P hides the IP address and location of the user. As a result, it is impossible to get an exact usage count of the dark web users from each country. 'Statistia.com' presents a statistic of internet users who have accessed darkweb technologies as of February 2019, sorted by country. During the survey period, 26% of respondents from India stated that they had used such technologies.[37] Although the highest count among all countries is undeniable, but every aspect has two sides as stated above in the paper. Some individuals are using it just to maintin their privacy where as others are using it to fullfill their criminogenic activities.

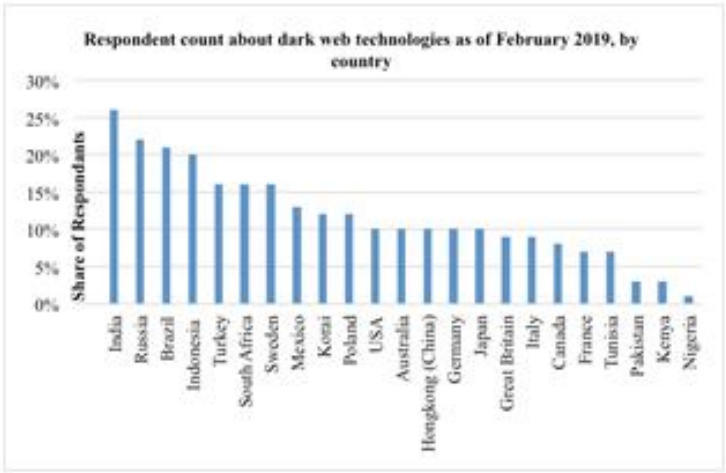

Fig 3: Awareness statistics of darkweb across the world

VII. CONCLUSION

The reality of the Darknet or Darkweb is much more complicated. Due to the lack of academic support, dark web resources are usually inter-cited and it has always been portrayed as a place of mysterious activities, Although, there exist some services that don't run afoul of the law. This paper states both positive as well as negative impacts of the darknet on society. Government's Law enforcement and private cybercrime agencies have always been trying to track down felonious sites but anonymity rocks every time. Through this paper, we would like to covey that, Darkweb is a double- edged sword. It is as evil or good as we make use of it. Helping journalists and whistleblowers, fighting against repressive regimes, protecting the privacy of an individual are the most important features of the darknet. Whereas, anonymous communication gives the home for hackers, attackers, pornographers and illegal traders. It is highly required to provide more awareness about the darknet to minimize its murky impact on society.

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SMART CONTRACT FOR FRAUDULENT ACTIVITY DETECTION SYSTEM

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ABSTRACT

The banking sector is a very dominant sector in our current day peer-group where almost every human has to distribute with the bank either physically or online. In dispense with the banks, the consumer and the banks face the chances of been confine by fraudsters. General use of Internet also had the real impact on the increase of the online card transactions especially with the beginning of the last decennary. Along with the expand of online transactions, the worldwide banking sector was forced to dispense with or to encounter an unpredictable number of fraudulent activities, yet. However, the rate of payment fraud with call is higher than with credit card. One prospective reason is that call detail is easier to be alter than credit card data by fraudsters, which reduce our data-driven fraud detection system. The paper presents two approaches to detecting fraudulent actions; the machine learning technique, which was evolve to accept fraud in the internet purchasing system; the algebraic approach, which was developed for the detection of attacks in block chain-based systems. This paper hereby addresses bank fraud detection via the use of corporation, assemble, estimating, and categorization to examine the customer data in order to recognize the patterns that can guide to frauds. Upon recognition of the patterns, adding a higher level of authentication to banking processes can be added.

Keywords — Fraud detection, profiling amount range, fraudulent actions, card-type, transaction characteristics, zero-day attack, amount-based success rate.

I. INTRODUCTION

The online transactions have been increased significantly in recent years, unfortunately so has fraud, which fraud is billion-dollar business and it has increased for several years. Credit or debit card fraud is the most popular items for thieves among many frauds because many customers personal message is suffered from leakage. It is accessible for hackers (unauthorized) to give the information about the password or security number

From consumers (bank authorized user) and transfer money to their accounts. Fraud detection plays an important role in minimizing these losses.

Today, fraudulent activities using social engineering are predominantly performed through Internet. Malware and phishing methods are engineered for this purpose. Most popular types of fraud include customer information altering through call center and branches, ATM fraud, credit card application fraud, card account theft, lost-stolen, fake credit cards and card duplication.

Current trade resolutions used by banks for fraud detection are essentially rule-based. However, in current years research has shown that machine learning methods are more functional than most rule-based resolutions. The data sets used in the issuing in which these outcomes are published do not always correlate with the real banking environment in terms of numbers, characteristics, and changes in time.

Nevertheless, fraudsters continue their appropriation by defeating all the existing and newly developed anti-fraudulent techniques with their clever dart. In this study we focus on current fraud detection of online Banking transactions (called phishing fraud) (e.g., logins, payments, view statements).

Phishing is a type of communal engineering attack often used to appropriate user data, including login credentials and credit card numbers. It occurs when an attacker, simulate as a believer in any entity, duplicate a victim into opening an email, instant message, or text message.

The purpose of a fraud detection solution in this setting is to assess in real-time the risk of each individual transaction in the form of a fraud probability. Then the bank may choose to allow the transaction, deny the transaction or impose some form of authentication on the user upon successful completion the transaction will be allowed.

Security is one of the major concerns of e-banking transaction people using e-banking are worrying that intruders will get into their account and spend their money.

China's e-banking fraud case has entered a period of fast growth and the risk of e-banking transaction is rapidly improving according to the report 29.17% of phone fraud happened.

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II. LITERATURE SURVEY

1.1. Block chain technology

Blockchain can be viewed as a decentralized ledger authorize direct peer-to-peer information convey. In other words, it consists of a series of data that are shared by group of computers but not located on a single server. All the on-ledger recorded data are open and clear to every on-chain node (computers). On-chain members can initiate an agreement and create a block associated with the transaction-related information. The block will be confirming by thousands of nodes on the network, and the verified block will be added to the end of the mainchain. Thus, blockchain stands for a chain of data, and each block of data is signal and controlled by cryptographic functions to make all the data immutable and secure. However, despite the rise in acceptance of blockchain tech, some people still question whether or not decentralized blockchains are a good idea. Later, in 2014, an innovative blockchain platform called Ethereum was proposed by Vitalik Buterin, and it provides a decentralized platform for software development. Ethereum introduced the appliance of smart contract to allow any kind of business logic to be autonomously executed on blockchain, and it enabled participants to build both decentralized financial and non-financial applications. After the aspect of Ethereum, there was an extreme increase in the number of blockchain-based applications being developed, and blockchain is regarded as a new pattern shift of information technology.

1.2. Blockchain in Regular Banking Industry

In facing the collision of economic modification, internet development, and financial innovations, the regular banking industry requires intense modification and is look for new growth method. As specify in recommendation, blockchain technology has the expected to facilitate global money settlement, smart contracts, automated banking ledgers, and digital assets; therefore, it could transform the underlying technology of the payment opening and credit details systems in banks. However, the regulation and actual implementation of a disperse system are issues that remain to be resolved. Therefore, Reference promoted the establishment of a "regulatory sandbox" and the development of industry standards, while Reference addressed the key issues that must be considered in developing such ledger-based technologies in a banking context. Reference reported, clearly, the appeal of blockchain in the China Foreign Exchange commerce System. In a briefly, blockchain technology advantage a time bank system in various ways.

Firstly, blockchain enables peer-to-peer token trading. In a time, bank system, there is a symbol called time credit and it is used for assess the value of services in terms of time units. All the on-chain data are immutable. That is, no one can alter the data note on the blockchain, such as the service-related data or the balance in the time credit pocketbook. The recompense rate and the matching algorithm are clear to everyone on the blockchain. The recompense-related information is writing down on smart contracts. The recompense rate is the rate for rewarding service providers. Paying transaction fees is important in a few presently existing time bank systems. In a blockchain-based time bank system, the payment of transaction fees is non-compulsory. [1]

Blockchain as a technology which consists of person-to-person networks, Cryptography knowledge and also the consensus in distributed manner. Blockchain helps people to create trust among those people which are not trusted and with these simultaneously new models will appear. However, there are certain basic problems with blockchain that comes in between like the increase in the chain affects it and the most important is that the performance of blockchain is that it cannot do the process of transactions as fast as the central system does every second. Governments and other shareholders will need to locate various major challenges before blockchains see extensive use for e-voting. Al-though blockchains are good at provide safety and accuracy, public confidence and trust are necessary additive for BEV's success. Block-chains' problems might hinder normal public acceptability of BEV. Broadband access and digital user skills are also concerning. A financial management product based on the blockchain technology is suggested in case when you are required to update the information regarding any product in many institutions, also if it is required to manage these wide institutions and also to decrease the delay of the update. It builds a diversified network which is resistant to any damage and gives security for information sharing.

In this paper we have used Hyperledger Fabric as the architecture and have studied the tasks of the system which includes the tracing of the product, maintain the route for information etc. To work on the weakness of this architecture we put forward a follow-up prospectus. Blockchain—a kind of distributed ledger technology—has been detailed in the most read press as the next big thing. If I explain in simple words, a blockchain makes it possible to create those digital transactions which are free from alterations and can be shared. To sign transactions among parties this technology uses public-key cryptography. After which the transactions are then created on a distributed ledger. The ledger constitutes a blockchain which has cryptographically linked blocks

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of transactions (bit.ly/2sgabnq). It is not at all possible or extremely difficult to modify or delete blocks of data that are stored on the block-chain ledger. [2]

III. PROPOSED METHODOLOGY

Fraud transactions have become a widen problem in the online banking domain. As technology progression, fraud peoples also change their methods of executing frauds. There are also emerging technologies that allow fraudsters to mimic the transaction behaviour of genuine customers and they also keep changing their methods so that it is difficult to detect fraud. Sometime happens the fraud like fake calls and getting information like credit card details or banking details. And to detect that problem we design this system. So, we design this advanced system to detect that fraud by tracking their location.

Basic architecture of present system consists of following component.

A. Bank Customer: Basically, he is the authorized client who is having internet banking account in particular bank.

B. Fraud Customer: He is the unofficial user who is not having valid Internet banking account in bank. Who makes use of official users Internet banking account to do Transaction? Hence, He is Fraudulent User.

C. Bank Manager: Bank Sever Retrieves previous information about sites that customer visits and the nature of payment made by customer From Customer Behaviour Banking Pattern Database. This is used to detect pattern and to identify Fraudulent Transaction.

D. Database: Stores the preceding information about Consumer Behaviour Banking Pattern. On finding a fraudulent transaction we shall send the One-time password to the client to an actually verify the identity of client and continue with transaction in case the actual user is actually initiating it.

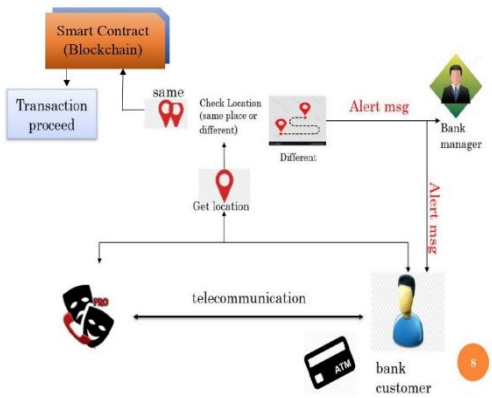

Fig 1: Graphical Working Diagram

IV. FLOWCHART

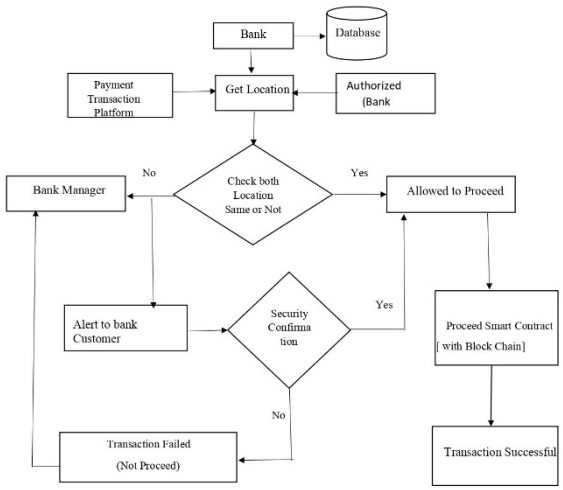

Fig 2: Propose System Pictorial Flowchart

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Figure 2 represents in these all the information of authorized user is store in the bank section e.g. (Name, Address, Card number, and Credit card information) after that it goes to get location section and checks the location of authorized user who enters the all information of credit card. And payment transaction platform means where the payment will be withdrawal or deposits from account it is online either offline then next it checks both locations are same or not. If both locations are same then transaction will be proceeding. If both locations are not found same then alert message will send to bank customer as well as bank manager. If bank customer sends the positive reply to the alerting message then security confirm that transaction is allowed to proceeding when transaction proceed in these particular sections verify this transaction and ask to authorized user to proceed or not.

When transaction proceed in this particular section. Methodology in block chain is used for hiding actual data so fraudster's can't stole the data easily for hiding data in block chain we use hash function. Hash function converts a zip letters and numbers into an encrypted output. So, it is very useful (In this sentence methodology of blockchain will work). If, bank customer neglects to proceed for the transaction using the alert message. For transaction we need One Time Password, then OTP (One Time Password) not sends to bank customer and transaction will be denied stores the alert message to bank manager side because of in future we need the bank customers account information in case any problem occurs.

It's all over the process to withdrawal money from ATM or to transfer money through online way. Now, the question is about how this system works when customer wants to deposit the money? But there is nothing to worry about the frauds because of at the time of money deposit, Customers enters the right information in which account they wants to deposit the money and customer check this account details again and again until the end. So, there is no chance to fraudulent misbehaviour.

So, in that system we used two approaches for detecting fraudulent activities the block chain-based techniques that is already explain in above process and machine learning algorithms are mostly used for detecting frauds is Supervised Learning, Unsupervised Learning, Semi-supervised Learning and last is Reinforcement Learning all these algorithms are used for detecting frauds.

V. EXPECTED OUTCOMES

We bring together different strategies to predict and detect online banking fraud. In this we can easily detect fraud by tracking their geo-location. The proposed method allows transparency to its decision by extracting and comparing geo-location of the device. If there is any ambiguity in terms of both the location of user as well as the person performing transaction, user is alerted with message and the transaction is denied**.** So in this way we can stop the big loss.

