

Responsible Towards Ai: Legal Prespective on Green Technology and Environmental Sustainability

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ABSTRACT

Artificial Intelligence (AI) has develop as a transformative instrument in dealing with contemporary environmental challenges and enhance sustainable development. Its integration into green technology has enabled significant progress in climate change prediction, pollution monitoring, biodiversity conservation, deforestation detection and efficient resource management. Through analytics- based decision-making and predictive analyzing , AI enhances the effectiveness of governments and institutions to respond effectively to environmental risks .nevertheless, the rapid expansion of AI technologies has also raised intensified concerns regarding their environmental implications, particularly in terms of high energy consumption, carbon emissions, and the absence of a comprehensive regulatory framework ensuring accountability.

From a legal standpoint, environmental protection in India is grounded in constitutional guarantees and statutory frameworks. The right to a clean and healthy environment has been judicially recognized under **Article 21** of the Constitution. Judicial ruling such as **M.C. Mehta vs Union of India**, **Vellore Citizens Welfare Forum vs Union of India**, and **Indian Council for Enviro-Legal Action vs Union of India** have laid down important legal principle that continue to shape environmental protection. These principles capable to being extended to regulate AI-related environmental harm.

Although legislation such as the **Environment (Protection) Act, 1986**, the **Air (Prevention and Control of Pollution) Act, 1981**, and the **Water (Prevention and Control of Pollution) Act, 1974**, there remains lack of a specific legal framework governing the environmental implications of AI technologies. thereby , this creates a regulatory gap that requires immediate attention. The context of Green AI, which emphasize energy-efficient and environmentally sustainable AI systems, emerges a practical solution to this issue.

This paper adopts a doctrinal research method to analyze the relationship of Artificial intelligence , environmental sustainability, and legal governance. It advocates for the development of a comprehensive legal framework that incorporate Green AI principles with existing environmental laws to ensure accountability, transparency, and sustainable technological progress.

KEYWORDS: Artificial Intelligence, Responsible Ai ,Green Technology, Environmental Sustainability, Climate Governance, Ai Ethic, Sustainable Development , Environmental Law.

1. INTRODUCTION

Artificial intelligence has emerged as one of the most significant technological innovation of the 21 cen-

ntury . It has transformed various fields including healthcare , administration, agriculture, education ,and environmental field. Modern time , the world continue to face severe environmental challenges, including climate change, rising pollution levels, deforestation, and depletion of natural resources. These growing environmental challenges have compelled nation encourage and prioritize sustainable development and environmental responsible innovation. These issues presence a serious threat not only to the environment but also to human being and as well as to the prospects of future generation. conventional approaches to environmental governance have frequently proven insufficient in addressing the complexity and scale of these problems. Consequently, there is an demanding growth for innovative and technologically strengthen solutions that can enhance environmental conservation and support sustainable development. Artificial Intelligence (AI) has emerged as one such transformative technology. Through advancement data analysis, predictive modeling, and automation, AI has the potential to significantly environmental management practices . AI-drivn systems can process vast volumes of environmental data in real time, dedect patterns, and generate valuable insights that support policymakers making well in informed decisions. As result ,This capability makes AI an crucial instrument for enhancing environmental sustainability.

However, despite its many advantages or AI offers numerous benefits, it also create important challenges. The running of AI systems demand substantial computational power which leading to high energy generate and increased carbon emissions. Moreover, the absence of a clear legal framework governing AI give raises concerns about accountability and liability. These issues emphasize the importance for a balanced approach that promote the responsible & sustainable use of AI in environmental sustainability.

2. RESEARCH METHODOLOGY

The present research adopts a doctrinal and analytical research methodology to examine the legal dimensions of Artificial Intelligence and environmental sustainability. The study is primarily based on secondary sources, including constitutional provisions, statutory laws, judicial decisions, international conventions, government reports, policy documents, academic literature, and scholarly writings.

This paper mainly analyzes:

- The concept and significance of Artificial Intelligence in promoting environmental sustainability.
- Environmental challenges and ecological risks arising from AI technologies.
- Constitutional and statutory frameworks relating to environmental protection in India.
- Judicial interpretation and expansion of environmental rights through landmark judgements.
- International legal and policy developments concerning AI and sustainability.
- The emergence of Green AI and the necessity for a specialized legal regulatory framework.
- In addition, the study incorporates contemporary developments and current issues related to climate change, sustainable technological innovation, and AI governance at both national and international levels.

