

Peer Reviewed Refereed and
UGC Listed Journal No. 40776

ISSN - 2277 - 5730

AN INTERNATIONAL MULTIDISCIPLINARY
QUARTERLY RESEARCH JOURNAL

AJANTA

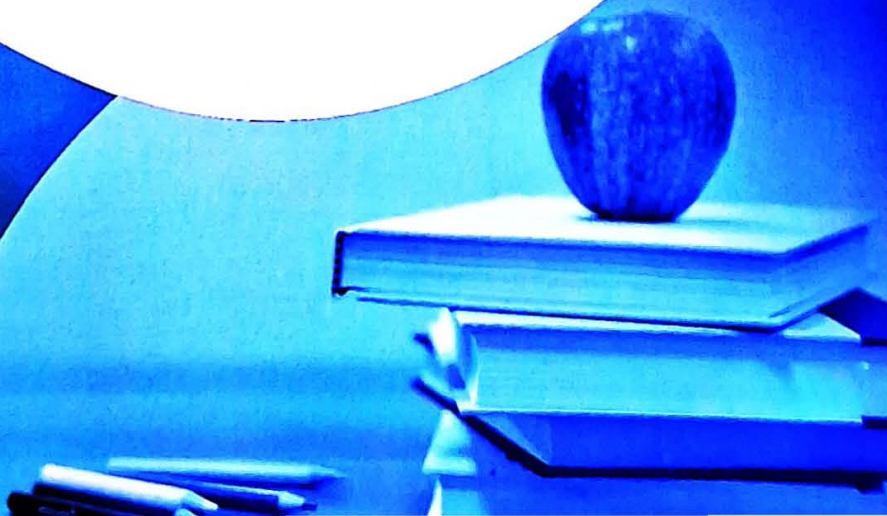
Single Blind Review / Double Blind Review

Volume - XV | Issue - I
January - March - 2026
English Part - IV



Impact Factor / Indexing
2023 - 7.428
(www.sjifactor.com)

**Ajanta
Prakashan**



❧ CONTENTS OF ENGLISH PART - IV ❧

S. No.	Title & Author	Page No.
1	Workplace Stress as a Challenge and a Burden: Implications for Job Satisfaction Ms. Tuba Khan Prof. Dr. Meghna Basu Thakur	1-8
2	Cultural Heritage and Its Preservation: Case Studies of Chandraketugarh (West Bengal) and Anantagiri Jain Caves (Telangana) Jucelee Ashok Bahadare	9-14
3	The Role of Corporate Social Responsibility in Enhancing Corporate Governance Dr. Chaitanya Ajabrao Ghuge	15-21
4	Artificial Intelligence in Social Development Dr. Chandrakant Gundappa Gaikwad	22-26
5	A Study on Impact of Work Life Balance on Job Satisfaction Ms. Lenora Sequeira Ms. Rhythm Mehrook	27-33
6	Artificial Intelligence and Human Intelligence in Law: A Comparative Evaluation of Opportunities and Risks Dr. Sajan G. Patil	34-40
7	Artificial Intelligence in Social Work and Community Development: An Indian Perspective Dr. Aarti Sanjay Salunkhe	41-47
8	India's New Legislative Landscape: Reforms and Challenges Prof (Dr.) Bindu Variath Mr. Devesh Jayant Joshi Mr. Aarav Singh	48-53
9	A Study on Infringement of Copyrights with Reference to Implications and Remedies Dr. Swapnil Choudhary	54-58
10	Artificial Intelligence in Climate Mitigation: Legal Challenges and Policy Gaps Prajakta Balveer	59-65
11	Artificial Intelligence in Social Development: A Legal Perspective Sonu Chhotelal Sharma	66-71
12	Media Trial: Judicial Effectiveness and Influence Nisha Dhadke	72-79
13	Ethical Leadership in Corporate Governance: Enhancing Accountability, Transparency, and Stakeholder Trust Abhinava Tiwari Dr. Reshma Nair	80-85

10. Artificial Intelligence in Climate Mitigation: Legal Challenges and Policy Gaps

Prajakta Balveer

Assistant Professor, Department of Law, Tilak Maharashtra
Vidyapeeth, Kharghar, Navi Mumbai.