VI. CONCLUSION

Online banking activities are constantly increasing and are likely to become even more common as online banking platforms develop. Credit card fraud detection has become more and more rampant in recent years. Fraud detection method are continuously developed to defend criminals in adapting to their strategies. In fraud detection, identifying fraud as quickly as possible once it has been done through fraud detection techniques, is now becoming faster and easier. One side effect of this drift is the rise in attempted fraud. We propose a consciousness based architecture for classifying digital banking transactions as either fraudulent or genuine. The proposed method allows transparency to its decision by extracting and comparing geo-location of the device. If there is any ambiguity in terms of both the location of user as well as the person performing transaction, user is alerted with message and the transaction is denied.

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AUTOMATIC SOLAR TRACKER FOR OPTIMUM POWER GENERATION

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ABSTRACT
Solar Energy is one of the renewable energy, since it comes from natural source that is Sunlight. This energy can replace fossil fuels in major areas of use like electricity. So efficient use of sunlight can result into abundance production of electricity. One of the most suitable way for efficiently absorbing solar energy is through Dual Axis Solar panels. Since this panels are dual axis they track the sun trajectory and gets inclined in such a way that maximum energy gets produced as compared to Single Axis trackers. LDR sensors are used for comparing the intensity of light, and accordingly with the help of servo motors it performs rotation. The controller circuit used is AtMega328p microcontroller. Servo motor's are used since they maintain comparative torque speed. This paper represents the entire brief about things that are used with their working. Also there is an android app developed for controlling devices that are working with the help of power generated through PV panel. The android app would be connected to HC-05 Bluetooth module, in order to receive signals from the user.

Keywords— LDR(Light Dependent Resistors) PV(Photovoltaic) panel, AtMega328p, Servo motors, HC-05 Bluetooth module

I. INTRODUCTION

A. BACKGROUND
Solar energy can be easily tracked by using dual axis tracker. Since dual axis tracking results into generation of electricity 30-40% more as compared to immovable trackers. Though handling of Dual axis trackers is bit complex, but it can be used over the places where the sun trajectory changes every season so as to get the best results out of it. Using dual axis is the only way of efficiently using the renewable source of energy for power generation.

AtMega328p microcontroller is used along with LDR sensors and Servo motors. The rotation of the panel depends upon the intensity of sunlight which falls upon the LDR sensors, and accordingly LDR sensors react by moving the servo motors in the direction where maximum sunlight could be absorbed. Also with the app, devices which are working through power generated by solar panel would be controlled. To be specific devices can be made ON/OFF through mobile app.

B. PROJECT JUSTIFICATION
This research paper ensures that maximum amount of sun rays fall on the solar panel, that is perpendicular to the solar panel. To achieve this servo motors play a significant role along with LDR sensors. In India maximum energy would be generated in the summer season, which can be harvested for future use. With the help of app we would be able to see the sunrise and sunset timings of that current year which are taken from official handlers online. This method of solar tracking can not only boost economy but would contribute to country's overall electricity consumption.

C. OBJECTIVES
The primary objective of this paper is to make alignment of panels in such a way so that maximum amount of energy could be retrieved. Here the torque of servo motors play a vital role for efficiently rotating the solar panels towards the sun rays.

D. SCOPE
The Solar Tracker would be moving all day by tracking the sun, and also in keeping mind that sun rays fall perpendicular to the panel so that maximum amount of energy could be generated and efficient use of solar energy could be done. Each part connected here plays a vital role for rotation of the panel. The power generated by panels is not harnessed here since it generates less power, devices such as led have been used. Also the app can be viewed for daily sunrise and sunset timings as well as controlling the devices (ie. led).

E. METHODOLOGY
The working of the panel, can be divided mainly into 3 phases like input, processing, output. Here input means the sunlight since it falls on the panels as well as LDR sensors. Mainly sunlight act as an input for LDR sensors because on the basis of intensity of sunlight they signal the servo motors for the movement of the solar panel. So on the basis of Input received Arduino checks the code internally that under what conditions what needs to be

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done. So this part comes under processing where Arduino performs processing based on input received through LDR sensors. After processing the signal is sent to servo motors where based on internal conditions they either make the panel rotate from east-west direction or north-south direction. Here servo motors act as output phase where on the basis of processing done they react. This circular loop of taking input, processing and producing output goes on repeatedly. Also the devices connected here to be specific Led are controlled with the help of HC-05 Bluetooth module. So first Bluetooth is connected with the mobile app, and in turn that Bluetooth devices is in connection with the Led so that we can switch ON/OFF the led. In the real world implementation this led could be replaced by devices such as Fan, Ac, Lights etc.

II. COMPONENTS USED

A. LIGHT DEPENDENT RESISTOR (LDR)

Light Dependent Resistor is known by several other names like photoresistor, cadmium sulphide (CdS) cell, photoconductor and photocell. The component is basically a resistor whose value decreases when the intensity of light decreases. These kind of resistors are used in large number of circuits where we need to sense the light. There are different types of Light dependent resistors available. Mainly they can be divided into two types Intrinsic Photo Resistors and Extrinsic Photo Resistors. LDR sensors are widely used in various electrical and electronic projects. Some of its applications are LDR light intensity for Street Lights , Security System Controlled by an Electronic Eye, Lighting Switch from Sunset to Sunrise etc.

B. SERVO MOTOR

For Selecting any electric motor it is one of the vital part in electro mechanical project. When project requires maximum precision it is always recommended to use servo motors. Servo motors are actuation devices for the precise control of speed, torque and position. They have robust performance and intact precision compared to other actuations in frequency converter. Nowadays servo systems are widely used in industrial applications. Some of the servo motor applications include Robotics, Conveyor belt, Solar Tracking System, Printers etc.

C. HC05 BLUETOOTH MODULE

HC05 Bluetooth is a communication protocol without wires. It is used for sending and receiving the information. The bluetooth communication protocol has comparatively less range of communication as compared to WiFi. The Bluetooth operates at the frequency of 2.41 Ghz and also used in many small ranges of applications.

D. ARDUINO UNO

The Arduino Uno is one of the promising and more frequently used microcontroller which is Open source and based on the Microchip ATMega328p microcontroller which is developed by Arduino.cc. The board contains one of the compact sets of digital and analog input and output[I/O] pins which can be further interfaced to several other shields or expansion boards and also other circuits. Also some other features of the board include 14 Digital Pins and 6 Analog Pins. Also the hardware can be programmed by using Arduino IDE[IDE stands for Integrated Development Environment] via type B USB cable. It has the capacity that we can power it through a USB cable or through an external 9 volt battery that accepts voltages between seven to twenty volts. In USB Arduino Boards, the Uno board is the first which was build and released. It is considered one of the most popular as well as extremely user friendly in the list of Arduino board series.

E. SOLAR PANELS

Solar Panels are one of the widely used and till today underrated devices, which contains solar cells that are connected either in series or parallel connection to produce the desired amount of voltage as well as current. A solar cell is a device that converts light into electricity via ‘photovoltaic effect’. The Photo Voltaic process [also known as PV effect] is one of the process that occurs in few semiconducting materials such as silicon

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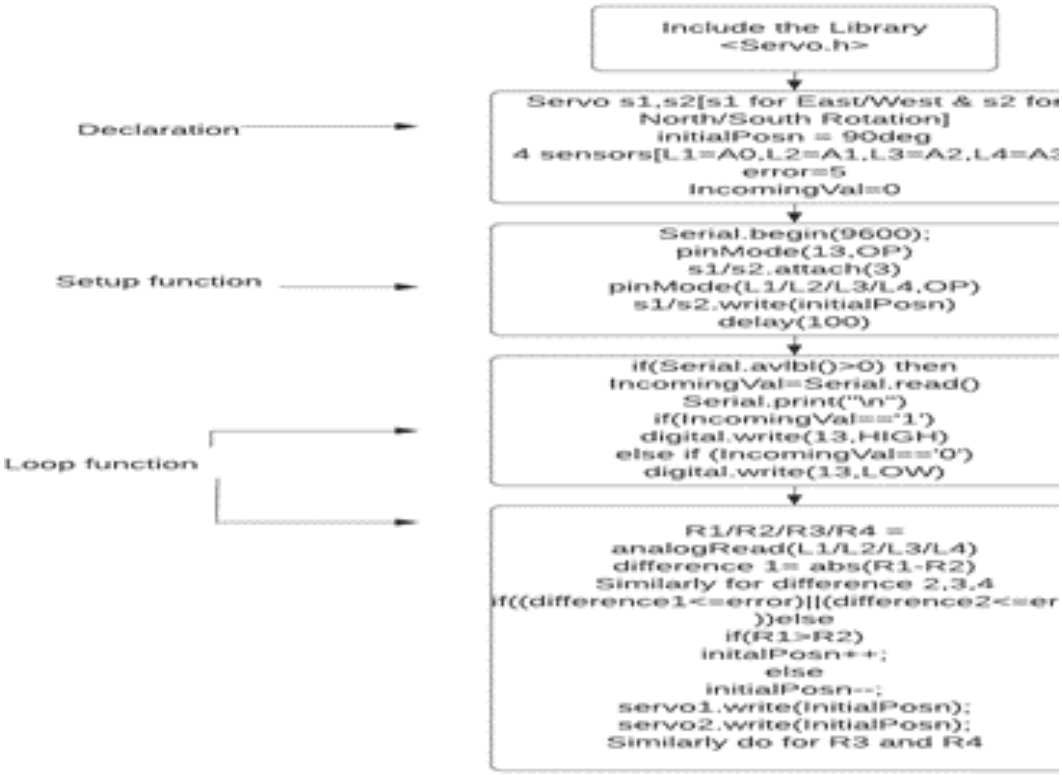
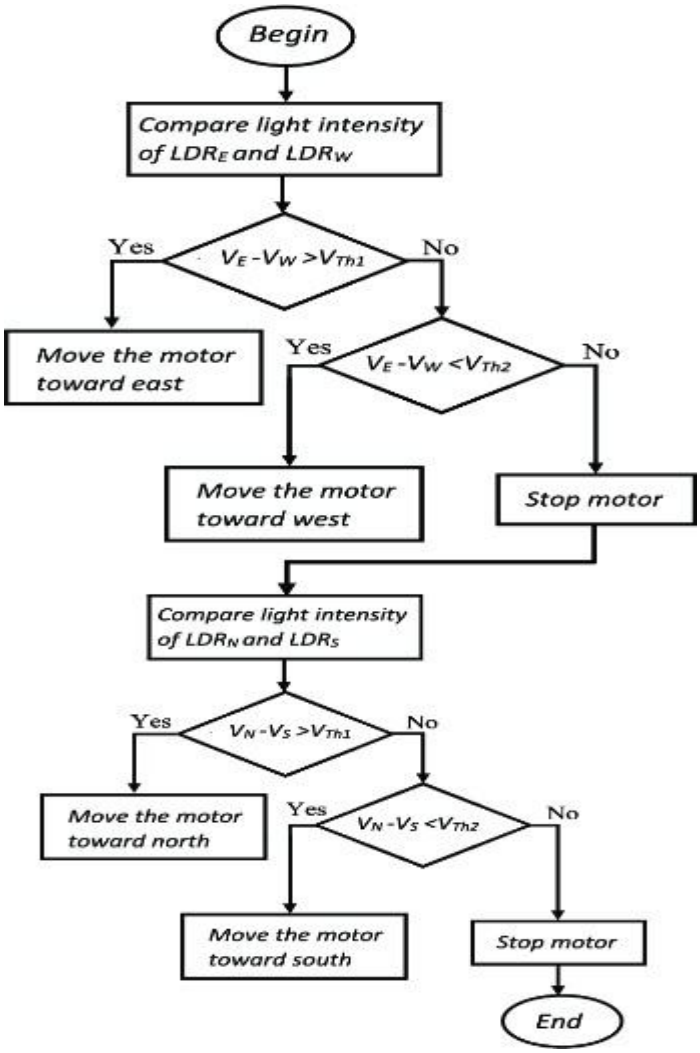
III. SOFTWARE CODE AND CIRCUIT

A. ARDUINO CODE FLOW



B. FLOW CHART



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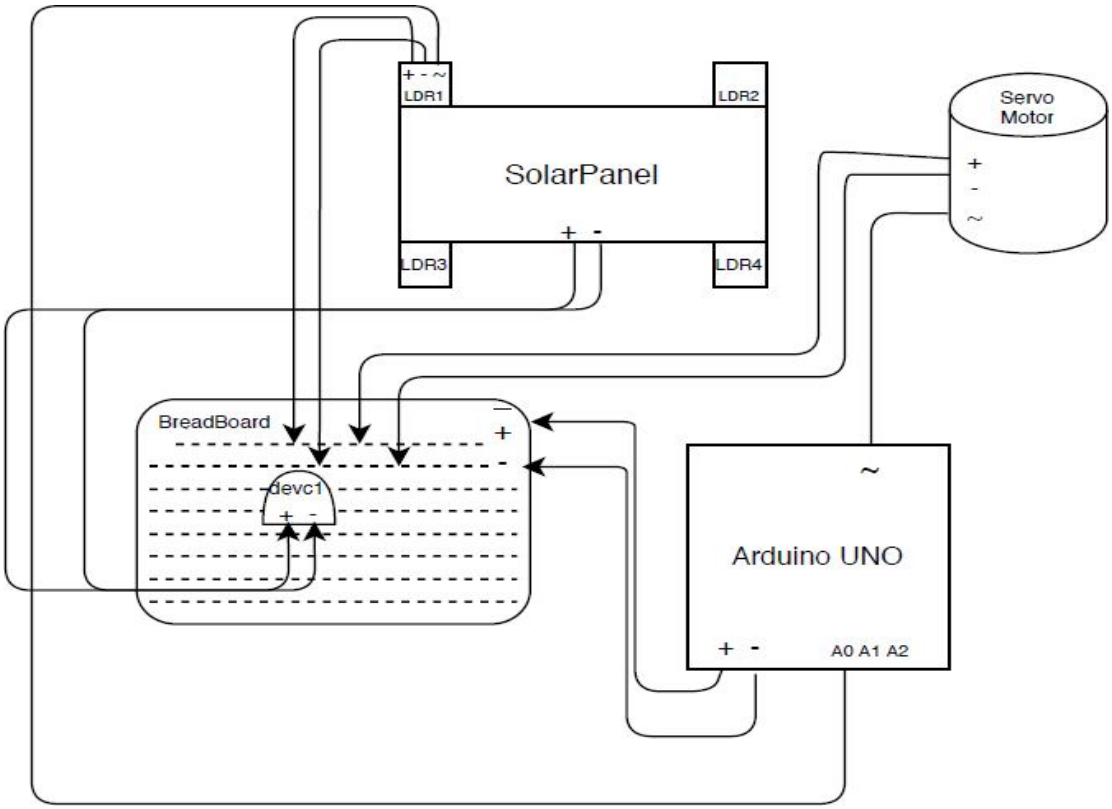
C. CIRCUIT



F. DISCUSSION AND COMPARISON

The primary objective of this paper was to track sunlight in a best and efficient manner so that it can result in maximum generation of electricity.