3. CONCEPT OF ARTIFICIAL INTELLIGENCE AND GREEN TECHNOLOGY

AI known as artificial intelligence , Ai is the branch of computer science ,and a technology who simulation of human intelligence by machine capable of learning, reasoning, perception ,problem solving also include , deep learning , natural language processing ,computer vision. They all are the pillars of artificial intelligence . The term Artificial intelligence Was coined by the American person or well known

computer scientist **JOHN McCARTHY** in 1955 and officially established at the Dartmouth conference in 1956.

The term GREEN TECHNOLOGY or GREEN TECH refer to the development and use of technologies that help to remove the negative effect of human activities on the environment and the society. generally refer to as environmental friendly technologies making for protection of environment in sustainable manner. The integration of AI with green technology has created innovation solution for environmental management and sustainable development .focuses on the optimizing algorithms and using renewable energy reduce the carbon footprint of computing.

4.1 CORE PILLARS OF GREEN AI:

GREEN IN AI

GREEN – BY AI

5. ROLE OF AI IN ENVIRONMENTAL SUSTANABILITY

AI play a very crucial role in sustainability by optimizing energy use ,reducing pollutant, reducing carbon emissions and managing resource .AI instruments process complex data ,emission measuring, local air quality monitoring .

5.1 climate change prediction: AI plays a significant role in studying climate patterns and help in forecasting environmental changes. Developed AI help or enable scientists and researchers to accurately predict natural disasters like cyclones, drought, flood , tsunami and increasing in global temperature .

5.2 POLLUTION MOINITRING

AI mechanism help in monitoring or identifying air and water pollution . with the help of smart sensor , satellite imaging ,governmentes and environmental and environmental agencies can detect pollution prone area and ensure enforcement of environmental law.

5.3 SMART ENERGY MANAGEMENT

Artificial intelligence enhance energy efficiency by supporting smart automated system .Artificial intelligence encourage the effective utilization of renewable source of energy. The main sustainable power procedure biomass, hydropower , wind ,solar .

5.3 BIODIVERSITY CONSERVATION

Artificial technologies are very much utilized in wildlife conservation and environmental protection .AI help in monitoring animal population ,prevent legal hunting also manage deforestation ,with the help of drones and satellite advance system.

One of the recent case **Mara Elephant Project {MEP}** in which uses drones along side satellites tracking to protect elephants and reduce illegal hunting.

5.4 SUSTAINABLE AGRICULTURE

AI also help in agriculture practices with farming technique . it also contributes in improving irrigation management , reduce excessive pesticide use , and improve crop productivity, also give different technique to reduce environmental damages.

5.5 WASTE MANAGEMENT

AI technologies improve waste disposal and recycling through technique . AI also support sustainable waste practices and promote environmental development in sustainable manner

Basically , In sustainable development artificial intelligence play crucial role to develop environment and help to achieving global objective .

6. ENVIRONMENTAL RISKS ASSOCIATED WITH AI

Despite in environmental benefits ,AI technologies also raise serious ecological issues .

6.1 CARBON EMISSIONS

Training advance AI models requires a lot of computational power ,resulting in high carbon emission . large scale machine learning system use enormous amount of electricity ,which often comes from non renewable energy sources.

6.2 ENERGY CONSUMPTION

AI infrastructure based on the data center need a constant supply of electricity . the raising demand of AI has greatly increased global energy consumption

The international energy agency {IEA} has warned that the rapid growth of artificial intelligence infrastructure may raise global electricity demand in coming years.

6.3 RESOURCE EXTRACTION AND MINING

For manufacturing of artificial hardware depending heavily on rare earth minerals such as -lithium , nickel , cobalt , which are essential for producing electronic device , processor , data infrastructure and other use in ai system also. The extraction of these minerals involve large scale of mining they can cause serious environmental damages because of this face many challenges like soil degradation ,deforestation damage to biodiversity ,and create pollution also .

In many case mining operation also lead to the displacement of local communities tribes ,because of this they all are face challenges and also negative effect on their livelihood .

7. CONSTITUTIONAL FRAMEWORK FOR ENVIRONMENTAL PROTECTION IN INDIA :

The constitution of India give strong legal provision for environmental protection

7.1 ARTICLE 21 : RIGHT TO CLEAN ENVIRONMENT

Article 21 guarantee the right of the life and personal liberty . The apex court of India interpreted this provision expansively also guarantees the right to a clean environment

In case of SUBHASH KUMAR V STATE OF BIHAR 1991) the supreme court held that the right to pollution free water and air is part of the life under article 21 .