Abstract

Artificial Intelligence (AI) is increasingly being recognized as a powerful enabler in global climate mitigation efforts. By enhancing data interpretation, forecasting emissions, optimizing energy systems, and supporting evidence-based policymaking, AI offers innovative solutions to reduce greenhouse gas emissions. Despite its growing application, the use of AI in climate mitigation raises significant legal, ethical, and policy-related concerns. Existing legal frameworks are insufficient to regulate AI's environmental impact, accountability mechanisms remain unclear, and policy coordination across nations is fragmented. Additionally, the energy-intensive nature of AI technologies challenges their sustainability claims. This paper critically examines the evolution and present role of AI in climate mitigation, identifies legal challenges and governance gaps, and analyzes national and international case studies. It further explores the role of governments and proposes future-oriented policy recommendations. The study concludes that effective legal governance and coordinated policy frameworks are essential to ensure AI contributes meaningfully and responsibly to global climate mitigation goals.

1. Introduction

Climate change poses an unprecedented threat to ecosystems, economies, and human well-being. Mitigation strategies aimed at reducing greenhouse gas emissions require advanced tools capable of managing complex environmental data and forecasting long-term impacts. Artificial Intelligence, encompassing machine learning, predictive analytics, and automation, has emerged as a transformative technology in this domain. AI enables accurate climate modeling, efficient resource management, and optimized energy consumption. However, the rapid integration of AI into climate mitigation has outpaced the development of legal and policy frameworks necessary to govern its use. Questions relating to accountability, transparency, environmental costs, and equitable access remain unresolved. This paper explores AI's role in climate mitigation while

highlighting the legal challenges and policy gaps that must be addressed to ensure sustainable and responsible deployment.

2. Evolution of AI in Climate Mitigation

The application of computational intelligence in environmental science began with basic statistical modeling and climate simulations. Early systems relied on deterministic models that required extensive manual interpretation. With the advent of machine learning and increased computing power, AI systems evolved to analyze vast datasets generated by satellites, climate sensors, and meteorological networks. Over time, AI tools have transitioned from research-oriented applications to operational use in energy management, climate forecasting, and environmental monitoring. International attention toward AI-driven climate solutions gained momentum during the last decade, particularly as nations sought innovative methods to meet emission reduction commitments. Despite technological progress, legal and institutional responses have remained limited and fragmented.

3. Present Role of AI in Climate Mitigation

3.1 Energy Systems and Renewable Integration

AI plays a critical role in managing renewable energy systems by forecasting solar and wind output, optimizing grid operations, and minimizing energy losses. Smart grids powered by AI improve efficiency and reduce dependence on fossil fuels.

3.2 Transportation and Urban Mobility

AI-based traffic control systems and logistics optimization tools reduce fuel consumption and emissions. Intelligent transport planning contributes to sustainable urban mobility and emission reduction targets.

3.3 Environmental Surveillance

Through satellite imagery and sensor networks, AI assists in detecting deforestation, air pollution, and industrial emissions. These insights enable governments to design targeted mitigation policies and enforce environmental regulations.

3.4 Climate-Responsive Urban Planning

AI models assess urban heat patterns, building energy demand, and land-use efficiency, supporting climate-resilient infrastructure development.

4. Legal Challenges and Policy Gaps

4.1 Absence of Comprehensive Legal Frameworks

There is no dedicated international legal instrument governing AI use in climate mitigation. Existing AI regulations focus primarily on data protection, consumer rights, and digital governance, leaving environmental considerations largely unaddressed.