Condition	Description
LDR 1 > LDR 2	Motor1 moves anticlockwise
LDR 2 > LDR 1	Motor1 moves clockwise
LDR 3 > LDR 4	Motor2 moves clockwise
LDR 4 > LDR 3	Motor2 moves anticlockwise

IV. CONCLUSION AND FUTURE WORK

A. CONCLUSION

This system would be used for detecting the sunlight and accordingly the intensity of lights will be compared, the side having maximum intensity the motor will move towards that position. The main aim of this paper is to propose a control system which will cause better alignment of the Solar Panel with respect to the Sunlight and also harvesting the power for use. The main significance of this project is to make use of natural resources in this case sunlight to its full extent.

B. FUTURE WORK

Bigger solar panel could be used which will generate more volts. Through which the whole system ie. 2 servo motors, Arduino, 4 ldr sensors can operate with the solar panels generated current. Display meter could be used for actual tracking of how much volts is being generated.

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IMPLEMENTATION AND ANALYSIS OF ELEARNING SOFTWARE BY MODELLING A SECURE AUTHENTICATED FRAMEWORK FOR ELEARNING (SAFE)

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ABSTRACT
E-Learning is a novel idea of learning digitally, typically over the net. E-learning and other applications on web platforms are significant and hundreds of handlers trust and depend on the execution of normal events. Handiness, anytime anywhere accessibility, and omnipresent applications on the web have made them susceptible. Authenticating users in a reliable environment is necessary for any eLearning system of organization. This research focuses on the design and evaluation of the eLearning system. Moodle platform is chosen for the implementation of the hybrid model. Password validation mechanisms can lead to major data breaches. In this paper, the first objective is to authenticate the e-learning system by incrementing the strength of password and applying password pattern policy using HTTPS instead of HTTP to keep it significantly extra secure from getting compromised by other security openings. The second objective emphasizes encryption by applying the AES algorithm in the system, for secure encoding and storing of handler credentials like names in session and cookies. The third objective is to mitigate attacks like XSS, man in the middle, phishing by editing HTTP headers. It is also used to apply security measures by using function and tokens for preventing csrf attack, which has a different role for different attacks and vulnerabilities which ensure authentication principle and frame an authenticated & integrated framework of E-learning.

Keywords—eLearning, Learning Management System (LMS), Modular Object-Oriented Dynamic Learning Environment (Moodle), Vulnerability, OWASP, XSS, CSRF, FOSS (Free and Open-source software).

I. INTRODUCTION

eLearning is the use of wide-ranging information and communication technologies that offer new education settings that may be communicating and can be retrieved online from anywhere anytime. The presence of e-Learning gives learners novel and appreciated learning practices. Moodle is an unrestricted, free, and open-source learning management system.

Educational and training systems make usage of several means and methods for conveying and imparting knowledge and facts. Information and Communication technology have unlocked various scenarios to dispense the content over the internet in numerous forms like multimedia, image, satellite communication, or web-based learning and training, etc. All these facilities are mentioned as eLearning. Since the demand for such methodologies is growing, there is a higher demand for security settings to support teaching and learning.

Learning Management System is an arrangement that is used by academicians and trainers to allocate courses using the web. Through the usage of ICT and related technologies, there are a wide-ranging variety of eLearning tools. eLearning is also be described as education utilizing ICT tools and other means from the attainment of information and skill using electronic technologies such as computer and net-based courseware using WANs.

According to Kraleva [10], one of the most famous LMS that is widely used globally is known as Moodle. Based on several measures [13], Moodle LMS is the considered finest in terms of various collaborative tools and activities. Indeed, Moodle has the finest administrative and communication tools and has a very active discussion forum. Besides, Moodle has notification which alerts students on new assignment and deadlines and can track the progress of learners also.

The main focus of research is to investigate security issues in Moodle mainly focusing on authentication vulnerabilities, which are broadly accepted as AICA is Availability, Integrity, Confidentiality, and Authentication, threat modeling method. However, notwithstanding the existing possessions and assistances of such learning techniques, few challenges it is facing are securing content and distribution tools and techniques [2] [3].

This research work is planned in the following manner, section II defines the E-learning security and its basic criteria like requirements, vulnerabilities and also presents the CWS, OWASP 2013, and 2018 list of

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vulnerability. Section III defines the problem domain in the existing work. Section IV explains the proposed methodology, in these various security measures that are applied in our proposed approach, section V defines results and section V and VI outlines the conclusion and future scope.

II. ELEARNING SECURITY

In this segment, a research outline about e-learning, and the classification of security attacks is presented.

A. Basic Security Requirements in e-learning

All elementary security principles should be met for the eLearning system to be safe and secure which includes authentication, access control, confidentiality, integrity, availability, non-repudiation.

A**uthentication** is mandatory for the identification of the handler, it is to verify identify who and what will be answered, usage the of application and what are his access rights. This process avoids the invaders to access any other user's credentials and cannot view sensitive info, nor can accomplish illegal actions.

The principle of **access control** is comprehended during the verification when the user is granted all the required privileges. The user will make in the system only the permitted actions.

According to the principle of **confidentiality**, eLearning arrangements must be safeguarded utilizing access control process to possessions and by securing the communication and the storing of the information.

The integrity of the information is a crucial issue even though it is usually ignored. It means that only approved are acceptable to alter information or code.

It is the principle of non-repudiation, which assures that operators or the users of the system will not able to plausibly deny to have carried out operations. Assume if any faculty or students delete his/her learner's grades. As per this situation, we should be able to detect and trace who erased the data by utilizing various means [6].

B. Common Weakness Scoring System and Open Web Application Security Project

The Common Weakness Scoring System (CWSS) distributes a process for ranking software weaknesses, vulnerabilities in a reliable, flexible, and open manner. The list is a collaborative community grounded exertion that is taking care needs of its participants and users, transversely for administration, the academic world, and business. The OWASP (Open Web Application Security Project) top ten shelters more general threats than CWE which gives CWSS (Common Weakness Scoring System) and the 25 top CWE shelters a wider variety of subjects than what ascends from the web and net focused opinion of the OWASP top ten. Few overlay is there, however, there are a few predominant applications and subjects in the OWASP top ten that have an impact on all software applications. The transformation has accelerated and has changed over the last four to five years, and the OWASP Top 10 needed to be reformed. The important and central technologies and their architecture of applications have changed significantly therefore to compare we have used OSWAP 13 and OSWAP 2018 (OSWAP 2017). For research work, both these OSWAP top ten lists were used which is known as OSWAP 2018 as in 2017 there is no variation in the list of the year. [3]

C. Free and Open Source eLearning Platform

The free and open-source package is conceivable to modify, access the code and is considerably laid-back allows examining as no monetary or copyright difficulties exist. A free and open-source Learning management system takes a major part in the marketplace and is desirable by the academicians and education fraternity. As an example, alone Moodle takes an extensive base of connections and implements on hundreds of organizations [11][14].

D. E-learning Platform Security Vulnerability

The common vulnerabilities in eLearning systems are described along with vulnerability details and their impact.

- Integrity threats like Cross-Site Scripting, SQL injection in the page, virus, or remotely injection of trojans.
- Authentication threats like broken authentication to find credentials like the pin, username, password cracking utilizing decoding schemes, session-id prediction on the web.
- Confidentiality threats deal with information leakage and improper error handling and information disclosure of security features database address connection details or script details.

The table describes these common vulnerabilities.

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TABLE I. DESCRIPTION AND IMPACT OF VULNERABILITIES FOUND EXAMINED E-LEARNING PLATFORMS

TABLE II.

#	Description	Vulnerability Details	Impact
1	SQL Injection (SQLi)	Can alter back-end SQL databases.	Web Applications that are vulnerable to SQLi may allow complete access to the underlying database with devastating results.[14]
2	Cross-Site Scripting	Family of web vulnerabilities casing a preys browser to perform a programming language script with the rights of a reliable host. They also act as initiation cushions for other, more severe attacks on users' local systems on the web.	Developers still today tend to disobey the simple rule of using the one, well tested, and documented sanitizing method for convenience or due to ignorance.
3	SVN Detected	SVN repository files can disclose SVN addresses, SVN usernames, and date information.	An attacker will exploit this information to launch an attack. SVN files should exist in a developing environment and never in production.
4	Authorization over HTTP	Basic authentication sends the username and/or password in plain text.	Intercepting traffic on the network, leads to compromise of user credentials, gaining full control of the application.
5	Cookie not marked secure	A cookie can be stolen after successfully intercepting and decrypting the traffic, or following a successful man-in-the-middle attack.	All cookies should be marked as secure unless the cookie is not linked to verification or does not transmit any personal info, which is usually the exception.
6	Source code disclosure	Source code of a web application could contain data such as database connection strings, usernames, and passwords, not to mention the technical and business logic of the application.	If database connection strings are exposed this can lead to a direct SQLi attack. If username & passwords are stored there, an attacker could compromise the entire platform. In general source code is one of the most “valuable” things an attacker could lay his hands-on
7	Header Injection (HTTP)	Every user input has to be sanitized before using it as an HTTP header. Otherwise, the application is vulnerable to header injection or response splitting.	The attacker can fully control the headers and create custom responses. The result could be the total hijack of the application
8	Detected GIT	A GIT repository file found accessible from the web	GIT Repository usernames and file lists are disclosed by GIT Repository. If combined with other innocent data can lead to severe problems
9	Open policy crossdomain.xml detected	If the Crossdomain.xml file has an open policy, the attacker can bypass any CSRF protection (nonce / CSRF tokens).	A n invader wants to dose an authentic handler of the website to exploit this issue effectively. The invader is then able to read authentic users’ private communications or carry out actions as the compromised user.
10	Password communicated over query string	The web application is transmitting passwords over the query string, causing both the client and the server to store it in logs.	When the query string is a link target in an HTML page, it should be transmitted as part of a POST form, not encoded in the URL itself, so it cannot expose the URL or other sensitive information.
11	Autocomplete enabled	Autocomplete is enabled in one or more fields either	The attribute autocompletes=" off" should be set to all form tags or individual "input" fields with

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		password fields or other significant fields.	sensitive information. All instances of inputs that store private data should disable autocomplete. Those fields should not be cached.
12	Cookie not marked as HTTP Only	Cookies with privileged information are not marked as HTTP Only	HTTP Only cookies can't be read by client-side scripts. This offers extra protection against XSS attacks.
13	Information disclosure (MS Office)	HTML files found that are produced by MS Office Suite with user-related information appended to the document	Combined with other "innocent" data can lead to severe problems
14	CSRF in login form detected	CSRF forces the user to take actions on the web site she is logged in to, guided by the attacker.	CSRF forges a cross-site request to the login form, logging the victim with the attacker into the web site [15]. The successful attack needs extra vulnerabilities exploitation by the attacker
15	CSRF detected	CSRF attack works by including a link or script in a page that accesses the website familiar to the (legitimate) authenticated user.	For a CSRF attack to succeed several other parameters need to be set. Nevertheless, attackers find continuously new ways to exploit this threat.
16	IP address disclosure	A string that matches an IPv4 style (e.g., 192.168.X.X) was found	This can be used for further attacks
17	Backup file disclosure	A backup file should never be publicly accessible, especially from the web	Such a file could contain all kind of privileged information
18	Cookie values used in Anti-CSRF	Reflected HTTP Constraint Effluence weakness and can bypass Anti CSRF token authentication.	By executing CSRF and then utilizing the CSRF, we can perform the stored HPP weakness compromising any preys account if that website is susceptible to these attacks
19	Programming error Message	An error message was produced to the end-user. Those messages should never reach the production state.	Could be a valuable start of a successful attack
20	The insecure frame (external)	An inline frame was found with the iframe sandboxing tag set to an option that allows further exploitation (e.g. allow-same-origin)	When the classification of the iframe is wrong the attacker can exploit this in conjunction with other vulnerabilities.
21	Database Error Message Disclosure	Database (various) error(s) message disclosure.	Error message(s) may disclose sensitive information leading to SQL injection vulnerability.
22	E-mail address disclosure	e-mail addresses found "hardcoded" somewhere in the application	E-mail addresses can be used for spam e-mail or for exploiting vulnerabilities, or social engineering attacks. Only standard e-mails should be hardcoded (e.g. info@mycompany.com)
23	Internal path disclosure (Windows)	A possible Interior Pathway Disclosure in the document. (Windows)	This can only be used to exploit other vulnerabilities in the application environment.

E. **Security Threats to Moodle**

With the growing claims of internet amenities, it outcomes in the rise of numerous amenity offer that provides an entree point to net handlers. As there are incredible augmentations in net handlers lately, safety and security

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issues have turn out to be a major concern. Moodle (Modular object-oriented dynamic learning environment) is vulnerable to certain design attacks like password prediction, username prediction, session capture or hijacking, cross-site scripting, Cross-site request forgery, etc.

III. PROBLEM DOMAIN

Moodle is recognized all over the globe and based on various standards, communication tools, and is indeed the best tool. The security attacks are classified based on the AICA model. Authentication attacks like broken authentication, session management, and insecure communication and Integrity attacks like Buffer overflow, cross-site requests forgery, cross-site scripting, malicious file extensions, etc.[15][16]

Growing usage of web applications has involved the invaders to search for loopholes and flaws in applications and take advantage of such loopholes in diverse conducts. Out of hundreds of web application weaknesses, the top most weaknesses are injection threats shadowed by XSS also entitled as cross-site scripting attacks vulnerability. As per this

- The absence of HTTP only permits the browser to allow cookies by client-side scripts. It may be deflated via an invader in combination with a CSS site scripting attack to take the affected cookie. An invader might take advantage and access the session in an unauthorized way as it does not have the backing of SSL and provisions user info into cache which may be misused.
- Cross-site request forgery is also a threat that Moodle is susceptible to, where an invader tricks the handler into the Moodle load page with a malicious request. Threat categorization is a collaborative exertion to streamline and compute the weak points and attacks, that can lead to the conciliation of information. It delivers a proper organization of attacks and their flaws. Its main practice is to offer the industry standard with commanding product and backing and has been peer-reviewed to check its correctness. The above vulnerabilities make it less secure and reliable even though it's known for other tools and features.

