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Greening the justice system: assessing the legality, feasibility, and potential of artificial intelligence in advancing environmental sustainability within the Indian judiciary

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This study examines the integration of Artificial Intelligence (AI) in the Indian judiciary system, focusing on its potential to address environmental sustainability and climate change challenges while improving judicial efficiency. The Indian courts' traditional paper-based operations contribute significantly to environmental degradation, necessitating technological solutions for a greener justice system. The research analyzes the current state of AI implementation in Indian courts through examination of three major initiatives: SUPACE (Supreme Court Portal for Assistance in Court Efficiency), SUVAS (Supreme Court Vidhik Anuvaad Software), and various e-Court projects. The study evaluates both environmental impact data and technological implementation reports from the Supreme Court's E-Committee and Ministry of Law and Justice. The implementation of AI-driven systems has shown promising results, with SUVAS successfully translating over 36,271 Supreme Court judgments into Hindi and 17,142 judgments into 16 regional languages by 2024. Virtual hearings between 2020 and 2023 prevented an estimated 50,000 metric tons of carbon emissions through reduced travel. While AI integration shows significant promise in reducing environmental impact and improving judicial efficiency, the study identifies key challenges including the need for comprehensive legislation governing AI use in judiciary, substantial infrastructure requirements, and data privacy concerns. The recent allocation of ₹1,500 crore for Phase III of the e-Courts Project and the implementation of the Digital Personal Data Protection Act demonstrate strong governmental commitment to technological advancement in judiciary while addressing legal and privacy concerns.

KEYWORDS

artificial intelligence, Indian judiciary, environmental sustainability, climate change, technology, legality

1 Introduction

India is one of the largest democratic countries having known for its judicial setup. The ongoing problem with Indian judiciary is the increased pendency of cases resulting in delayed justice. There are many factors contributing to the same such as increased filling of cases, less infrastructure, a smaller number of judges, red-tapism, etc. On an environmental safeguarding approach, it is also known that the Indian judiciary is prone to have the traditional set up relying more on paperwork. This makes the procedure more cumbersome, delayed and equally impacting the environment in a negative way. The increasing development in technology could

be of a more aid to Indian judiciary in this aspect. Artificial intelligence can be incorporated in the judiciary to address these issues, and it can also be a solution to other issues such as language diversity, quick mode of completing tasks, etc. At present the Supreme Court of India has constituted AI Committee to assist the judiciary in various aspects. Some of the aspects are incorporated while the others are being worked on. With the increasing climate change, it is of utmost importance for the State to investigate environmental sustainability and prevent depletion of natural resources. When the State incorporates a sustainable approach of incorporating AI in its primary function it would be of immense contribution to environmental sustainability. Indian judiciary has begun to facilitate the same. However, it would not be free of legal problems. This research paper delves deep into the various aspects over which artificial intelligence have been incorporated in Indian justice and how it had contributed to have an environmentally friendly approach thereby helping to attain environmental sustainability. The authors have analyzed the legal issues that would arise because of incorporating AI in judiciary and suggested some measures addressing the same.

2 Methodology

The research undertaken is both doctrinal and analytical focused on environmental sustainability in the Indian Scenario in the light of incorporating AI in judiciary and analyzing its legality and practical effectiveness. The research relies on gathering information from both primary and secondary sources, including books, journals, websites, case laws, and other relevant materials.

Sources were selected based on their relevance to the Indian judiciary's integration of AI, their authority within the legal and technological fields, and their contribution to understanding the intersection of environmental sustainability and AI. Primary sources include relevant case laws, statutes, and government reports, while secondary sources involve academic publications, expert opinions, and credible online resources.

To ensure data validity, the research cross-references multiple sources, including both legal documents and scholarly analysis, ensuring a balanced and accurate understanding of the subject matter. This study employs doctrinal legal analysis to interpret statutes, case law, and policy documents and incorporates an analytical approach to assess the impact of AI on legal practices, with particular emphasis on environmental sustainability.

