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Environmental Impact of Artificial Intelligence and its Regulation in India

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ABSTRACT

The rapid growth of science and technology in today's era is unexpectedly evolving towards the age of Artificial Intelligence. AI is an emerging field that is increasingly influencing global business and economics.AI tools have become popular in many fields and research due to their first development and efficient solutions. Today's era possesses a threat to the environment through unprecedented climate change, biodiversity interference loss, deforestation, pollution and many other hazards. There has been an unexpected imbalance into earth's ecosystem through unlawful human interference. Despite these challenges, Artificial Intelligence has emerged as a powerful innovation with immense potential for environmental protection. However beneath its transformative potential there is a risk factor possessing a threat to privacy, security, due process and democracy itself. Therefore monitoring and regulation is necessary in the area of AI and environmental sustainability. This paper aims to focus the enhanced use of AI focussing on pros and cons of environmental issues associated with it. The paper seeks to analyse critically the existence of regulatory methods associated with the use of AI in environmental

field and the key tradeoffs for artificial intelligent and climate change.

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INTRODUCTION

There is no single definition of the term Artificial Intelligence. It refers to the branch of computer science that is concerned with making machines behave intelligently. It is the ability of a computer program or a machine to think and learn. It can also be referred as a programme that tries to mimic humans the way we see or do things. AI performs the task that are basically performed by human beings which includes recognising speech, making decisions, identifying pattern etc.The term AI was for the first time coined by John McCarthy in the year 1956 to advance the use of machines to emulate human thought. Since the 1980s, AI has experienced a resurgence, driven by interest in expert system applications, where computers were programmed with rules to simulate human expert decision-making. The application of AI into environmental science has been driven by the concern on climate change, growing population in vulnerable areas and continues use of unsustainable practice. The creation of adequate condition for healthy living of people is dependent on natural environment. Once it is disturbed by human activities possibilities of healthy living becomes very impossible. The activities of humans causing environment imbalance is not restricted to boundaries but beyond that. The global concern for environmental problems was for the first time reflected in an international conference held by the United Nations at Stockholm in the year 1972.The heads of the various countries meet in the said conference to take stock of the situation focusing on the regulation of activities causing threat to the environment. Further a common responsibility of the member states for protecting and preserving environment has also been created by the Charter of economic rights and duties.The Nairobi Declaration, 1982 the first ever Earth Summit, the United Nations Conference on Environment and Development, held at Rio-De-Janeiro in the year 1992, the Earth Summit at Johannesburg in 2002 are the examples where the international community met at regular intervals to discuss about the problems affecting environment making it evident that the entire world is awakened by the concerns of environmental sustainability. Since the dawn of the web in the late 1980s, we have witnessed a technology revolution that has changed the way we think and work. Where Yahoo! Search was among the most popular search engines in the 1990s, Google Search took the mantle in the 2000s and continues to do so even today. Today, Google Search has a global market share of more than 90%. But the evolution of technology is not limited. It grows by leaps and bounds on a regular basis.

Applications of AI in Combating Environmental Problems

As the use of Science and Technology is rapidly increasing, the use of AI techniques in solving the issues related with environment is also increasing. Some of the examples of AI beings used in environmental issues are as follows—

1. **Climate Change Mitigation and Adaption**— By using the artificial intelligence algorithm climate models are enhanced, future climate patterns are forecast, and the effects of climate change are better estimated. It is also helpful in developing best strategies for prevention, elimination and coping mechanisms.
2. **Natural Resource Management- B**y using the AI techniques the deforestation is detected, endangered species are protected, and water quality data is processed to conserve the natural resource management by the best possible ways.
3. **Wildlife conservation-** Autonomous drones and surveillance cameras are employed to track and prevent poaching activities. These technologies not only help detect illegal hunting but also provide valuable insights into animal behavior, aiding in the conservation and protection of various species and their habitats.
4. **Waste Management**-- AI enhances waste sorting and management, boosting recycling rates, minimizing carbon footprints, and promoting a circular economy.
5. **Disaster Management and Resilience**- AI models assist in forecasting natural disasters such as hurricanes, floods, and wildfires, aiding in preparation, evacuation planning, and resource distribution. This leads to better disaster readiness and a stronger capacity for recovery after a calamity.