IV. PROPOSED METHODOLOGY

The comparison of the weaknesses highlights various vulnerabilities like SQL injection, Vulnerable JavaScript library, Breach attack, etc as per OWASP and CWE list of the most common methods. The two main design vulnerabilities XSS and CSRF which are selected for study, as these are still most common, where XSS has a major percentage in total severe vulnerability findings [3] and CSRF in Login Form is also detected and is prevalent in most of the open-source eLearning platform [3]. In this segment, we frame the code that would defend against XSS threats and SQL injection threats and also provide a key for additional security glitches allied to web applications. The XSS threat highlighted in OWASP, we have proposed work on extenuating XSS attack identified, the hybrid model is proposed to find a solution using tokens for CSRF attack.

This research focuses on the design and evaluation of the eLearning system. Moodle platform is chosen for the implementation of the hybrid model. Password validation mechanisms can lead to major data breaches. In this paper, the primary objective is to validate the e-learning system by incrementing the strength of password and applying password pattern policy with using HTTPS instead of HTTP for making it significantly extra safe and secure from getting conceded by other security breaches. The second objective is to apply the AES algorithm in the system, for secure encoding and storing of credentials like user names in session and cookies. The third objective is to mitigate attacks like XSS, man in the middle, phishing by editing HTTP headers. We apply security measures by using function and cookies for preventing CSRF attack, which has a different role for different attacks and vulnerabilities which ensure authentication principle and frame an authenticated & integrated framework of E-learning.

In existing work, the password is created reliant on the anticipated dimension along with the anticipated string of characters, it includes the password generated using function generate password($length) with return random string($length,$chars). This algorithm generates sturdy keywords that are password to protect credentials. The proposed mechanism implements, the increment of the keyword length and password pattern policy for mitigating the brute force attack and ensure the authenticity of the e-learning system's encryption with our base approach which uses MD5, whereas the proposed approach enhances security by storing user name in encrypted form in session and cookies by using MD5 encrypted password along with hash and salt in combination.

This not only strengthens the password and authentication process but also mitigates the XSS and CSRF and other vulnerabilities. By applying HTTP security headers for mitigating security vulnerabilities.

A. Hybrid Approach

Message digest algorithm MD5 which gives digest value is used for validating the actual initial communication with the hash value, salt which is a random value, along with Advance encryption standard (AES) as an

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encoding algorithm. Message digest algorithm, MD5 is used to muddle and hash the keyword that's the password to shield against brute force and dictionary attack. AES algorithm for encoding and storing of credentials in session and cookies which makes it a more protected and authenticated framework for eLearning called Safe.

B. HTTPS and HTTP

To provide secure transfer using HTTPS, SSL certificates are used to encrypt the transmitted information to secure identities and information over the web. The framework must have an SSL certificate that provides integrity of, encryption, and verification to protect the user's sensitive information in the e-learning environment.

C. HTTP Security Headers

TABLE III. SECURITY HEADER AND PURPOSE

Security Header of HTTP	Purpose of Header
X frame option	Guards against clickjacking
X XSS protection	Eases cross-site scripting threats
Strict transport security	Defends man in middle threats
X content-type Option	Guards phishing or XSS threats

D. X-Frame-Options

To sidestep clickjacking attack embeds I-frames that's in the X frame options, HTTP reply header can be used to specify and answers the browser, decides whether to allow to render a webpage in a < frame >, < iframe >, < embed >, < object > or should not be allowed. Websites can use this to evade clickjacking threats, by safeguard and confirming their content is not embedded into supplementary websites.

Header (" X frame options : sameorigin");

E. Protection Header X XSS

HTTP X XSS of protection response header is a characteristic of browsers like Internet Explorer, Chrome, and Safari that halts webpages from getting loaded when they notice reflected cross-site scripting threats.

Header (" X XSS protection : 1");

F. Security Header Strict Transport

Security header HTTP Strict Transport Security response header allows a website and communicates to browsers that content should solely be retrieved using HTTPS, not using HTTP.

Header ("Strict Transport Security: max age=31536000");

G. X Content Security Policy

An additional coating of safety is the Content Security Policy (CSP) which helps to perceive and alleviate **a few** categories of threats, counting cross-site scripting and data injection threats. Theft, site disfigurement, or spreading of malware are common reasons for these threats.

Header (" X content-type Options : nosniff ");

The proposed mechanism is implemented with the increment of the password length and password pattern policy for mitigating brute force attacks. AES encryption with our base approach uses MD5 which enhances security by storing user names in encrypted form in session and cookies and MD5 encrypts the password using hash and salt. By applying HTTP security headers for mitigating security vulnerabilities and attacks and also apply security measures using function and cookies for preventing CSRF attack.

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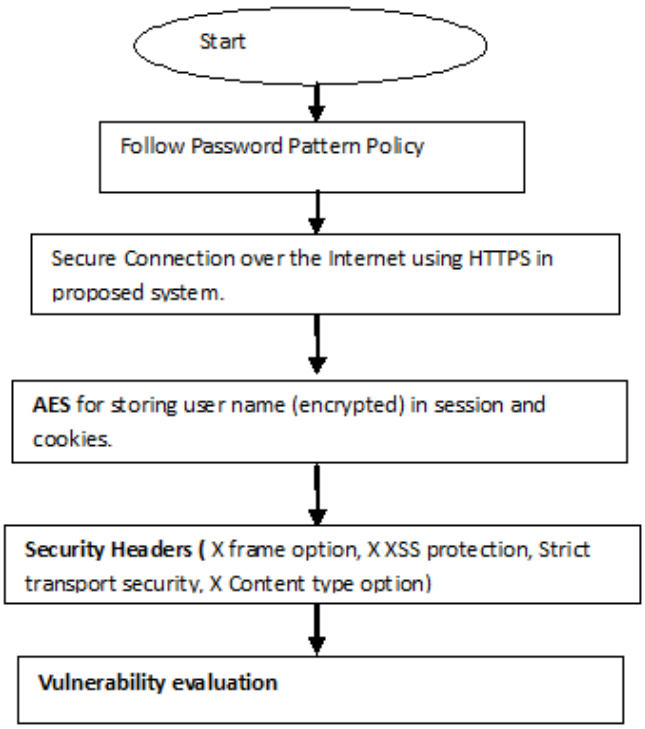

Fig. 5. Flow Chart of Proposed Methodology

Algorithm Implementation Step

Step1 Follow the password pattern policy (Increase the password & apply 1num, 1sym, 1 cap,1sml)

Step2 Apply HTTPS to secure for Encrypt User's sensitive or confidential information in e-learning.

Step3 Apply the AES algorithm for storing user names (encrypted) in session and cookies.

Step4 By applying HTTP security headers* for mitigating different security attacks and vulnerabilities*.

a) Security Headers (Xframe option, X XSS protection, Strict transport security, X content-type option)**)**

b) Vulnerability (XSS attack, clickjacking attack, man-in-middle attack, phishing).

Step5 By making the CSRF plugin and use function and tokens for avoiding CSRF attack.

$_SESSION [_'csrf'] =md5(random_string);

Step6 By vulnerability scanner check all vulnerabilities.

Step7

V. RESULTS

Fig. 6. HTTP cookies Secure or not

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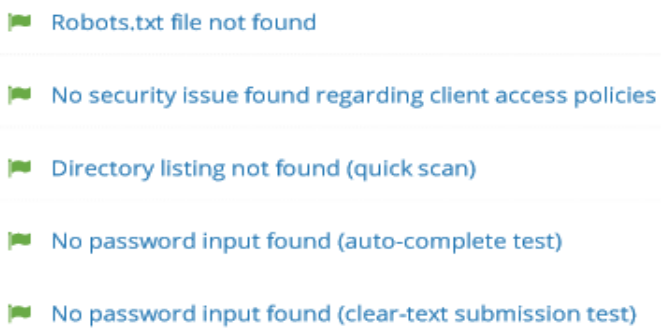
It is seen that the base approach has no secure HTTP but the proposed approach has a secure flag is to prevent cookies from being observed by unauthorized parties due to the transmission of the cookie in cleartext. In the proposed framework by setting the secure flag, the browser will prevent the transmission of a cookie over an unencrypted channel.

A. Analysis of Security Measures



(a)Base Approach

(b)Propose Approach

Fig. 7. Security measures evaluated

B. Evaluation of Both Approaches

Security Measures	Base Approach	Proposed Approach
Secure HTTP flag	No	Yes
Secure Communication	No	Yes
X-XSS-Protection	-	Yes
X-Content-Type-Options	-	Yes

Fig. 8. Comparative evaluation of both approaches.

VI. CONCLUSION

In this paper, we have shown a full study on Moodle and to get a distinct MOODLE. However, we have realized that this LMS is vulnerable to security problems such as XSS, CSRF, and brute force login threats. Moreover, we have expressed the issue using PHP codes thus demonstrating that we have to choose a platform that is appropriately implemented.

We have suggested a framework security setting that will be assisting in having an effective and more secure LMS largely concentrating on verification and data integrity problems. XSS threats can be worked out not just to prevail threats and also to mitigate varied categories of weaknesses in the eLearning setting to model a secure and safe framework. If the developer forgets to sanitize correctly just one very minor fault in a hardly used function; unfortunately, this is more than sufficient for the intruder to compromise the entire database. The security weaknesses debated in this paper are the same in any platform employed using PHP.

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VII. FUTURE SCOPE

XSS and CSRF are inheritance issues and have initiated another major application field [10] Finding the security measures against XSS, CSRF needs an hour for e-learning platforms. It is very stimulating for an enthusiastic investigator to scrutinize the connection between the security actions and the safety glitches of numerous eLearning platforms. Next to that, we can take further the work by examination and investigation of the eLearning system and also propose a more safe and secure e-learning architecture by incrementing security parameters in the system. Another forthcoming study and research route might be the orderly assessment and nomenclature of vulnerability assessment tools as per detail comprehensive guidelines.

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PREDICTING PLACEMENT OF MCA STUDENT BY IMPLEMENTING MACHINE LEARNING ALGORITHM UNDER SAVITRIBAI PHULE PUNE UNIVERSITY

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ABSTRACT
Machine learning is the training of algorithms that enhances by its own past experience and that too by its own. This is one of the fastest growing technology captured almost all domain and still one of the scope full technology.ML has many powerful algorithms which can be used different purposes based on demand of domain including Education sector. Using different ML models student's placement can be predicted those who are pursuing MCA course grounded on statistical data. Considering results of all algorithms, their p-value, testing data result, one model is wisely selected and suitable reaction can be taken at appropriate time for enhancing student's placement. Soft skill is also considered as a variable for determining the placement status.

Keyword: Machine learning, MCA Programme, Soft Skill, placement prediction

I. INTRODUCTION

Machine Learning has been successfully implemented in many sectors such as banking, insurance, retail, stock exchange and in education as well. In this paper an implementation of ML algorithm is shown for predicting result of a MCA student. Some algorithms are successfully implemented here and results are discussed. Considering this era of education where the versatility of a student plays important role in shaping his/her career. ML can be proved a dynamic tool for predicting/ forecasting result and thus can lead to proactive approach for extracting best out of a student before it's too late.

IMPORTANCE OF PREDICTION

As in above section we have seen it that Machine Learning is widening its horizon in all domains, as in education. Literal meaning of prediction says that "A prediction is a guess or a forecasting which is being made based on the available data". Data can be in form of text, picture, media, audio, clips, recordings or data received from any media. Education plays a very important role in society from the initial days, but maintaining the pace of education steady is really a big challenge especially with MCA students who are already techno savvy.

Prediction is one tool which helps teacher in enhancing their teaching skills by knowing the forecasted results well in advance. Some of the benefits of the prediction are:

a) students' prediction can reveal their conceptions

b) it plays an significant role in reasoning

c) Prediction of learning.

II. LITERATURE REVIEW

In the paper written by Radhika R Halde titled "Application of Machine Learning algorithms for betterment in Education system", 2016, IEEE, author has focused on ML algorithms for stakeholders like student, administrator and faculty members. With their experiment author proved there is association between performance of the student and their psychological state. Here the predictive models can forecast with 60-80% precision. SEM6 result had positive association with motivation, information processing, and test taking skills.

In research paper "Education 4.0 – Fostering Student's Performance with Machine Learning Methods" 2017 IEEE written by Monica Ciolacu, Ali Fallah Tehrani, Rick Beer and Heribert Popp, the key focus of author is to enhance the quality of learning. Study aims to find students at risk early in the semester and to personally motivate them from teacher with mails to improve their academic achievement. Finding of paper was that students who begin to learn earlier in the semester have a higher chance to pass the exam.[19]

Research Paper by Vladimir L. Uskov, Jeffrey P. Bakken, Ashok Shah, Adam Byerly, "Machine Learing base predictive analytics of Student Academic Performance in STEM Education:" 2019, IEEE Global Engineering Education Conference (EDUCON) has setup and benchmarking of 8 ML algorithms for predictive learning analytics, specifically, a prediction of student academic performance in a course.

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Based on obtained accuracy in ML algorithms, they have formulated a set of recommendations for faculty and practitioners in terms of selection, setup and utilization of ML algorithms in predictive analytics in STEM education.