The study draws on a variety of authoritative sources to provide a well-rounded analysis. These sources include reports and publications by government bodies, such as:

- **Centre for Law and Policy Research (CLPR)**, which provides insights on the role of AI in judicial processes.
- **eCommittee Supreme Court of India**, which offers detailed information about the eCourts project and its phases, directly linked to the modernization of the judicial system in India.
- **Ministry of Electronics and Information Technology (MeitY)**, which lays the groundwork for India's national strategy on digital governance, including AI integration.
- Reports from **NITI Aayog**, such as “*National Strategy for Artificial Intelligence*” and “*AI for All: 2022*,” which outline the

government's vision for AI in various sectors, including the judiciary.

- Publications by the **National Informatics Centre** and **Press Information Bureau (PIB)**, which provide information about specific AI-driven tools such as the SuVAS translation tool, a crucial element for simplifying legal processes.
- **Supreme Court of India's Annual Reports**, which offer insights into the structure and functioning of the judiciary, contributing to understanding the existing legal framework.

Additionally, the methodology incorporates policy document analysis to evaluate government initiatives and policies related to AI and environmental sustainability, offering a comprehensive overview of the current legal framework and its potential for future development.

3 Review of literature

3.1 Artificial intelligence and judicial modernization

This book explores AI integration within China's judicial system and how it improves efficiency, avoids wrongful convictions, and aids in decision-making. It reports on Project 206, an AI system developed by the Shanghai High People's Court to automate criminal case management through automated case filing, investigation, prosecution, trial procedures, and sentencing recommendations. AI application in evidence verification, interrogation assistance, and intelligent court trial support is highlighted as revolutionary instruments for judicial reform. As a remedy for reducing human imperfections, enhancing legal uniformity, and enhancing transparency, the book introduces AI as the answer. The book, however, acknowledges AI bias, ethical issues, and the challenge of balancing automation and judicial discretion. Despite this, there are several gaps in the research, such as the limited discussion on the ethical and legal implications of AI, particularly on data privacy, accountability, and the safeguarding of human rights. The research is China-focused and lacks comparative analysis regarding AI application in other legal systems, which could offer broader insight into best practices and potential pitfalls. There is also a lack of empirical evidence quantifying AI's efficiency in reducing trial duration, reducing case backlogs, and improving legal outcomes. The book is primarily criminal justice-focused and leaves the application of AI in civil, corporate, and administrative law less developed. The book also does not discuss the extent of how AI-based judicial systems interact with human judges, legal professionals, and existing procedural systems. Future research is intended to critically examine the legal and ethical issues of AI, carry out comparative studies on AI-adjudication in various jurisdictions, offer empirical data on the effect of AI on judicial efficiency, broaden its application to areas other than criminal law, elucidate how its introduction can affect environmental sustainability and establish how AI can supplement human judicial decision-making rather than replace it. In bridging these knowledge gaps, future research can have a wider and more balanced knowledge on AI's contribution to judicial modernization.

3.2 Artificial intelligence for sustainable and effective justice delivery in India

This paper explores the capability of AI to reduce India's court case pendency and ensure effective judicial processes. The paper acknowledges India's urgent need to address case pendency due to a lack of judges and increased litigation. Jain opines that AI can accelerate various judicial processes, ranging from document processing of legal documents and case law research to supporting bail, parole, and probation. The paper provides examples of AI application in the courts of developed nations, such as the U.S. and Canada, where machine learning algorithms predict case outcomes and support judicial decision-making. AI's capability to perform administrative tasks, review legal precedents, and reduce human bias is highlighted as the key advantage. However, Jain admits that AI cannot substitute human judges but can be used as a decision-support tool. Although the study provides valuable insights, it also highlights some research gaps. First, the paper does not provide empirical evidence on the effectiveness of AI in accelerating case resolution and judicial efficiency. Second, while the paper acknowledges AI's capability to reduce human bias, it does not examine the possibility of biases in AI algorithms. Third, the study examines the capability of AI in accelerating legal proceedings but not its implications on legal ethics, transparency, and public confidence in automated justice. Fourth, there is limited discussion of AI integration challenges within India's existing judicial system, including compatibility with traditional court procedures and legal professionals' acceptance. Future studies need to conduct studies to evaluate AI's effectiveness on judicial efficiency, examine algorithmic bias in legal AI models, explore ethical and legal challenges in AI-based judicial decisions, and create frameworks for AI implementation in India's judiciary. Plugging these gaps would provide a clearer picture of the role of AI in modernizing the judiciary and ensure that it is properly implemented.

