Indigenous Innovations for Sustainable Future of India

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TWENTYFIRST CENTURY PUBLICATIONS
PATIALA

First edition published in 2025 by

TWENTYFIRST CENTURY PUBLICATIONS

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ISBN: 978-93-6586-800-5

Price: 500/-

Laser Type Setting

Sandeep Kaur

Printed in India at

Twentyfirst Century Printing Press Patiala

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CONTRIBUTION OF AI IN ATTAINING SDG 2030

Nisha Arora* & Pooja**

Abstract

This research explores the diverse contributions of Artificial Intelligence (AI) to achieving the UN's Sustainable Development Goals (SDGs) by 2030. It examines AI applications across key sectors like healthcare, education, agriculture, and environment, showcasing its potential to accelerate progress towards specific SDG targets.The research aims to provide a comprehensive overview of AI's potential and challenges in the context of the SDGs.

Introduction

The United Nations' Sustainable Development Goals (SDGs), particularly the ambitious Agenda 2030, represent a global commitment to addressing vital social, economic, and environmental challenges. Achieving these goals requires innovative solutions and transformative approaches. Artificial intelligence (AI), with its remarkable ability to analyze data, automate processes, and generate insights, has emerged as a powerful tool with the potential to significantly contribute to the attainment of the SDGs.This research explores the multifaceted contributions of AI in achieving the SDG 2030. It delves into the diverse applications of AI across various sectors, including healthcare, education, agriculture, and environmental conservation, examining how AI-powered solutions can accelerate progress towards specific goals. The study also investigates the challenges and ethical considerations associated with AI implementation, emphasizing the importance of responsible and inclusive AI development. By examining the potential of AI, this research aims to provide valuable insights into the role of AI in shaping a sustainable and equitable future for all. The research paper explores how AI applications can accelerate progress across diverse sectors crucial for SDG achievement,

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including healthcare (e.g., disease diagnosis, drug discovery), education (e.g., personalized learning, accessible education), agriculture (e.g., precision farming, crop yield prediction), and environmental conservation (e.g., climate modeling, biodiversity monitoring). The figure 1 highlights the central role of AI in achieving the goals set for sustainable development.

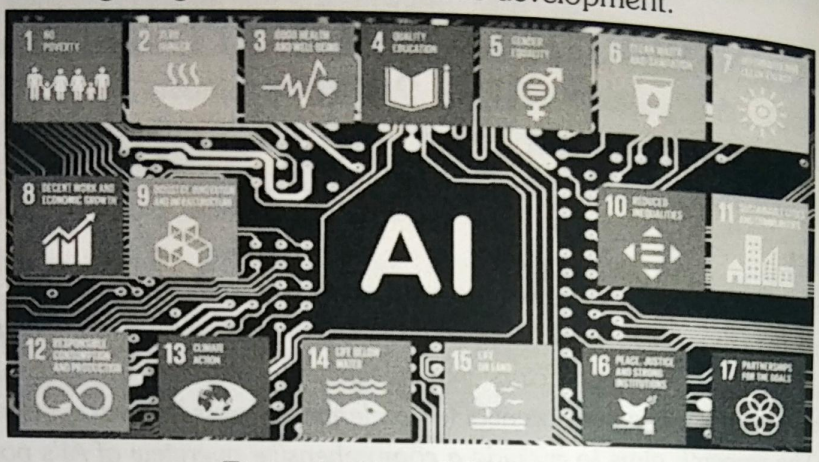

Figure1: AI and SDG 2030

Sustainable Development Goals (SDG2030)

Fifty years of discussion and agreement on sustainable development led to SDGs.At the 2015 UN Sustainable Development Summit, world leaders adopted the 2030 Agenda for Sustainable Development, which they describe as "a plan of action for people, planet, and prosperity," in an effort to steer the globe toward a more resilient and sustainable future.This universal, integrated, and transformative agenda is based on 17 SDGs, 169 targets, and 232 indicators (United Nations, 2022a). Figure.2 depicts all 17 SDGs organized into three pillars: environmental, social, and economic.

Environmental Pillar		Social Pillar		Economic Pillar	
6. Clean Water & Sanitation	7. Affordable & Clean Energy	4. Quality Education	5. Gender Equality	1. No Poverty	2. Zero Hunger
12. Responsible Consumption & Production	13. Climate Action	10. Reduced Inequalities	11. Sustainable Cities and Communities	3. Good Health & Well-being	8. Decent Work & Economic Growth
14. Life Below Water	15. Life on Land	16. Peace, Justice & Strong Institutions	17. Partnerships for the Goals	9. Industry, Innovation & Infrastructure	

Figure 2: SDGs 17 Goals organized into three pillars

The following section highlights the major contibution of AI in attaining goals of SDG 2030.