Research Paper "Educational data mining for student placement prediction using machine learning algorithms" International Journal of Engineering & Technology, 7 (1.2) (2018) 43-46) by researcher K. Sreenivasa Rao, N. Swapna, P. Praveen Kumar focuses on final year student data of an institute to predict recruitment of students. The efficiency of each model is tested and analyzed based on the students' performance. Result obtained in each model is considered for study. Done multiple regression on dataset and analyzed which attribute of the student is more contributing towards placement of the student by eliminating and adding each of the attribute in multiple regression

III. EXISTING TRENDS OF MACHINE LEARNING WITH RESPECT TO EDUCATION SECTOR

- Artificial intelligence and Machine learning in education sector assisted the institutions to move towards the cloud technology. This can be revolutionized because it can reduce numerous functioning costs.
- As during the lock down it has been examined that all the courses around the world are running on online mode so, It facilitated in fragmenting the complete process of education online and led to easy access of the subjects through various software's.
- Virtual and Augmented Reality is the fastest developing technology which can be used implementing Machine learning. Many academies and universities are using this advanced technology to provide the real like experience in different subjects especially in science, geography and so in other subjects as well. Augmented reality and virtual reality are the technology which gives new mode of learning through almost real feeling animations, images HD movies etc. This technology has proved to be the boon for instructors, educators, teachers to achieve highly reliable subject oriented experience. It seems to be excellent pedagogy for them
- Adaptive learning techniques such as text recognition, speech recognition, are some of the best expansions that can be appreciated in the educational sector through Machine learning technology in combination with Artificial intelligence.
- Managing of the data became easier through AI and Machine learning technology. Enormous amount of data that have been saved in records and registers can be moved to smart and intelligent systems which will save, analyze and provide appropriate perceptions through latest technology.
- Online Assessments are proved to be used and accepted worldwide, and it generates huge amount to data as well, so this big data can be easily recorded, analyzed and even study pattern can be collected.
- With the advancement in technology and available online platform like moodle, google classroom, Microsoft team content sharing has become very easy. Now students can check the assignment, upload them, and access them from any part of world. Detail interactive personalized dashboard is also available which helped the teachers to assess the performance of the student appropriately.[20]
- Differently-abled students can get opportunity to study the course via speech recognition AI and ML technology as this technology has become a very good source to get education. Toughest topics can be easily and perfectly taught to specially-abled students through, VR technology and helped them to overcome their limitation.
- It provides the growth of AI technique equipped coaches, virtual educators, smart teachers, websites with content sharing and interactive dashboards and etc.
- ICT enabled classroom, features extraction of student while learning, books in form of e resources, online lecture with all facilities of assessment cloud-based content, and many more were developed due to the deployment of AI and Machine learning in the educational field.[20]

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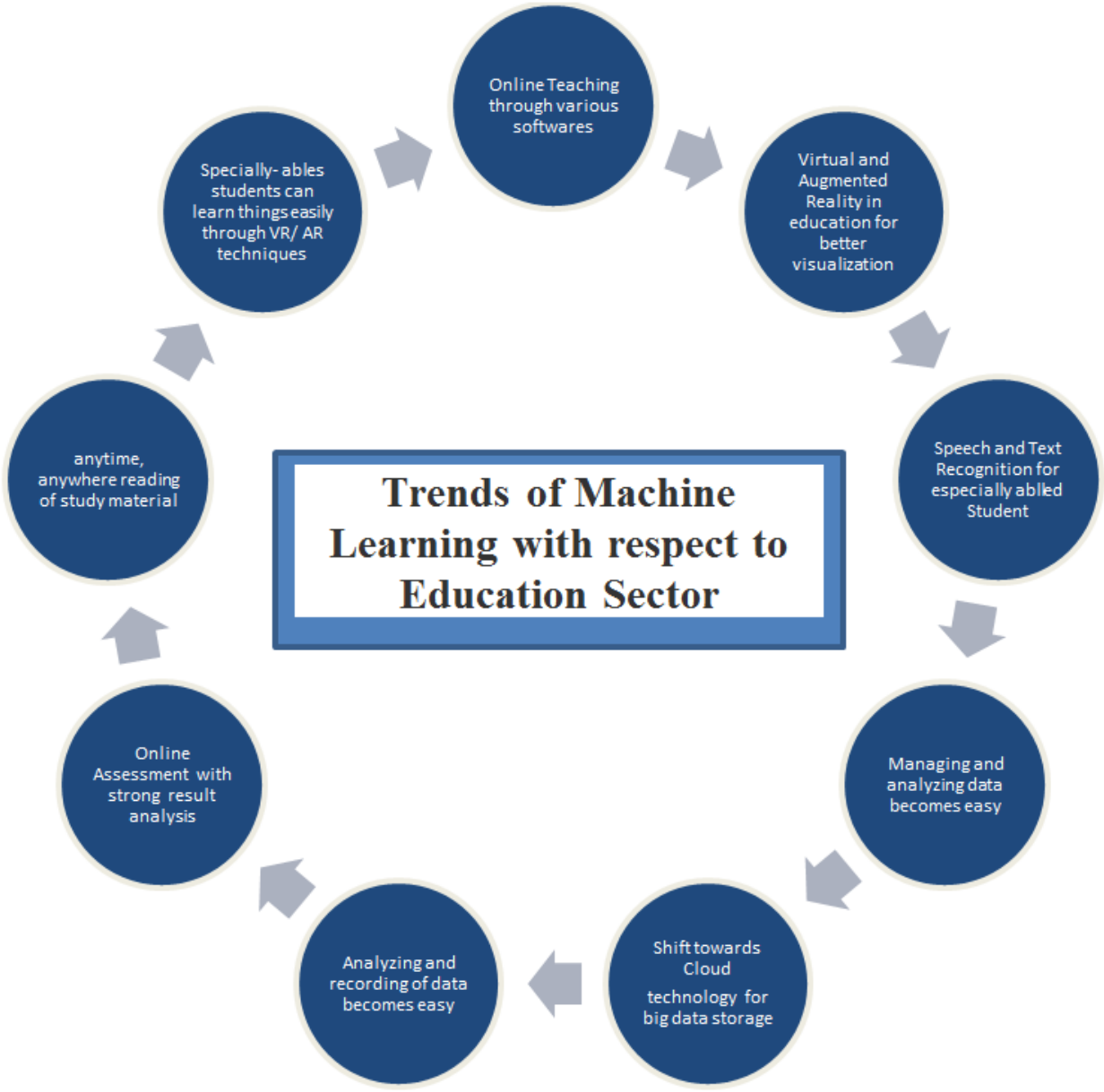

Figure 1: Trends of Machine Learning with respect to Education sector

IV. PROBLEM STATEMENT

Machine Learning technology is successfully adopted in various manufacturing sector, Medical field, Insurance, customer care, transportation, e-commerce, automobile for analytics and proved useful in the respective areas. However in academics the machine learning is not been much implemented in MCA institutes.

Hence the aim of study is "Will Machine Learning techniques are beneficial to improve student's placement in MCA institutes"

SIGNIFICANCE OF THE STUDY

Machine learning algorithms are further explored and apply them to predict the students' academic result in upcoming semester, which will help in giving early predictions about student's placement and results their after.

The ML forecasting/ predictions will help the institutes to take timely corrective actions, to mentor and to guide the students in improving their placement before actual placement drive.

Students those who are weak in soft skill can be given extra training, so that their weakness can be overcome during interview and it will strengthen their soft skills.

V. OBJECTIVE AND HYPOTHESIS

a) To analyze and predict the placement of students using Machine Learning techniques.

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b) To find out the effectiveness of Machine Learning in predicting the placement status of the students before actual placement drive.

Based on the data I have collected, I am able to predict following thing:

Students scoring higher percentage in MCA are more likely to get placed.

H0: ML algorithm cannot help in predicting student placement.

H1: ML algorithm can help in predicting student placement.

H0: Soft skill does not have any impact on placement result

H1: Soft skill has impact on placement result.

Sampling Methods: Stratified Sampling & Convenience Sampling

Data Collection: As discussed, in sampling method, stratified and convenience sampling technique is used and for this research work secondary data has been collected from authorities of college under Savitribai Phule Pune University. Since privacy is associated with the data the availability of data was a challenge.

Population: All the MCA pursuing students under Savitribai Phule Pune University makes the population.

Sampling Methods: Stratified Sampling & Convenience Sampling

It contains passing and placement records of one batch of MCA student along with soft skill score/ grade. The parameters considered for prediction are score a student has secured in his/her MCA course, beginning from semester I to semester V along with Soft skill score.

•Data that has been collected is in excel sheet. Data is collected from training and placement department of an institute

- Data that has been collected is in excel sheet.
- It contains 53 observations and 67 variables.
- It contains 14 variables having categorial type data whereas 53 variables are of numeric type.

Data Analysis Tool

For analysis of Data R programming is taken as a tool. There are many reasons for selecting R. Some of them are listed as follows:

a) R is open source and freely available software.

b) R is one of the simple and easy tool for Statistical Data Analysis.

c) R has Sturdy User Community from where getting assistance is easy.

d) It is extremely extensible, flexible and high level statistical methods are present in R.

e) Statistical hypothesis testing (t test, analysis of variance, chi-square test)is also available

f) Models like ANN, DT, Linear Regression, Logistic and many more can be implemented as R support packages fro these models.

g) Graph quality and data analysis reports are very fine

VI. MACHINE LEARNING ALGORITHM'S IMPLEMENTATION ON STUDENT DATA SET:
Author states that machine learning empowers the computer with the ability to learn without intervention of human programming [15].

There are many areas in education sector where ML is tested and partially implemented as well. Predictive analytics is proved to be very helpful in prediction result, placement, retention, failure detection behavior and many more characteristics of student.

In this research paper student data set is used

A. LR (Logistic Regression)
Logistic regression model was implemented for predicted the MCA student's placement. The algorithm was implemented in R open source tool. The probability predicted by the logistic classifier predicted of the student's

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placement MCA score and Gradient descent algorithm was learned, which were significant to compute the probability of student getting good score.

The collected data was divided into 80:20 ratios for training and testing the model. The model was trained on 80% of data, testing of model is done on 20 % of data. The result received by implementing logistic regression model was not found satisfactory and this was tested on testing data. Summary of the generalized linear model and the p-values is 0.0410 which is significantly low. This was proved by implementing confusion matrix.

For analyzing soft skill role in placement of MCA student Logistic Regression is implemented. The results are shown below. AIC value is 43.609, The AIC is the "Akaike information criterion" and it's an estimate of how well our model is describing the patterns in your data. Fisher Scoring Iterations is 4 and it means, the number of iterations it takes to fit the model. The logistic regression uses an iterative maximum likelihood algorithm to fit the data.

```
Call:
glm(formula = SS ~ PlacedYN, family = "binomial", data = training)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-1.9103   0.5931   0.5931   0.5931   0.8446

Coefficients:
            Estimate Std. Error z value Pr(>|z|)
(Intercept)   0.8473     0.6901   1.228    0.220
PlacedYN      0.8014     0.8454   0.948    0.343

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 40.472  on 40  degrees of freedom
Residual deviance: 39.609  on 39  degrees of freedom
  (13 observations deleted due to missingness)
AIC: 43.609

Number of Fisher Scoring iterations: 4
```

Fig 2: Output of glm algorithm

B. DT (Decision Tree)

Decision Tree (DT) is one of the extensively used Machine Learning algorithms in classification.

DT is used to take a decision that a specific value can be accepted or rejected. It gives the tree in form of IF-Then rules for giving values current state or forecasting state. A smart and intelligent system was build using Decision Tree Model. p-value received after implementing the DT was significantly low and this was tested successfully on testing data. Figure 3 shows the tree received after implementing DT. p-value received after implementing decision tree is 0.1074

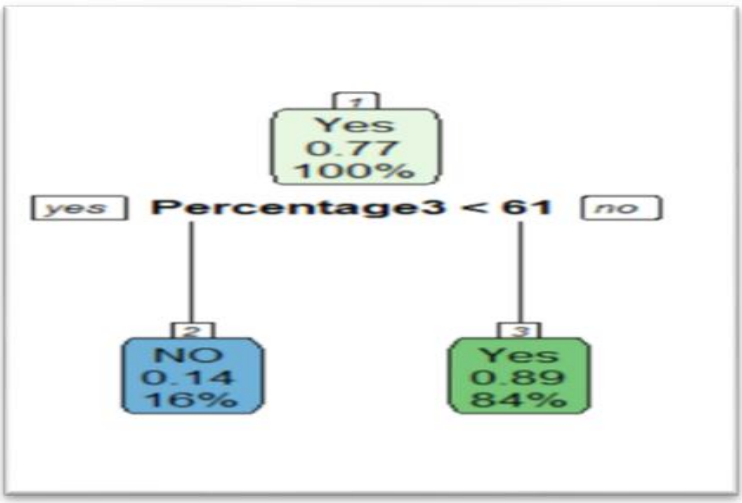

Fig 3-: Decision Tree

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C. Linear Regression

Linear regression is an algorithm in Machine Learning which is used to calculate relationship between a dependent and independent variable or we can say target variable and other forecaster variable using a linear equation. This can be represented by an equation in the following form:

$Y=\alpha + \beta*X$ (1)

The line of regression using the least squares was applied to analyze the relationship between student's MCA All semester score and placement. The study was conducted on 53 students where there was one target variable of MCA Score and one forecaster variable of placement status i.e; placed or not placed.

The disadvantage of using linear regression was that all the data points are not covered while plotting the linear model. But here after plotting the linear regression line, the line is linearly touches maximum data points. And hence the model can be accepted. This leads to accuracy in prediction and the p-value received after implementing linear model is also low and acceptable, so it increases the accuracy of prediction. So this model can be accepted.

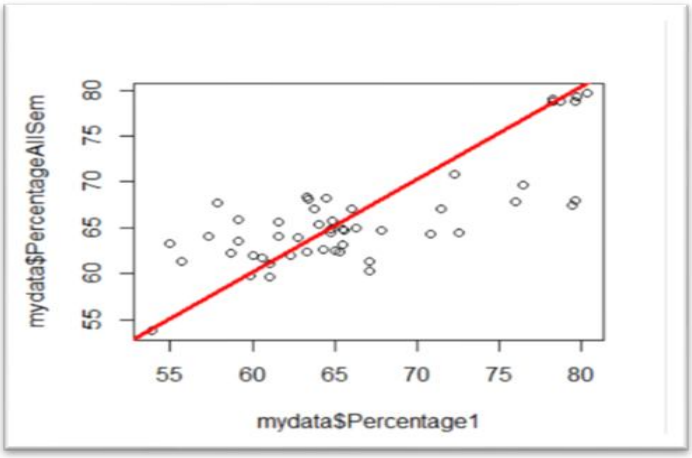

Fig 4: plotting of linear regression line

Along with percentage of student, it has been tested that soft skill subject score is also important factor for placement of a student. Soft skill subject includes communication skill, teaching body language to student, interview etiquettes and many more.