3.3 The role of e-government in public services

The study by [Didin et al. \(2024\)](#) examines the impact of e-government on public services from a bibliometric perspective. The results highlight the revolutionary potential of information and communication technology (ICT) in government, especially improving efficiency, transparency, and access. Employing Biblioshiny, a tool for bibliometric analysis, the study maps prevalent trends in the literature and identifies key scholarly works contributing to research on e-government. The results show that electronic governance enables streamlined administrative processes, reduces bureaucratic hassles, and promotes increased participation of citizens. However, the study also highlights issues such as cybersecurity breaches, uneven digital literacy, and the need for improved infrastructure to facilitate e-government services. While the bibliometric study maps research trends, it lacks empirical case studies that critically evaluate the practical use and effectiveness of e-government policy in different socio-economic contexts. Further, there is a conspicuous absence of focus on developing countries. While the study highlights efficiency and transparency, it does not take into consideration factors such as legal accountability, data protection legislation, or the ethical considerations entailed in e-government.

3.4 Potential and challenges of digital governance at the local level

The study by [Karinda et al. \(2024\)](#) is grounded in local-level digital governance, i.e., on a case study in Central Sulawesi, Indonesia. The study illuminates the different opportunities and challenges of the adoption of digital governance in a developing context. The findings indicate that digital governance can improve data management, accelerate administrative processes, and improve citizen engagement. However, the study also identifies some of the major challenges, including poor internet infrastructure in rural areas, insufficient digital competence among public sector employees, and public skepticism regarding data protection. The study employs NVivo 12 Plus to analyze attempts at digital adaptation, with the emphasis on stronger policy interventions to improve local digital governance. While the study provides valuable findings applicable to the region, it avoids best-practice comparisons from other regions or analyzing how digital governance might be adapted to overcome cultural and socio-economic barriers. While the study mentions data security concerns, it does not analyze the legal frameworks on data protection, privacy legislations, or cybersecurity laws at the local level.

3.5 Sustainable AI: AI for sustainability and the sustainability of AI

The research work by [Van Wynsberghe \(2021\)](#) centers on Sustainable AI, highlighting both AI for sustainability and sustainability of AI. The study illustrates how AI can be harnessed to facilitate sustainability through energy efficiency, environmental surveillance, and optimization of resources. However, the study also brings up the less researched sustainability dimensions of AI itself, such as high energy consumption, ethical imbalances in accessing AI, and the absence of standardized guidelines to constrain AI's environmental impact. The study promotes an integrated strategy that incorporates ecological integrity and social justice into AI development. The key research gaps the study identifies are the importance of an integrated lifecycle analysis of AI's environmental impact, interdisciplinary policy frameworks with AI ethics and environmental studies, research into alternative energy sources, development of standardized sustainability indicators, and public awareness. Although the study offers insightful insights into Sustainable AI, it does not research comparisons with other industries' best practices or regulatory frameworks in other sectors. The study also does not investigate present legal tools for sustainability regulation, carbon emissions laws, or policy on responsible AI development. These gaps require significant attention to ensure AI development aligns with long-term sustainability objectives.

4 Greening of the justice system-need of the hour

4.1 Justice system and its prime role

Judiciary is a separate and important body of the state. It is one of the crucial organs of the government, namely Legislature, Executive and Judiciary. It performs the vital role of addressing the issues raised

by executing the laws enacted by the Legislature. The State would collapse with the disfunction of Judiciary. It aims to ensure justice and fairness. The justice system typically concentrates on two broad forms of cases such as civil and criminal case, each having its own procedures. Its primary role encompasses interpreting and upholding the constitution while ensuring that legislative and executive actions align with constitutional principles.