However with increasing use of AI in tackling environmental problems there lies concerns about its negative impact also. These include—

1. **Increased energy Consumption—** The use of AI comes with substantial computational power resulting in increased energy consumption posing a threat upon sustainability.
2. **Increased water usage and coolong—**The various techniques and tools of AI like Chat Gpt, Microsoft data centre used large quantity of water causing a serious threat to environmental sustainability.
3. **Carbon footprint** – The manufacturing a disposal of AI hardware causes a problem of electronic waste by harming the ecosystem. The carbon footprints associated with AI software and hardware must also be taken very seriously.

Global Developments on AI Regulation

Global Partnership Artificial Intelligence (GPAI) Summit

GPAI is an international initiative established to guide the development and use of AI in a way that respects human rights and shared democratic values of its members. India is a member and lead chair 2024 of GPAI. The GPAI report suggests that considering the increased use of AI into various fields' government can reduce the negative impact of AI by incorporating climate considerations into AI regulations, strategies, funding mechanisms and procurement programs. The report suggest that government should establish standard measurement and reporting framework to evaluate, implement and govern AI in context of climate change.

The Organization for Economic Co-operation and Development (OECD)

The Organization for Economic Co-operation and Development (OECD) is an international organization founded in 1961 to stimulate economic progress and world trade. The Organization for Economic Co-operation and Development (OECD) and GPAI has developed an integrated partnership towards developing human centric, safe, secure and trustworthy AI. The OPED recommendation as updated in 2024 calls for inclusive growth, including beneficial outcomes such as protection of natural environment and sustainable development. The report made a distinction between direct and indirect impact of developing, using, and disposing AI. The report recommends for establishment of measurement standards, the expansion of data collection, the identification of AI specific impacts as well as the improvement of transparency to help policy makers to use AI for the purpose of addressing sustainable development.

USA

Artificial Intelligence Environmental Impacts Act of 2024 bill was introduced in US senate in January 2024. The Bill had two objectives-

- To mandate the Administrator of the Environmental Protection Agency to conduct a study on the environmental effects of artificial intelligence.
- To direct the Director of the National Institute of Standards and Technology to assemble a consortium to examine the environmental effects of artificial intelligence and to establish a voluntary system for reporting these impacts, along with other related objectives.

The Bill was introduced by certain findings such as-

- Various estimates suggest that computational power usage for artificial intelligence applications has surged significantly over the past decade. A 2022 analysis indicated that the computational operations required to develop the largest AI models are doubling approximately every 10 months.
- The fast-paced progress of artificial intelligence could lead to a considerable rise in energy usage due to the high power requirements of the hardware used for training and operating AI models. This issue persists even with ongoing enhancements in the efficiency of both AI models and computing hardware.
- The growing development of data center infrastructure, including cooling systems and backup power supplies required to support AI and other high-computing technologies, leads to pollution, higher water usage, and alterations in land use.
- Producing hardware for artificial intelligence and other high-performance computing technologies requires substantial resources and energy, leading to notable environmental impacts.
- The increasing amount of electronic waste (or "e-waste") each year poses escalating environmental and health risks, which could intensify as obsolete AI-related hardware is discarded.
- Artificial intelligence applications can yield both direct and indirect environmental benefits, such as improving energy efficiency, advancing renewable energy development, aiding planetary research, discovering new materials, and automating environmental monitoring.
- Several strategies exist to minimize AI's environmental footprint, such as optimizing models, hardware, and data centers for efficiency, utilizing renewable energy sources, and assessing the environmental impact of AI applications.
- Implementing transparency measures and environmental protection initiatives can help reduce AI's negative effects while promoting its applications that contribute to sustainability.
- This bill was presented on February 1, 2024, in a prior congressional session but was not brought to a vote. While it was not passed into law, its provisions could still be adopted if included in a different bill.

The EU

In April 2021 European Commission for the first time proposed regulatory framework on AI with the objective of regulating the use of AI according to the risk they pose to users. The regulatory framework was initiated with the objective of ensuring AI system in EU is safe, transparent, traceable, and non discriminatory and environment friendly. The assessment of AI risk is obligatory upon the providers and user under the regulation. The banned AI applications in EU include-

- AI systems that manipulate human behavior, such as voice-activated toys that promote harmful actions in children.