4.2 Accountability and Liability Issues

AI-driven decisions in climate policy raise questions regarding responsibility for errors, bias, or unintended environmental harm. Current legal systems struggle to assign liability when autonomous systems influence policy outcomes.

4.3 Transparency and Explainability

Many AI models operate through complex algorithms that lack interpretability. This opacity undermines trust and limits regulatory oversight in climate decision-making.

4.4 Environmental Impact of AI Technologies

AI infrastructure requires substantial energy for training and deployment. Without legal standards to regulate emissions associated with AI systems, their climate benefits may be offset by their carbon footprint.

4.5 Equity and Access Concerns

Unequal access to AI technologies and climate data may widen disparities between developed and developing nations, raising concerns about climate justice.

5. Role of Governments

Governments are central to aligning AI innovation with climate objectives. National policies can mandate transparency, establish environmental performance standards for AI systems, and integrate AI into climate action plans. International cooperation is essential to harmonize regulations, share best practices, and support capacity building in resource-constrained countries. Public funding mechanisms can encourage research into energy-efficient AI and climate-focused applications while ensuring compliance with environmental standards.

6. Existing Policy Initiatives

Several national and international initiatives promote responsible AI use in climate action. However, these efforts often lack enforceability and specific environmental mandates. AI governance policies typically prioritize ethical principles without linking them explicitly to climate

mitigation goals. Bridging this gap requires integrating environmental obligations into AI regulatory frameworks and climate policies.

7. Case Studies

7.1 National Case Study: India

India has explored AI-based solutions in areas such as energy efficiency, transportation planning, and water management. Government-supported research initiatives demonstrate AI's potential in emissions reduction, though regulatory frameworks remain underdeveloped.

7.2 International Case Study: Europe

Several European countries employ AI to optimize renewable energy integration and monitor industrial emissions. These initiatives highlight the benefits of combining technological innovation with strong regulatory oversight.

7.3 Smart City Initiatives

Cities like Singapore use AI to address urban heat stress and energy efficiency, demonstrating how localized governance can support climate mitigation goals.

8. Future Perspectives

AI is expected to play a growing role in monitoring national climate commitments, enabling predictive modeling of mitigation pathways, and supporting adaptive policymaking. Future governance must emphasize explainable AI, environmental accountability, and cross-border regulatory cooperation. Integrating sustainability principles into AI design will be crucial for long-term effectiveness.

9. Role of Social Media in AI-Driven Climate Mitigation

Social media platforms play an increasingly influential role in climate mitigation by acting as channels for information dissemination, public engagement, and policy dialogue. Artificial Intelligence is deeply embedded in social media through algorithms that curate content, analyze user behavior, and shape public narratives. In the context of climate mitigation, AI-driven social media analytics are used to assess public awareness, track climate-related discourse, and evaluate responses to environmental policies.

Governments, international organizations, and civil society increasingly rely on AI-powered social media tools to promote sustainable behavior, disseminate climate science, and mobilize collective action. Sentiment analysis and trend detection enable policymakers to understand public perceptions of climate initiatives, identify resistance to regulatory measures, and

tailor communication strategies accordingly. Social media campaigns supported by AI have been instrumental in encouraging renewable energy adoption, sustainable consumption, and climate advocacy.

However, the role of social media also presents significant legal and policy challenges. Algorithmic amplification of misinformation, climate denial narratives, and misleading content can undermine mitigation efforts. The absence of clear regulatory standards governing AI-driven content moderation raises concerns related to accountability, transparency, and freedom of expression. Furthermore, large-scale data collection from users for climate-related analysis creates privacy and data protection concerns, particularly in jurisdictions with weak digital governance frameworks.

To maximize its positive impact, social media governance must be integrated into broader AI and climate policy frameworks. Regulating AI algorithms used by digital platforms, ensuring transparency in content curation, and combating climate misinformation are essential steps toward leveraging social media as a constructive tool in climate mitigation. When responsibly governed, AI-powered social media can strengthen public participation, support behavioral change, and bridge the gap between policy formulation and societal action.