AI and SDG 2030

SDG1: No Poverty: AI is a powerful tool in the fight against poverty, contributing to the achievement of the first Sustainable Development Goal (SDG1). In predictive analysis, AI can analyze vast amounts of data to identify patterns and predict economic downturns[1], natural disasters[2], and other events that can exacerbate poverty. This allows for proactive measures to mitigate the impact on vulnerable populations. Job Creation as an aim, AI can drive economic growth and create new job opportunities, contributing to poverty reduction.

SDG2: Zero Hunger: AI is playing a crucial role in addressing the complex challenges of food security and helping to achieve SDG Goal 2: Zero Hunger. By improving agricultural practices, optimizing supply chains, and reducing food waste[3], AI is contributing to a more sustainable and food-secure future for all..By optimizing food supply chain, it contributes by predicting demand, managing inventory, and improving logistics. This reduces food waste and ensures that food reaches those who need it most, especially in remote areas. Improvement of agricultural practices through AI algorithms can assisst in analyzing images and data to detect crop diseases[4] and pests early on, allowing for timely interventions and preventing widespread damage. This helps to minimize losses and ensure food security.

SDG3: Good Health and Well Being: AI is revolutionizing healthcare and contributing significantly to SDG Goal 3 [5]. AI has contributed in following healthcare services:

A. **Early and Accurate Diagnosis:** Through image analysis and symptom checker, the prompt diagnosis of deadly diseases is possible, which further assist in treating the patient instantaneously.[6]

B. **Drug Discovery and Development:** AI can analyze vast amounts of biological and chemical data to identify potential drug candidates and predict their effectiveness, significantly speeding up the drug discovery process.

C. **Remote Healthcare and Telemedicine:** AI-powered telemedicine platforms can provide remote consultations, diagnosis, and monitoring, especially in underserved areas with limited access to healthcare facilities. Addidtionally, AI algorithms can analyze data from wearable sensors to track vital signs, detect anomalies, and provide early warnings of potential health issues, enabling proactive interventions.[7]

D. **Mental Health Support:** AI can analyze text and speech to detect signs of mental distress, enabling early interventions and personalized support[8].

SDG4:Quality Education: AI has the potential to significantly contribute to the attainemnet of quality education. Through personalised learning, improved accessibility and enhanced teaching practices, AI has revolutionised the traditional educational system and has assisted in achieving high quality in education.AI can recommend relevant courses and learning materials based on an individual's interests and career goals, supporting lifelong learning and skill development. It also enhances efficiency and effectiveness by optimizing resource allocation in educational institutions and predicting student enrollment, henceforth, identifying areas where resources are needed most[9].

SDG5: Gender Equality: AI can be used to develop apps and systems that help women report and prevent gender-based violence. AI can analyze data to identify high-risk areas or patterns of abuse.For women empowerment, AI can help women entrepreneurs access funding, mentorship, and business resources. AI-powered platforms can connect women with investors or provide personalized business advice. Although, AI has the potential to be a powerful tool for advancing gender equality[10], but it's not a silver bullet. Addressing the challenges and ensuring ethical development are crucial to realizing the positive potential of AI for SDG5.Bias in algorithm, privacy concerns, digital divide and job displacement are some of the crucial challenges that needs to be addressed while handling gender equality through AI.

SDG6: Clean Water and Sanitation: AI helps in monitoring quality of water in real time and assists in detecting pollutants and anomalies quickly. Additionally, AI algorithms can predict when pipes or treatment facilities are likely to fail, allowing for proactive maintenance and preventing costly disruptions in service. For sanitation services, AI can analyze data from sanitation systems[11] to identify problems like overflows or blockages, enabling timely interventions and preventing the spread of disease. Pridiction of water availability can be achioved by analyzing weather patterns, climate data, and other factors to predict water availability in rivers, lakes, and aquifers.This helps communities plan for droughts or floods and manage water resources sustainably.

SDG7: Affordable and clean energy: AI algorithms analyze weather patterns, historical data, and other factors to accurately predict solar and wind energy generation.This allows for better grid management and integration of

renewables. AI-powered smart grids can optimize energy distribution, reduce transmission losses, and integrate distributed energy resources, such as rooftop solar panels. It can also accelerate the discovery of new materials for solar panels, batteries, and other clean energy technologies.AI can analyze data on energy demand, resources, and infrastructure to help governments and organizations plan for expanding access to clean energy.Overall, AI has the potential to accelerate the transition to a more sustainable energy future. By leveraging the power of AI, we can make significant progress towards achieving SDG7 and ensuring access to affordable, reliable, sustainable, and modern energy for all.