7.2 DIRECTIVE PRINCIPLE OF STATE POLICY

Article 48A directs the state to protect environment and safeguard forest and wild life

7.3 FUNDAMENTAL DUTIES

Article 51A imposes fundamental duties upon the citizen of India to protect and improve the natural environmental .

8 .ENVIRONMENTAL STATUTORY FRAMEWORK IN INDIA :

8.1 ENVIRONMENT {PROTECTION } ACT 1986

The environmental protection act is umbrella statute enacted after Bhopal gas tragedy . it empowers the central government to take measure for environmental protection and pollution control .

8.2 AIR {PREVENTION AND CONTROL OF POLLUTION }ACT 1981

The statute aim to protect environment from air pollution

8.3 WATER {PREVENTION AND CONTROL OF POLLUTION } ACT 1981

The act aim to protect environment from water pollution

8.4.LANDMARKS JUDGMENTS:

M.C. Mehta v. Union of India {1987}

Vellore citizens welfare forum v. Union of India

9. INTERNATIONAL PRESPECTIVES ON AI AND ENVIRONMENTAL SUSTINABILITY

9.1 UNESCO RECOMMENDATION ON THE ETHICS OF AI

UNESCOS' recommendation on the ethics of artificial intelligence highlights the importance of environmental sustainability and the responsible use of AI technologies .It member nations to evaluate and monitor the environmental consequences of the AI system in order to ensure sustainable and ethical technologies development

9.2 EUROPEAN UNION AI ACT

The European union has taken an important step toward regulating artificial intelligence through the EU AI ACT ,which follows a risk based approach to AI governance . The EU focuses on ensuring transparency , accountability , and ethical governance in the development and use of AI system..

10. NEED FOR A COMPREHENSIVE LEGAL FRAMEWORK

At present , our India lack of specific legal framework to regulate the environmental consequences arising from AI technologies. Present laws only provide environmental protection they are not fully deal with the new challenges and risks created rapidly enhance AI digital systems.

- The urgent need for legal framework ;
- Proper management and disposal of electronic waste .
- Regulating carbon emission
- Mandatory environmental impact assessment
- Promotion of green AI
- International cooperation
- Public awareness and participation
- Integration with existing environmental laws

11. RECOMMENDATIONS

India should enact dedicated legislation governing environmentally sustainable AI development

- international cooperation
- International cooperation very important for developing uniforms concerning AI sustainability.
- ethical AI governance
- AI regulation should incorporates ethical principle including sustainability ,transparency , and accountability .
- mandatory environment impact assessment
- Promotion of renewable energy
- Carbon accountability mechanisms

CONCLUSION

Artificial intelligence has emerged as one of the most revolutionary technologies advancement of the modern age. Artificial Intelligence has emerged as one of the most influential and transformative technologies of the modern age. Its ability to tackle major environmental issues such as climate change, pollution, biodiversity loss, and efficient resource management highlights its important role in promoting

environmental sustainability. AI-powered technologies can greatly assist governments, institutions, and societies in strengthening environmental governance and achieving sustainable development goals.

At the same time, the growing use of AI also raises serious environmental, legal, and ethical concerns. The excessive energy consumption of data centers, increasing carbon emissions, electronic waste, water usage, and large-scale extraction of natural resources required for AI infrastructure pose significant threats to ecological balance and global climate objectives. Existing environmental laws were primarily created to regulate traditional industrial pollution and are not fully capable of addressing the complex environmental challenges arising from advanced AI technologies.

Indian constitutional jurisprudence, however, provides a strong legal foundation for dealing with these concerns. Constitutional principles and judicial doctrines such as sustainable development, the precautionary principle, the polluter pays principle, and the public trust doctrine can play an important role in regulating environmentally harmful technological activities and ensuring environmental accountability.

In this context, the concept of Green AI offers a balanced and forward-looking solution by encouraging the development of environmentally sustainable and energy-efficient AI systems. Nevertheless, effective implementation of sustainable AI requires strong legal regulation, corporate responsibility, ethical governance, and international cooperation.

Therefore, responsible AI development must become an essential part of environmental governance. Technological progress should not come at the expense of environmental protection. The future of sustainable development depends on maintaining a balance between innovation and ecological responsibility through effective legal frameworks, ethical technological practices, and sustainable policymaking.

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