10. Policy Recommendations

- Establish international legal standards linking AI governance to climate objectives
- Mandate environmental impact assessments for AI systems
- Promote transparency and explainability in AI-based climate tools
- Encourage energy-efficient AI development
- Support data sharing and capacity building in developing countries
- Strengthen interdisciplinary collaboration between legal, technological, and environmental institutions

Conclusion

Artificial Intelligence has emerged as a powerful instrument in advancing climate mitigation by enabling data-driven decision-making, optimizing energy systems, and enhancing policy effectiveness. Nevertheless, the rapid deployment of AI technologies has exposed significant legal and policy gaps, particularly concerning accountability, transparency, environmental sustainability, and equitable access. Without robust governance mechanisms, the potential benefits of AI risk being undermined by ethical, legal, and environmental challenges.

The expanding role of **AI-driven social media platforms** further highlights the complexity of climate governance in the digital age. Social media significantly influences public understanding, behavioral change, and policy acceptance related to climate action. While AI-powered social media tools can amplify climate awareness and support participatory governance, they also pose risks through misinformation, algorithmic bias, and unregulated data use.

Addressing these challenges requires an integrated governance approach that aligns AI regulation, climate policy, and digital platform oversight. Governments and international institutions must develop comprehensive legal frameworks that ensure transparency, accountability, and environmental responsibility across AI systems, including those operating within social media ecosystems. With coordinated national and global action, Artificial Intelligence supported by responsible social media engagement can serve as a vital and sustainable force in achieving long-term climate mitigation and environmental justice.

References

- United Nations Framework Convention on Climate Change. (2021). *Artificial intelligence for climate action*. UNFCCC.
- United Nations Environment Programme. (2022). *Emissions gap report 2022: The closing window*. UNEP. <https://www.unep.org>
- Organisation for Economic Co-operation and Development. (2019). *OECD principles on artificial intelligence*. OECD Publishing. <https://www.oecd.org/going-digital/ai>
- European Commission. (2021). *Proposal for a regulation laying down harmonised rules on artificial intelligence (Artificial Intelligence Act)*. <https://digital-strategy.ec.europa.eu>
- Vinuesa, R., Azizpour, H., Leite, I., Balaam, M., Dignum, V., Domisch, S., Felländer, A., Langhans, S. D., Tegmark, M., & Nerini, F. F. (2020). The role of artificial intelligence in achieving the Sustainable Development Goals. *Nature Communications*, 11(1), 233. <https://doi.org/10.1038/s41467-019-14108-y>
- Rolnick, D., Donti, P. L., Kaack, L. H., Kochanski, K., Lacoste, A., Sankaran, K., Ross, A. S., Milojevic-Dupont, N., Jaques, N., Waldman-Brown, A., Luccioni, A., Maharaj, T., Sherwin, E. D., Mildenerberger, M., Hilchey, M., Vidaurre, D., Clune, J., & Bengio, Y. (2019). Tackling climate change with machine learning. *arXiv preprint arXiv:1906.05433*. <https://arxiv.org/abs/1906.05433>

- Floridi, L., Cowls, J., Beltrametti, M., Chatila, R., Chazerand, P., Dignum, V., Luetge, C., Madelin, R., Pagallo, U., Rossi, F., Schafer, B., Valcke, P., & Vayena, E. (2018). AI4People—An ethical framework for a good AI society. *Minds and Machines*, 28(4), 689–707. <https://doi.org/10.1007/s11023-018-9482-5>
- CSTEP. (2022). *Artificial intelligence for climate change mitigation and adaptation in India*. Centre for Study of Science, Technology and Policy. <https://cstep.in>
- World Economic Forum. (2022). *Harnessing artificial intelligence for the Earth*. WEF. <https://www.weforum.org>
- Intergovernmental Panel on Climate Change. (2023). *AR6 synthesis report: Climate change 2023*. IPCC. <https://www.ipcc.ch>