SDG8: Decent work and economic growth: By Boosting Productivity and Efficiency, AI automates repetitive tasks, freeing up human workers to focus on more creative and strategic work. This increases productivity and efficiency across various industries. The development, implementation, and maintenance of AI systems create new job opportunities in fields like data science, AI engineering, and AI ethics thereby, aiding in accelerating economic growth. Additionally, AI can analyze data on job postings and worker skills to identify skills gaps and inform education and training programs. AI can help small businesses and entrepreneurs access funding and resources, promoting economic growth and job creation.

SDG9: Industry,Innovation and Infrastructure: SDG9 include poverty free, healthy, child friendly, water sufficient, clean & green, self-sufficient infrastructure, socially secured, good governance and women friendly villages.AI promotes SDG9, which embraces three essential attributes of sustainable development: infrastructure, industrialization, and innovation. AI-based innovation (such as digital financial services) SDG9 stimulates economic growth, creates employment opportunities (SDG8), and reduces poverty (SDG1) in cross-country settings, as indicated by several prior studies[12].

SDG10:Reduced Inequality:AI can be used to make recruiting more equal by integrating data-driven insights into hiring choices. Through the use of AI-powered algorithms, employers can guarantee that applicants from any demographic category have an equal probability of being hired[13].Health inequity and education inequity are significant issues in many parts of the world. AI has the potential to bridge this gap by making healthcare,education facility more accessible and affordable for everyone.Artificial intelligence is playing an important role in reducing inequalities around the world.As

technology continues to evolve, so will our ability to use it to reduce inequality gaps even further, making the world fairer and more sustainable for everyone.

SDG11: Sustainable Cities and community: Reports from international organizations indicate that over 50% of people worldwide live in cities, and by 2050, over two-thirds of the population will do so, offering significant investment prospects for tech development firms. The role of AI in sustainable cities is going to play a big role in making urbanization smarter, aiming to accomplish sustainable growth by making the cities prepared with advanced features to live, shop, walk, and enjoy a safe and more convenient life in such environments.Advance Security Camera,Face Detection Cameras,Surveillance System,Autonomous Flying Objects for Ariel View Monitoring and Movement for Public Safety are major role of AI in obtaining sustainable cities and community.

SDG12: Responsible Consumption and Production: Digital and artificial intelligence (AI) technology can create disruptive and commercially successful new product and service models.AI plays a significant role in promoting responsible consumption by enabling businesses and consumers to make informed decisions based on data analysis, allowing for optimized resource usage, reduced waste, and increased transparency throughout the product lifecycle, ultimately contributing to more sustainable practices in production and consumption patterns.

SDG13:Climate action :AI has been trained to measure changes in icebergs 10,000 times faster than a human could do it.This will help scientists understand how much meltwater icebergs release into the ocean – a process accelerating as climate change warms the atmosphere.AI system is helping to tackle climate change by making waste management more efficient. AI can also be used to improve agriculture and reduce its environmental impact by processing data from sensors placed on crops.

SDG14:Life below water : By analyzing massive amounts of underwater data to identify marine species, monitor ocean health, detect pollution, optimize fisheries management, and even help clean up ocean debris, artificial intelligence (AI) can greatly aid in the protection and understanding of life below the surface. This is made possible by sophisticated algorithms and autonomous underwater vehicles (AUVs) that can reach difficult-to-reach areas.

SDG15:Life on Land: It aims to 'Protect, restore and promote sustainable use of terrestrial ecosystems,sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity

ss'.AI helps to monitor environmental conditions,detecting threats to odiversity, and predicting weather patterns, ultimately helping to conserve cosystems and mitigate climate change impacts by providing data-driven lutions for sustainable practices in agriculture, forestry, and conservation forts.

SDG16: Peace, Justice and Strong Institutions: AI powered gal analytics for judicial decision support. AI based algorithmic tools for entifying and addressing human rights violations,predictive policing and ime prevention algorithms[14] provide access to justice for all, and build ffective, accountable, and inclusive institutions at all levels.

SDG17: Parternerships for goals: AI driven data collaboration latforms for global development initiatives. Predictive analytics for identifying artnership opportunities and enhancing collaboration effectiveness[15]. y streamlining data exchange, decision-making procedures, and resource llocation for the SDGs, artificial intelligence (AI) can promote cooperation nd partnership among stakeholders. AI functions as a potent tool to ptimize global efforts towards achieving a sustainable future and strengthen artnerships.

Conclusion

The paper has examined the nuanced relationship between Artificial ntelligence (AI) and the Sustainable Development Goals (SDGs).It includes he potential of AI in advancing specific SDGs through its capabilities in data analysis, prediction, and optimization.In order to guarantee that AI supports sustainable development initiatives, stakeholders must give ethical considerations, human-centered methods, and proactive mitigation strategies top priority. This highlights the significance of responsible AI deployment.

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