- AI-driven social scoring that categorizes individuals based on socio-economic status or personal traits.
- Biometric identification and classification of individuals.

Certain AI applications must undergo mandatory registration, including those used for:

- Managing and operating critical infrastructure.
- Education and professional training.
- Employment, workforce management, and access to self-employment.
- Law enforcement.
- Migration, asylum, and border control.
- Legal interpretation and application.

A parliamentary working group has been established to oversee the implementation and enforcement of the AI Act, ensuring that AI regulations support the growth of the EU's digital sector.

India-

The power of AI in combating climate change is revolutionary. It plays a very crucial role in promoting sustainable development. However use of AI also results in carbon emissions and energy waste posing challenges to environmental protection. Therefore to balance AI ambition with existing decarbonization goal is a long term necessity and urgency for sustainable growth

Involving companies and governments.At present in India there is no specific codified law dealing only with AI. However the government has realized the need of regulatory measures and guidelines to AI ensure that AI developments align with national interests. Accordingly the government has passed much legislation and issued advisories to ensure that AI developments follows ethical guidelines and addresses key legal concerns. The key laws governing AI in India are as follows—

1. **Information Technology Act, 2000 (IT) Act**

The Information Technology Act, 2000 is India's primary legislation that governs electronic transactions, digital governance, and cyber security. Although it was enacted before AI technologies came to the forefront, several provisions in the IT Act apply to AI-related activities.

- **Section 43A**: This section enables compensation in case of a breach of data privacy due to negligent handling of sensitive personal data. AI systems that process user data must ensure that they comply with this provision to avoid legal repercussions.
- **Section 66D**: This section penalises individuals for cheating by impersonation using a computer resource. It is particularly relevant for AI-driven deepfakes and other AI-generated fraudulent content.
- **Section 67:** This provision prohibits the publishing or transmitting of obscene material in electronic form. AI systems capable of generating inappropriate or harmful content could fall under this section.

While IT Act 2000 does not directly address environmental protection, however it indirectly facilitates paperless operations, secure data management, and cyber security for environmental systems. Additionally complementary rules like the E waste rules and digital India Initiated enhance sustainability efforts in the IT sector.

2. **Digital Personal Data Protection Act, 2023**

The Digital Personal Data Protection Act, 2023, signed into law on August 11, 2023, is a comprehensive framework for protecting personal data in India. The Act covers how data can be collected, stored, processed, and shared, making it highly relevant for AI systems that handle large volumes of personal data.

Key provisions of the Act include:

- **Data Protection Principles**: These principles mandate that AI platforms obtain user consent before processing personal data, ensure transparency, and allow users to withdraw their consent.
- **Data Localisation**: The Act requires certain sensitive data to be stored within India, which impacts AI systems that rely on cross-border data transfers.
- **Data Breaches**: Companies deploying AI must report data breaches to regulatory authorities within a specific timeframe, further ensuring accountability.

3. **Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021 (IT Rules 2021)-**

The IT Rules 2021 regulate intermediaries such as social media platforms, digital news media, and over-the-top (OTT) services. Under these rules, intermediaries must ensure that their platforms do not host, display, or transmit unlawful content, making it relevant for AI systems generating content, such as deep fakes or automated media.

Rule 3(1)(b): This rule specifically mandates that intermediaries should not allow users to upload or share any information that is "grossly harmful, harassing, or defamatory." AI platforms that fail to comply with these provisions may lose their intermediary "safe harbour" protections and face legal penalties.

4. **Draft National Data Governance Framework Policy (NDGFP)**

Released in May 2022, the Draft National Data Governance Framework Policy (NDGFP) aims to modernize India's data governance structure. Its core objective is to create an ecosystem that fosters AI and data-driven research and startups. The policy proposes a comprehensive repository of datasets that can be used to train AI models.This policy is crucial for AI research and development, as it enhances access to high-quality data for training AI algorithms. The quality and accuracy of data used in AI models can significantly impact their output, and this policy plays a pivotal role in ensuring better datasets for AI innovation.

