AI FOR SUSTAINABLE DEVELOPMENT GOALS

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ABSTRACT

Artificial Intelligence (AI) has emerged as a transformative technology with significant potential to accelerate progress toward the United Nations' Sustainable Development Goals (SDGs). This research paper explores the role of AI-driven solutions in addressing critical global challenges such as poverty alleviation, quality education, healthcare accessibility, climate change mitigation, sustainable agriculture, and smart infrastructure development. By leveraging machine learning, data analytics, computer vision, and intelligent automation, AI enables data-driven decision-making, efficient resource utilization, and predictive insights across multiple sectors. The study examines existing AI applications aligned with various SDGs, highlights their benefits, and analyzes real- world use cases demonstrating measurable social, economic, and environmental impact. Additionally, the paper discusses key challenges associated with AI adoption, including data privacy, algorithmic bias, ethical concerns, energy consumption, and the digital divide. The research emphasizes the importance of responsible AI development, inclusive policies, and cross- sector collaboration to ensure sustainable and equitable outcomes. The findings suggest that when ethically designed and effectively governed, AI can act as a powerful enabler for sustainable development, supporting long-term global resilience and inclusive growth.

Keywords: Artificial Intelligence, Sustainable Development Goals (SDGs), Machine Learning, Data Analytics, Smart Infrastructure, Climate Change, Healthcare, Education, Sustainable Agriculture, Ethical AI.

I. INTRODUCTION

The Sustainable Development Goals (SDGs), adopted by the United Nations in 2015, represent a global framework aimed at addressing pressing social, economic, and environmental challenges by 2030. These 17 interconnected goals focus on eradicating poverty, improving healthcare and education, ensuring environmental sustainability, promoting economic growth, and fostering inclusive societies. Achieving these ambitious goals requires innovative approaches, advanced technologies, and collaborative efforts across governments, industries, and academia.

Artificial Intelligence (AI) has emerged as a key enabling technology with the potential to significantly accelerate progress toward sustainable development. AI refers to the simulation of human intelligence in machines capable of learning from data, recognizing patterns, making predictions, and supporting decision-making processes. Recent advancements in machine learning, deep learning, natural language processing, and computer vision have expanded the scope of AI applications across various domains, including healthcare, agriculture, energy management, transportation, and urban planning

II. LITERATURE REVIEW

Artificial Intelligence (AI) has increasingly attracted scholarly attention as a transformative tool for addressing complex global challenges outlined by the United Nations Sustainable Development Goals (SDGs). Existing research provides evidence of AI's potential to significantly contribute to sustainable development across multiple domains, from healthcare and agriculture to climate action and education. However, these studies also highlight a range of technical, ethical, and implementation challenges that must be addressed for AI to achieve its full potential

AI in Poverty Alleviation and Economic Growth

Several studies have emphasized AI's role in promoting economic inclusion and reducing poverty. AI-driven analytics enable governments and organizations to identify vulnerable populations, optimize social welfare programs, and facilitate access to financial services through credit scoring and microfinance platforms (Smith & Johnson, 2020). Machine learning models have been used to analyze large datasets and predict unemployment trends, informing targeted policy interventions. However, research also warns that without inclusive access to technology, AI could deepen existing socioeconomic disparities (Kumar et al., 2021).

III. RESEARCH METHODOLOGY

This study adopts a descriptive and qualitative research approach based on secondary data analysis. Relevant information is collected from peer-reviewed journals, research papers, United Nations reports, and credible online sources related to Artificial Intelligence and Sustainable Development Goals (SDGs). The collected data is analyzed using thematic analysis to identify key AI applications, benefits, and challenges across different SDGs. The study emphasizes ethical considerations such as data privacy and bias and is limited by reliance on existing literature.

- Descriptive and qualitative research approach

- Based on secondary data collection

- Data sources include journals, research papers, UN reports, and credible websites

- Thematic analysis used to study AI applications across SDGs

- Focus on benefits, challenges, and ethical issues of AI

- Study limited to available literature

IV. RESULTS AND DISCUSSION

The analysis of existing literature reveals that Artificial Intelligence (AI) plays a significant role in supporting the achievement of the Sustainable Development Goals (SDGs) across multiple sectors. The findings indicate that AI technologies are most actively applied in healthcare, education, agriculture, climate action, and smart infrastructure, where data-driven decision-making is critical.

No Poverty

The review of existing studies indicates that Artificial Intelligence (AI) has a significant role in supporting Sustainable Development Goal 1 (No Poverty) by enabling data-driven poverty identification and targeted policy interventions. The results show that AI-based data analytics and machine learning models are widely used to analyze large socio-economic datasets, helping governments and organizations identify vulnerable populations more accurately than traditional methods.

V. CONCLUSION

This research highlights the significant potential of Artificial Intelligence (AI) in advancing the United Nations Sustainable Development Goals (SDGs). AI-driven technologies enable data-driven decision-making, efficient resource management, and innovative solutions across critical sectors such as healthcare, education, agriculture, poverty reduction, and climate action. By improving accuracy, accessibility, and efficiency, AI contributes to inclusive economic growth and environmental sustainability.

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