For placement many factors are important, some of these are MCA score, soft skill, aptitude, Technical skill (which can be assumed to be good if student have good MCA score). Here in this paper only soft skill and MCA score is considered for predicting the placement of a student.

Soft skill is factor type variable. It has values as Excellent, Very Good, Good, Average and Poor. Analysis is done to check whether Soft skill has any significant role in placement of student or not. And based on the result of analysis it has been identified that student having Excellent and Very Good as their soft skill score are more likely to get placed.

```
Call:
lm(formula = mydata$Percentage1 ~ mydata$PercentageAllSem)

Residuals:
    Min      1Q  Median      3Q     Max
-10.183  -2.240  -0.119   1.363  11.761

Coefficients:
                        Estimate Std. Error t value Pr(>|t|)
(Intercept)              -0.4784     6.9870  -0.068    0.946
mydata$PercentageAllSem   1.0111     0.1061   9.533 6.43e-13 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 4.577 on 51 degrees of freedom
Multiple R-squared:  0.6405,    Adjusted R-squared:  0.6335
F-statistic: 90.87 on 1 and 51 DF,  p-value: 6.43e-13
```

Fig 5: Output of Linear Regression

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p value is used to check statistical significance:

Summary given in the above figure states a number of things.

One of the important thing in the model is p-Value and the p-Value of individual predictor variables (value which is given in extreme right column under Coefficients). p-value is considered to be vital for the reason that, a linear model is said to be statistically significant only when both these p-Values are less than the pre-determined statistical significance level of 0.05. This can visually interpreted by the significance stars at the end of the row against each X variable. The more the stars beside the variables p-Value, the more significant the variable.

DATA COLLECTION AND GATHERING

Real time data was collected for carrying out this research work. Data of 53 students was collected. The data consisted of name of student, score of all the subjects from semester I to semester V, placement status i.e; placed or not along with package received in placement percentage of all semesters and soft skill score. The data was compiled in excel file.

VII. METHODOLOGY AND EXPERIMENTAL RESULT

The study was carried out to find out the relationship between the MCA all semester score, percentage and soft skill score. After implementing different algorithms, the accuracy of the model is checked.

- From the analysis done on above mentioned algorithm it has been found that Linear Regression Model is fits to the data.
- And it can be concluded that student's performance is linearly related to the placement of MCA student.

The results that has achieved from earlier prediction can motivate students, particularly for the students who are able to get good score and prepare well for placement. Their performance can be predicted prior to actual exam, and all alternative ways can be explore to improve their learning approaches and likewise it can help the teachers to prepare strategy and implement on slow performers and thus students can improve their performance and placement. The teacher/college can make use of the simple model for prediction. Based on the results of prediction, the students can prepare his/her plan. Good performers as per prediction model can even become university toper and can give share their experience and knowledge with slow learners.

There can be two possibilities of applying predictive algorithm it has advantages and disadvantages. The prediction shows significant role in development of a student but if accuracy is low or not correct it may lead to inappropriate direction and unsuitable judgments which de-motivate the students and affect their growth. The limitations can occur in the process of gathering of data, building models, getting proper input and generating the proper output in utmost accuracy.

VIII. CONCLUSION

This paper gives an implementation view about the Machine Learning Techniques used in Education sector and the scope where it can be used more efficiently used. Education is the very important part of every individual and it becomes the responsibility of every educator to maintain the teaching learning process up to the highest standards, where students can get benefits in all aspects. The foremost objective of this paper is to understand the problem being faced in education sector and the possible solution by machine learning techniques. This paper gives prediction of placement of a student based on two important variable these are MCA score and Soft skill score/ grade.

Machine Learning can be successfully used in Education institutes. This paper highlights the use of different Machine Learning algorithms used for benefit students, faculty and administrators. The study also demonstrates that there is correlation between score of MCA score and placement. And a positive correlation is found between soft skill and placement as well. Machine Learning has been proven to be beneficial tool to explore opportunities and improvise the hidden loop holes in education system

FUTURE ENHANCEMENT

Data set contain many fields, huge hidden facts can be extracted from the data set. Other Machine Learning algorithms can also be tested for better placement prediction.

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21. *Stefan A. D. Popenici1* and Sharon Kerr2* "Exploring the impact of artificial intelligence on teaching and learning in higher education"

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Bateson, C. D.,(2006), 'Doing Business after the Fall: The Virtue of Moral Hypocrisy', Journal of Business Ethics, 66: 321 – 335

- **Multiple author journal article:**

Khan, M. R., Islam, A. F. M. M., & Das, D. (1886). A Factor Analytic Study on the Validity of a Union Commitment Scale. *Journal of Applied Psychology*, *12*(1), 129-136.

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Sillick, T. J., & Schutte, N. S. (2006). Emotional intelligence and self-esteem mediate between perceived early parental love and adult happiness. *E-Journal of Applied Psychology, 2*(2), 38-48. Retrieved from http://ojs.lib.swin.edu.au/index.php/ejap

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Uddin, K. (2000). A Study of Corporate Governance in a Developing Country: A Case of Bangladesh (Unpublished Dissertation). Lingnan University, Hong Kong.

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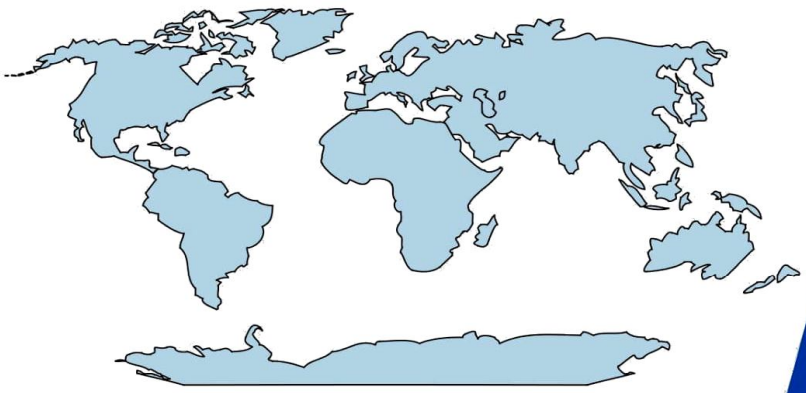

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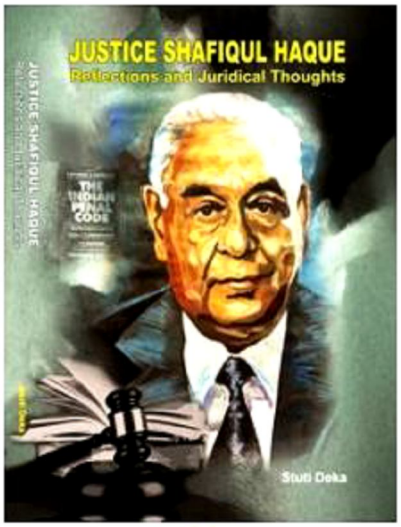

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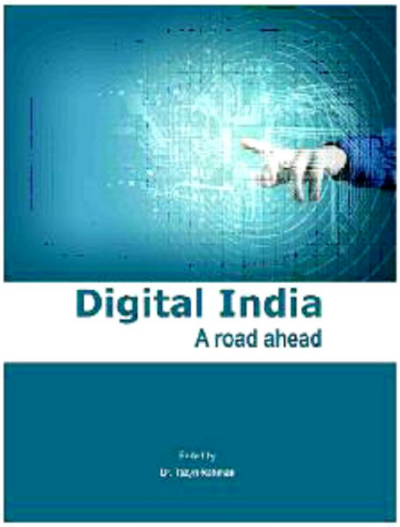

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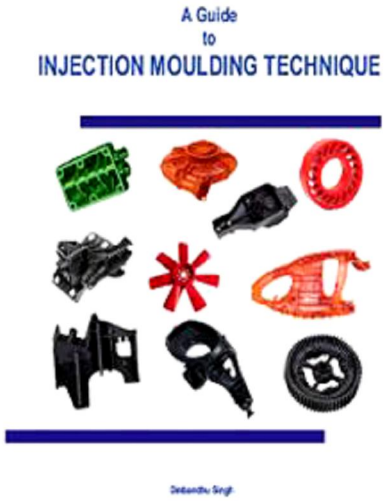

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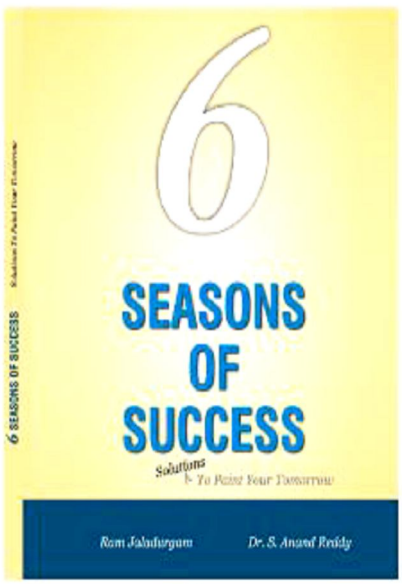

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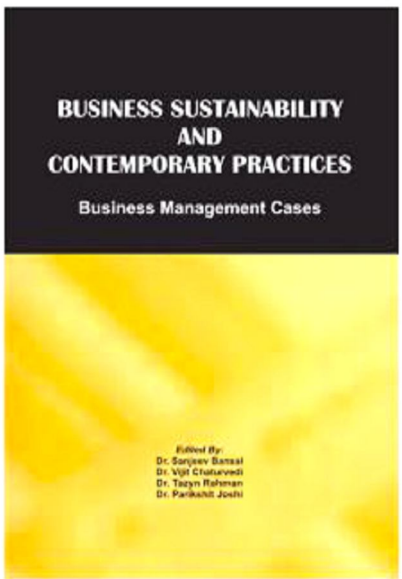

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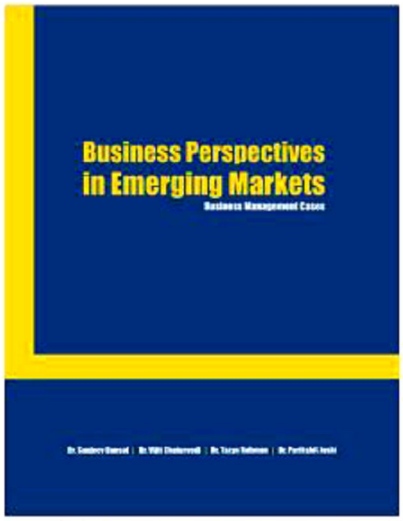

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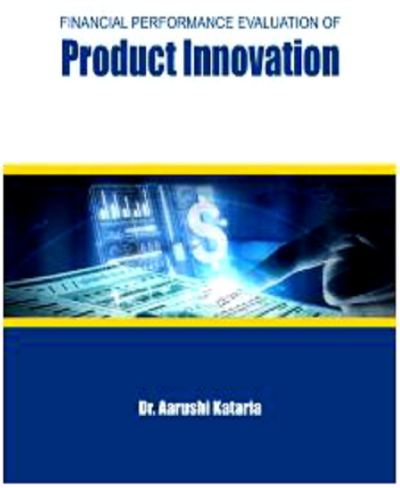

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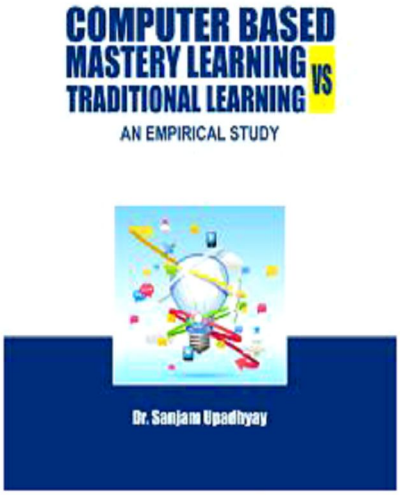

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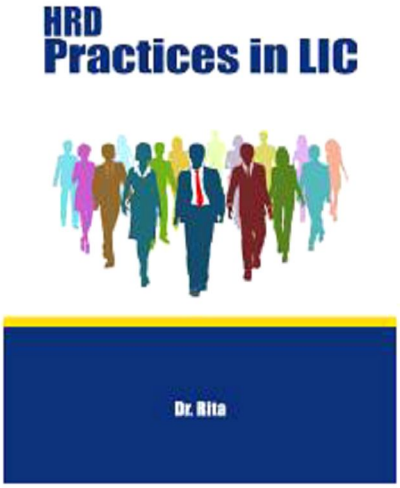

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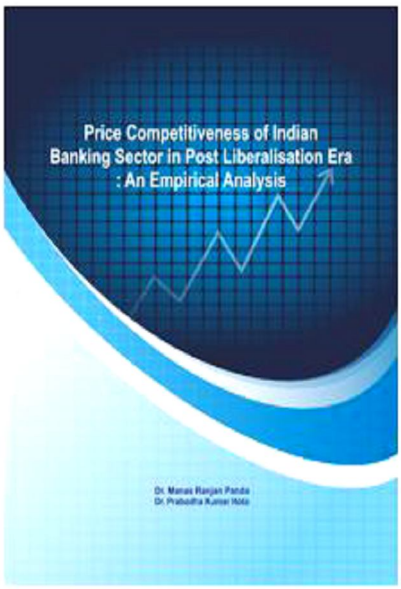

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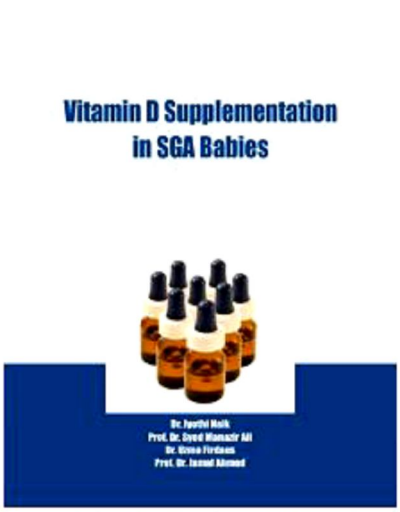

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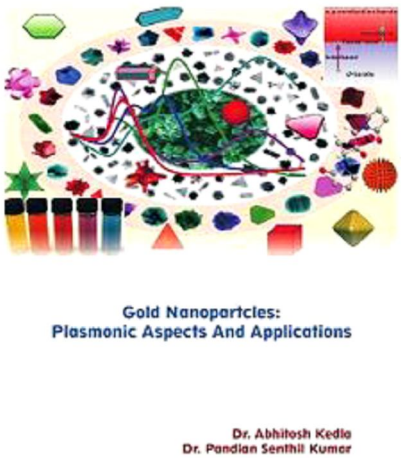