As the supreme interpreter of laws, the judiciary resolves legal ambiguities and establishes binding precedents that shape jurisprudence. The administrative dimension of judicial function involves overseeing the court system, managing both civil and criminal justice administration. Through innovative mechanisms like public interest litigation and alternative dispute resolution, the judiciary has made justice more accessible to ordinary citizens (Cassels, 1989). The new challenges and opportunities that come before the judiciary in this digital age have been received with initiatives such as e-courts, virtual hearings, and digital case management systems. These innovations enhance efficiency, access to justice, and environmental sustainability. Its role on the world stage has also expanded, and it is increasingly involved in interpreting international treaties, settling cross-border disputes, and ensuring compliance with global legal obligations.

Through its rulings and policy recommendations, the judiciary plays a pivotal role in advancing legal reform and addressing systemic inefficiencies, while championing procedural modernization (Banks and O'Brien, 2015). Preserving public confidence remains a cornerstone of its function, achieved through transparent operations, well-reasoned judgments, and the provision of accessible information on court processes (Donnelly, 2024).

4.2 Environmental sustainability and its importance

Environmental sustainability is the careful use and management of natural resources so that they are available for use by both current and future generations. In order for future generations to make use of these resources, the current generation has to utilize them productively and in a controlled manner to prevent overexploitation. It also includes environmental preservation, economic development, and social equity (Kumar et al., 2024). The basis of environmental sustainability is the fact that human survival is closely linked with natural ecosystems, and a balance has to be struck between use and conservation (Eldredge, 2000).

The three core elements of environmental sustainability are ecological balance, resource management, and pollution control (Hussen, 2012). Ecological balance refers to the preservation of habitats, the protection of threatened species, and the maintenance of the continuity of natural processes upon which all life on Earth depends. Healthy ecosystems provide very important services to humans in terms of air purification, water filtration, and soil fertility, among others—all very essential for human survival. Resource management entails the judicious use of renewable and non-renewable resources. It includes the use of efficient methods of extraction, promoting recycling and reuse, and finding alternatives to resources that are limited. This ensures that needs are met while at the same time reserving resources for future generations. Pollution control implies effective management of pollution

affecting air, water, and soil. This entails emission reduction, proper waste management, and cleaner methods of production. The approach emphasizes both preventing future pollution and addressing existing environmental harm (Van Wynsberghe, 2021, 216).

Environmental sustainability has multiple uses, namely, environmental, social and economic benefits. Environmental benefits include climate stability, biodiversity conservation and natural resource protection. Climate change is a crucial issue faced by all the countries over the world (Ammal, 2024). Environmental sustainability will address this issue by attaining climate stability through reducing greenhouse gas emissions, promote carbon sequestration, support climate adaptation strategies, transitioning to renewable energy, improving energy efficiency, and protecting natural carbon sinks (VijayaVenkataRaman et al., 2012). Earth's rich biodiversity needs to be conserved for maintaining the food chain, ecosystem resilience, medical discoveries and food security (Sunderland, 2011). This can be done by environmental sustainability which efforts to protect both individual species and the entire ecosystem. Natural Resource Protection involves the wise use of natural resources, preventing depletion and maintaining ecological balance which includes water conservation, forest management, and soil protection (Kumar, 2023).

The social benefit of environmental sustainability is the betterment of public health, promotion of social equity and improvement of quality of life. Betterment of public health includes enhancing air and water quality, minimizing exposure to harmful toxins, and improving living conditions (Wu et al., 2007). Adopting sustainable practices helps prevent environment-related health problems and reduces healthcare expenses (Adanma and Ogunbiyi, 2024). By ensuring fair resource distribution and promoting equal access to natural resources, societal equity is achieved. Better quality of life can be achieved through improved urban spaces, access to nature, healthier living conditions, creating green spaces, reducing pollution, and promoting sustainable transportation options (Mensah et al., 2016).