5. **National Strategy for Artificial Intelligence (2018)**

India's inaugural of National Strategy for Artificial Intelligence, introduced by NITI Aayog in 2018 under the AI for All initiative, aimed to promote inclusive AI development. The strategy identified five key sectors—healthcare, agriculture, education, smart cities, and transportation as priorities for AI-driven growth. It emphasized the need for high-quality datasets, enhanced research capabilities, and robust legislative frameworks to address cyber security and data protection concerns. By striking a balance between innovation and regulation, the strategy sought to ensure the responsible development of AI while driving progress in these critical areas.

6. **Principles for Responsible AI (2021)**

Building on the National AI Strategy, NITI Aayog released the Principles for Responsible AI in 2021. These principles guide AI development in India with a focus on ethical considerations. The system considerations cover principles such as decision-making transparency, accountability, and inclusivity, while the societal considerations focus on AI's impact on job creation and the automation of industries. This document establishes guidelines for AI governance, ensuring that AI systems adhere to ethical and transparent practices.

7. **Bharataiya Nyaya Sanhita, 2023-**

BNS is passed in India with an objective of modernizing criminal Justice system in India. Though not exhaustive few provisions of BNS addresses cases of insulting a woman's modesty, which could be used to prosecute deep fakes that exploit women's images or videos. While the IT Act and **Bharatiya Nyaya Sanhita** provide some remedies, there is a need for dedicated laws to tackle the malicious use of deep fakes. The Indian government must continue developing laws to prosecute AI-driven misinformation and protect individuals and institutions from its damaging effects.

Challenges-

- Artificial Intelligence is emerged as game changer in many aspects yet the need to address the issue related to its environmental effects such as carbon emissions, e waste, and its potential harm to eco system is largely neglected.
- As AI datasets and models become more complex, the energy needed for training and operation increases substantially. This heightened energy demand leads to greater greenhouse gas emissions, exacerbating climate change.
- The electronic waste generated by AI technology presents a significant issue. It contains harmful substances such as lead, mercury, and cadmium, which can pollute soil and water, posing risks to both human health and the environment.
- The increasing use of AI in agriculture could contribute to the overuse of pesticides and fertilizers, leading to soil and water contamination and threatening biodiversity. Focusing solely on maximizing yields through AI-driven methods without considering environmental balance may promote monocultures and reduce biodiversity.

- The use of AI in environmental management brings up ethical concerns. AI-driven decisions may be biased if the systems are trained on inaccurate or incomplete data.

To overcome the issues related to use of AI in environment the following practices may be incorporated—

- Developing energy efficient AI Hardware and Software.
- Transiting data centers to renewable energy sources.
- Companies may promote sustainable AI software and hardware designs.
- Government may consider policies related to responsible AI principles into design structures.

Conclusion

As AI continues to grow rapidly its impact on environment is obvious. To mitigate the climate emergency, there is need that all the stakeholders come together and consider incorporating climate friendly considerations of AI. The role of policy makers in this regard is more crucial. Though government have taken significant steps in considering ethical concerns of AI and the existing legal framework like Information Technology Act , Technology Rules and Digital Personal Data Protection Act are indirectly overseeing AI activities , yet the gap as regards to enactment of an AI specific laws are still persistent. Given AI's rapid development in every aspect, there is high need of bringing a legislative framework which ensures sustainable use of AI.

References

1. Tripathi, S.C. (2019). Environmental Law (7th ed.). Central Law Publication.
2. Mohanty, Amlan and Sahu, Satarkatu (2024). India's Advance on AI Regulation.
3. Singh, Ankit (2025). The AI RegulatoryLandscape in India: What to Know.
4. Bhatia, Umit(2024). The Environmental Impact of AI: Is it a tool to accelerate climate action or climate crisis.
5. Agarwal, Aishwarya (2024). AI Laws in India.
6. https://www.snrlaw.in/climate-change-and-esg-considerations-in-indias-ai-driven-future/#

7. https://www.europarl.europa.eu/topics/en/article/20230601STO93804/eu-ai-act-first-regulation-on-artificial-intelligence
8. https://www.whitecase.com/insight-our-thinking/ai-watch-global-regulatory-tracker-india#article-content
9. https://www.geeksforgeeks.org/how-artificial-intelligence-is-helping-tackle-environmental-challenges/