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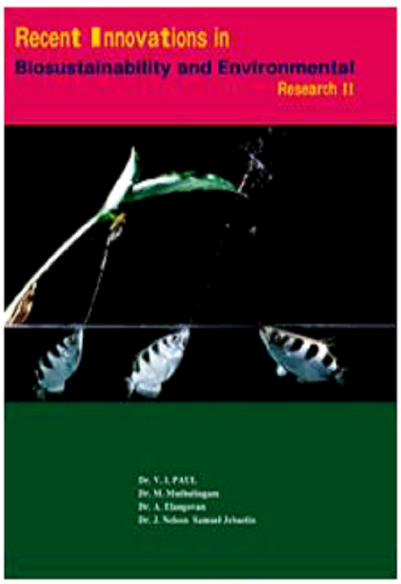

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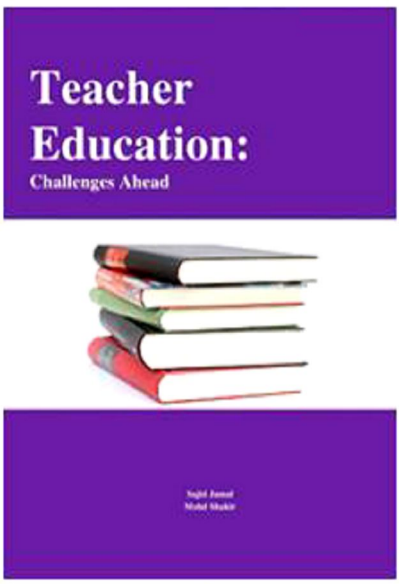

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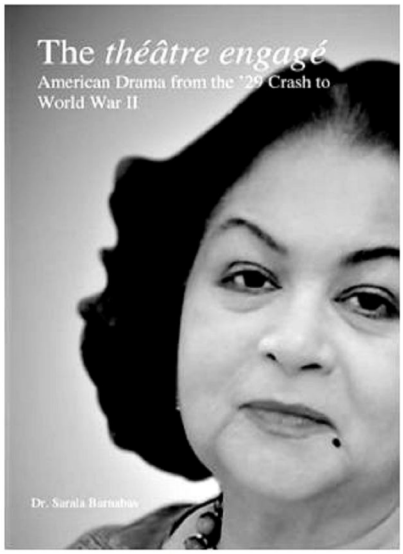

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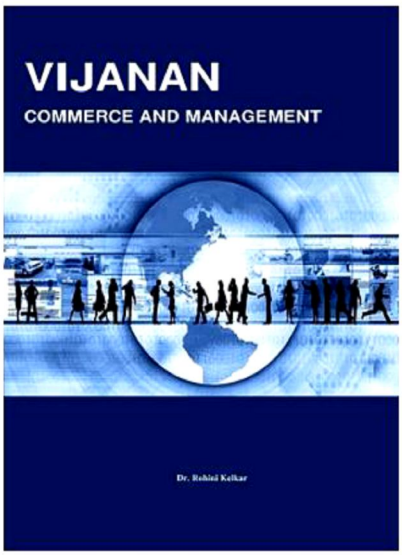

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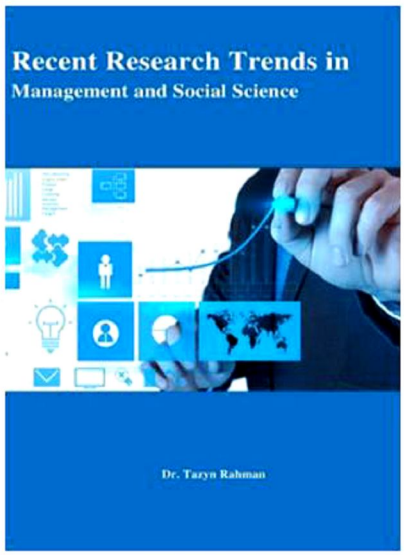

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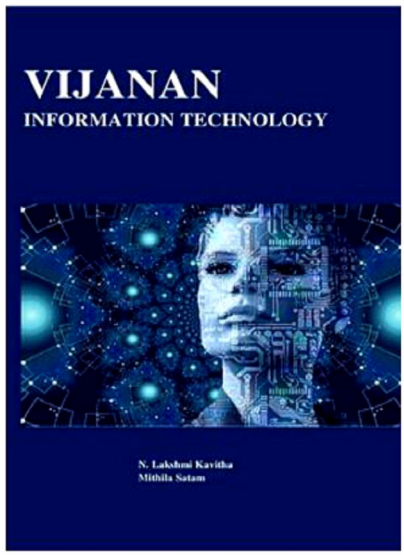

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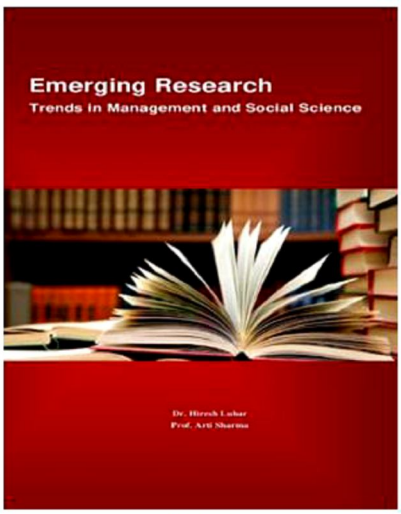

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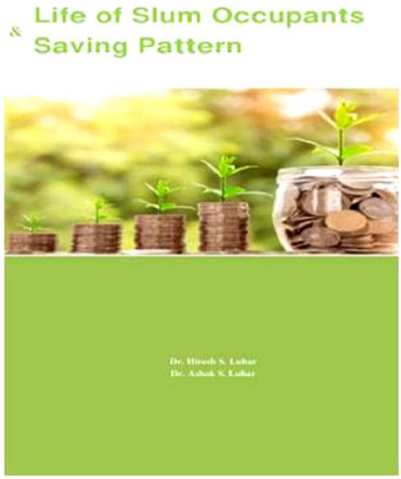

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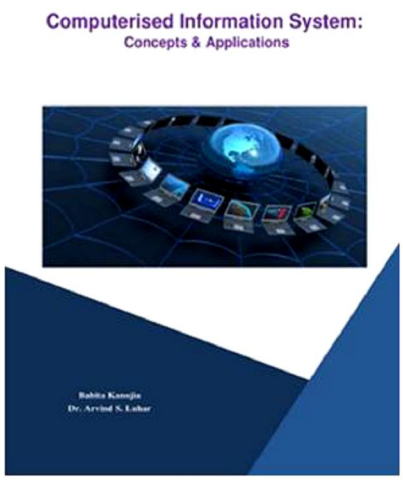

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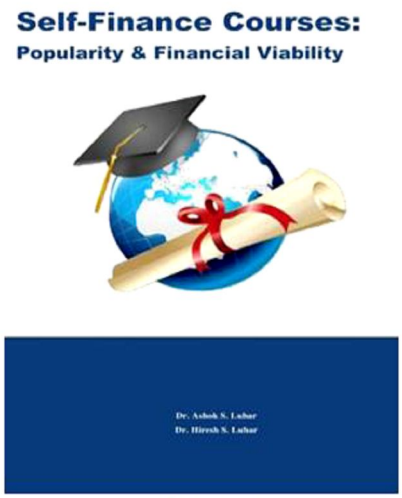

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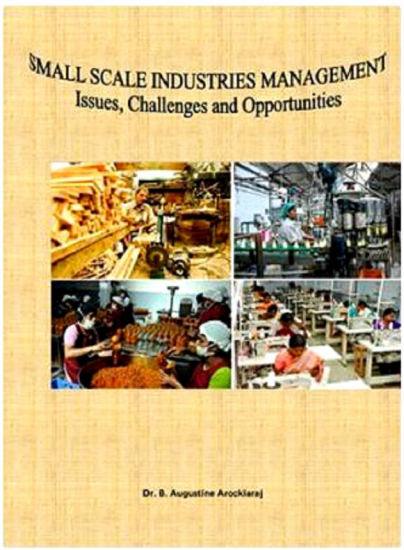

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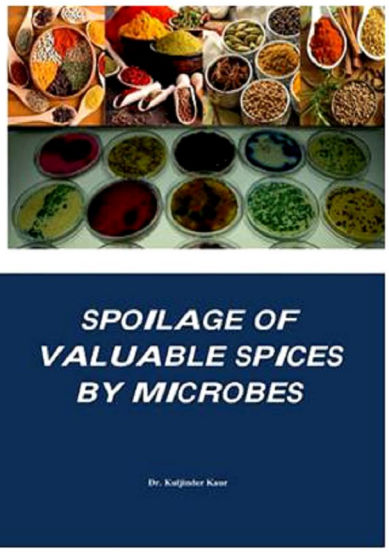

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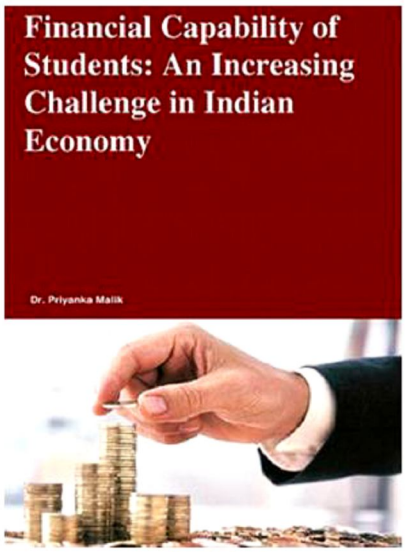

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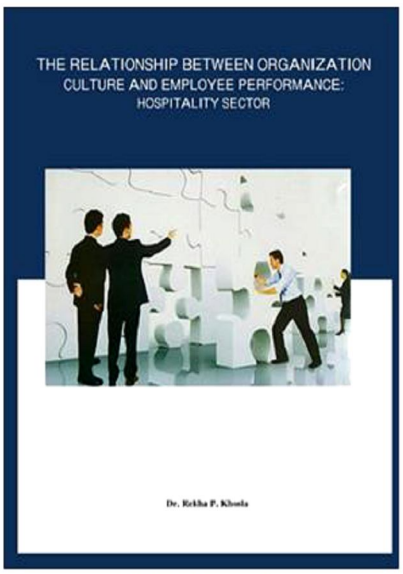

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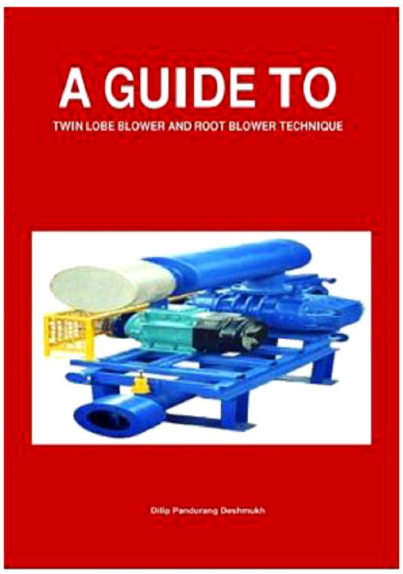

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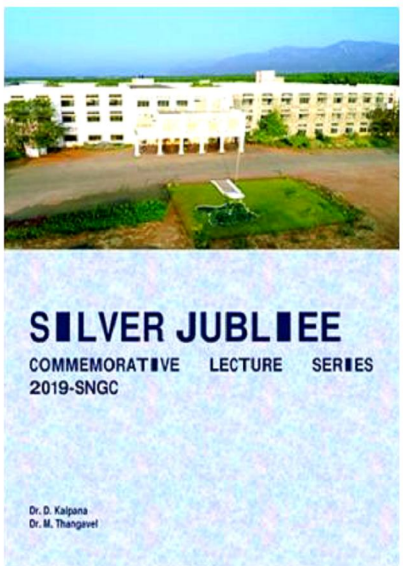

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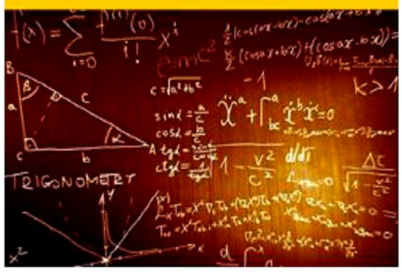

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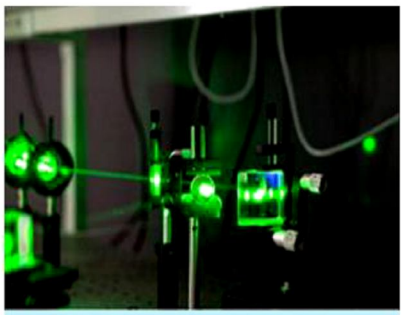

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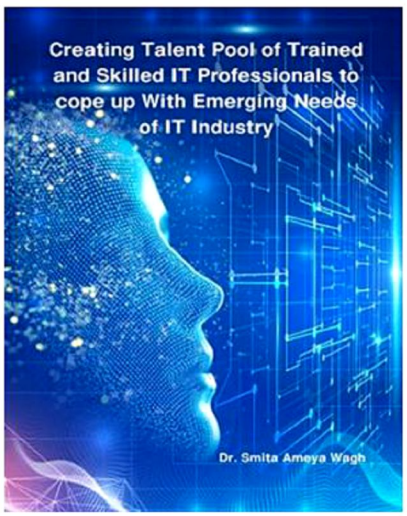

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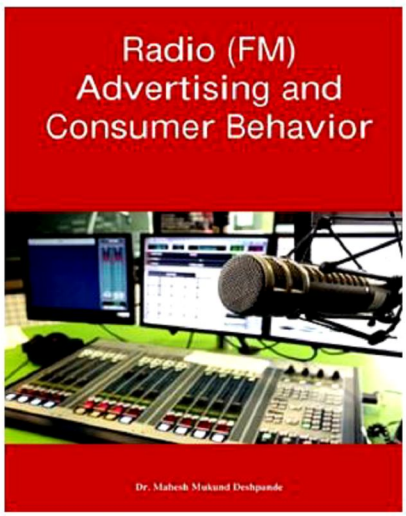

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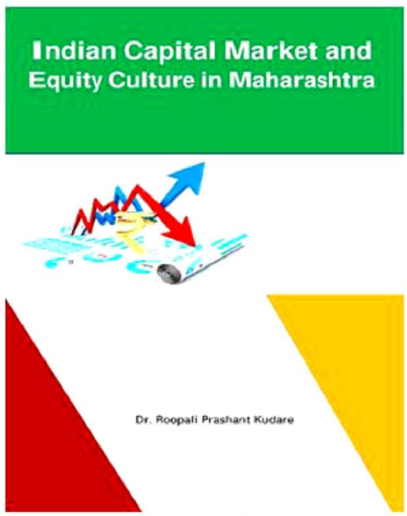

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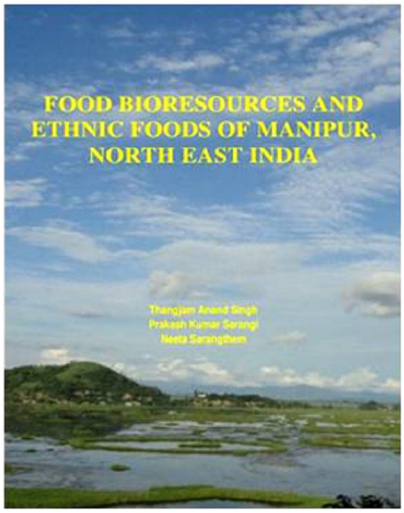

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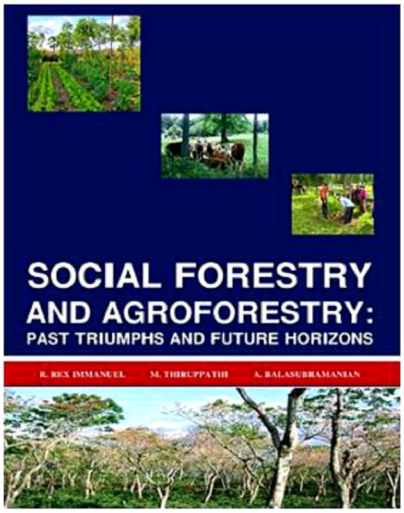

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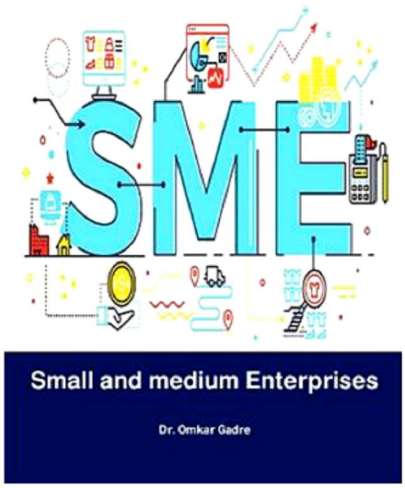

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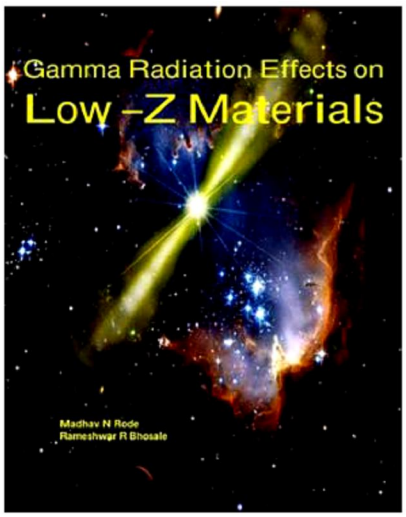

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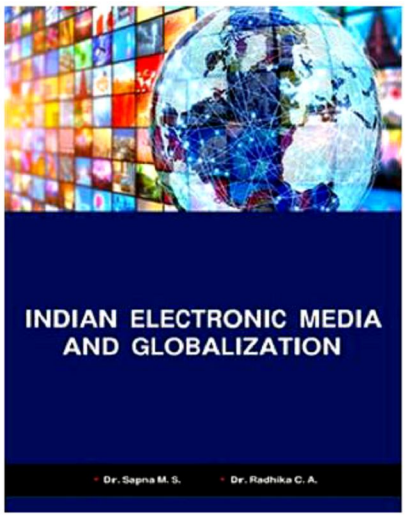

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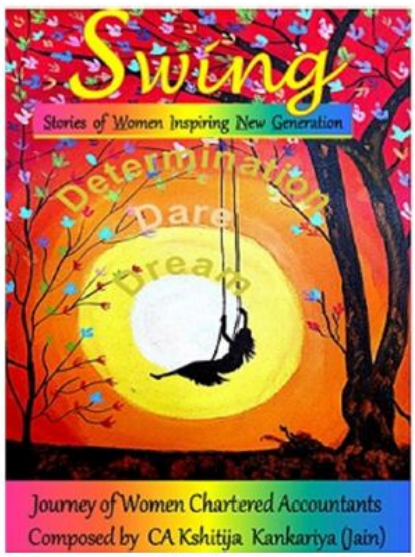

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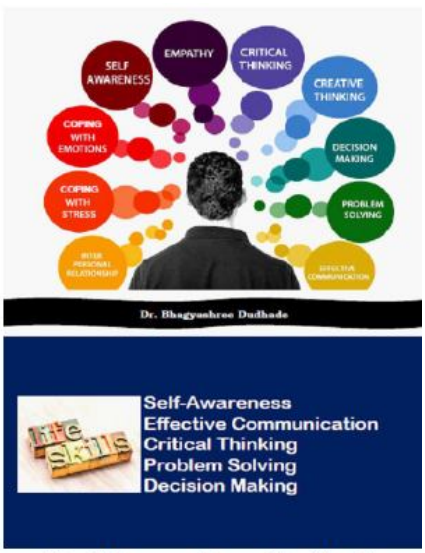

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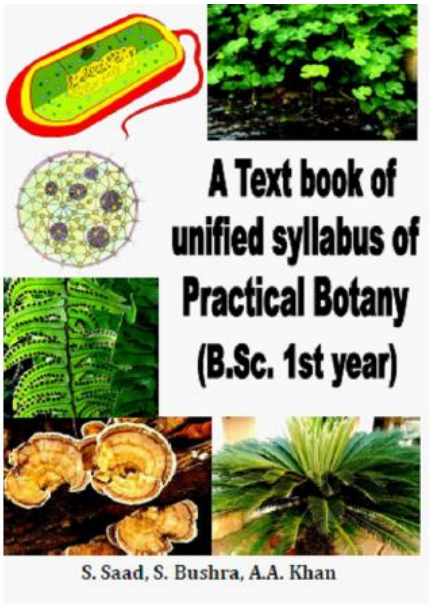

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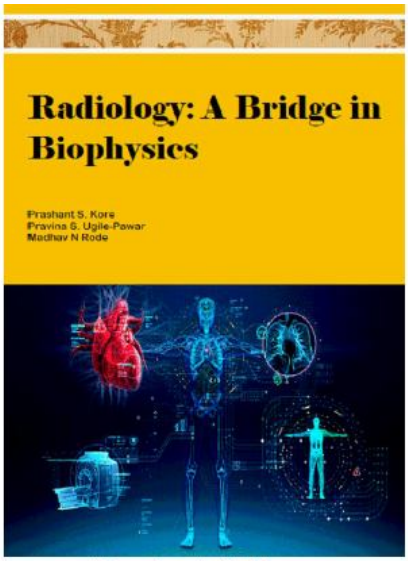

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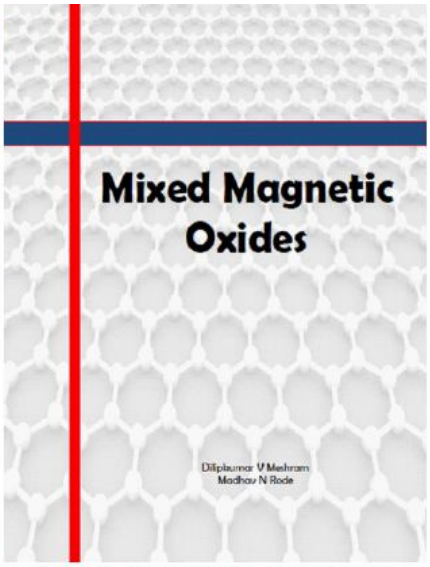

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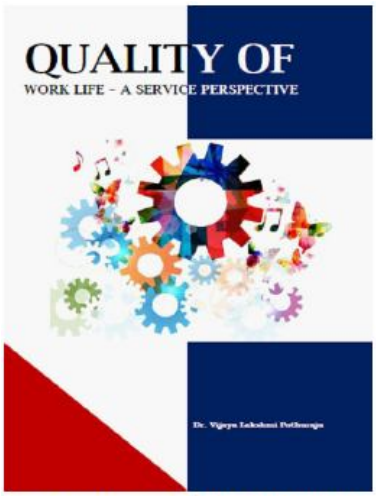

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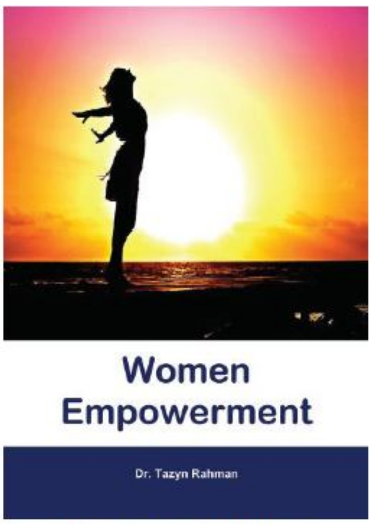

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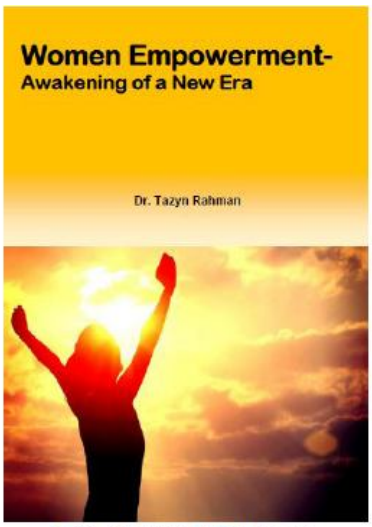

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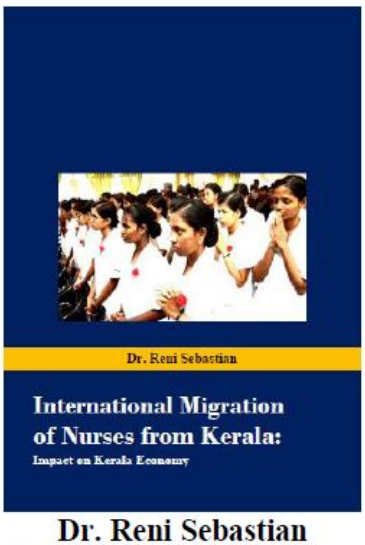

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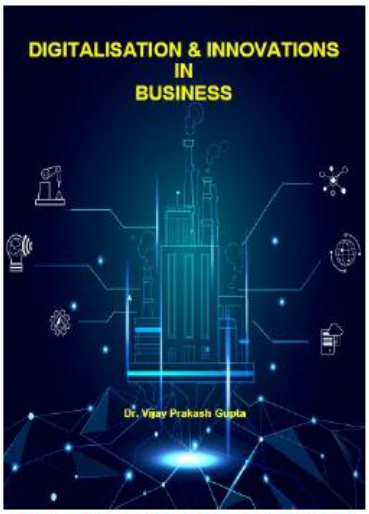

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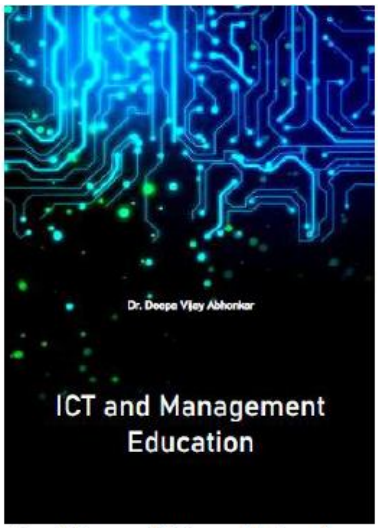

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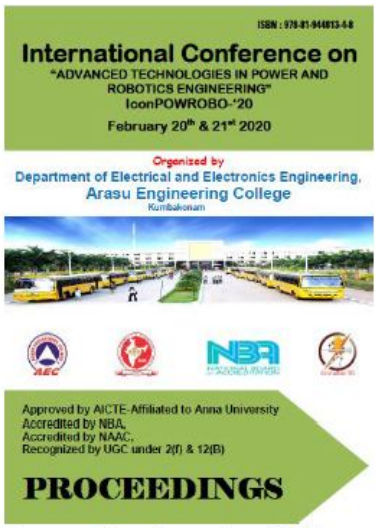

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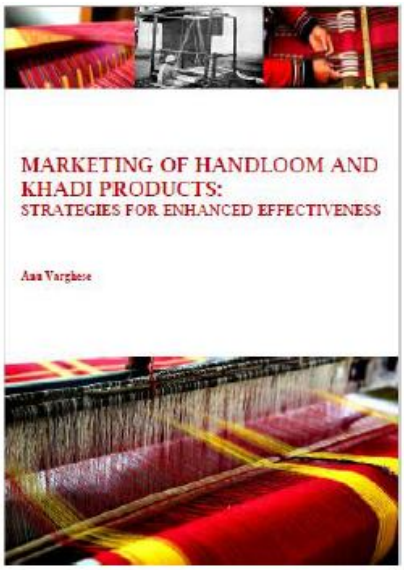

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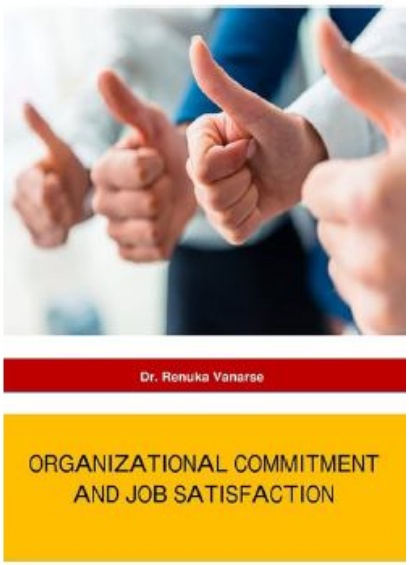

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