The economic benefit of environmental sustainability includes green innovation, cost savings and market opportunities. Environmental sustainability fosters technological innovation and opens up new economic opportunities. This includes advancements in renewable energy, sustainable agriculture, and green building technologies. Such innovations not only drive job creation but also stimulate economic growth (Butt, 2024). Improved efficiency, reduced resource consumption, lower energy costs, reduced waste management expenses, and improved resource utilization results cost savings (Rosen et al., 2008). Increasing consumer awareness of environmental concerns is driving demand for sustainable products and services (Niva and Timonen, 2001). Businesses that embrace sustainable practices often gain a competitive edge and tap into emerging market opportunities (Srivastava et al., 2013).

Suggested ways through which environmental sustainability could be implemented would be through proper policy measures and regulatory framework, developing a technological solution, and individual and community action through social and self-consciousness. Increasing population growth, Urbanization and climate change are the possible challenges to implementation of environmental sustainability (Satterthwaite, 2008). It is important to note that technological innovation, global cooperation, and a green economy are ongoing opportunities for maintaining sustainable environment (Cosbey, 2011).

4.3 Environmental impact by the judiciary

The Indian judiciary, being the backbone of dispensation of justice, contributes to a sizeable environmental footprint, much of which remains out of sight. This is so because of various operational dimensions, including extensive paper consumption, demands for physical infrastructure, transportation needs, and the centralized functioning of higher courts. In order to foster sustainability in the judicial framework, this aspect needs to be widely understood.

4.3.1 Paper consumption and documentation

The Indian judiciary's dependence on paper documentation constitutes one of its most significant ecological impacts. A 2023 report by the E-Committee of the Supreme Court found that Indian courts use an estimated 12 billion sheets of paper in a year (Centre for Research & Planning, 2023). To put this in perspective, that is roughly equivalent to 1.3 million trees cut down every year just to keep the judiciary's paper needs satisfied. The Supreme Court alone generates an estimated 70,000 pages of documents daily, considering both filing and internal paperwork. It's more worrying in lower courts where the adoption of digital was relatively late. A report by the Ministry of Law and Justice says district courts in India use anywhere from 1,000 to 3,000 sheets of paper per case, depending on the complexity and length of the litigation (Ministry of Law & Justice, 2023). With more than 3.5 crore cases pending in courts of various levels, paper consumption reaches staggering proportions (Supreme Court of India, 2024). Initiatives such as e-filing and digital court proceedings, accelerated in the wake of the COVID-19 pandemic, notwithstanding paper usage remains at high levels. The National Judicial Data Grid reports that only about 15% of court proceedings currently operate in a completely paperless manner, which shows the gigantic potential for the reduction in paper consumption through further digitization (Centre for Research & Planning, 2023).

4.3.2 Physical storage requirements and infrastructure

The physical storage of court documents presents another significant environmental challenge. The Indian judiciary maintains vast archives of case files, requiring extensive infrastructure and energy consumption for preservation. According to the National Archives of India, the judiciary currently maintains over 70 million square feet of storage space across the country, with climate control systems running continuously to preserve documents (Centre for Research & Planning, 2023).

The energy consumption for document preservation is substantial. A 2022 energy audit of judicial buildings across major cities revealed that document storage facilities consume approximately 30–40% of the total electricity used in court complexes (Centre for Research & Planning, 2023). This translates to roughly 200–250 million kilowatt-hours annually, contributing significantly to the carbon footprint of the judicial system.

Moreover, the construction and maintenance of storage facilities require considerable resources. The Department of Justice reports that approximately ₹500 crores are spent annually on constructing and maintaining document storage facilities across India's courts. This infrastructure development often involves land use changes and construction activities that impact local ecosystems.

4.3.3 Transportation and travel impact

Centralization of the higher judiciary bodies in New Delhi causes significant environmental effects due to transportation and travel. The Supreme Court and the different National Commissions, by being concentrated in the capital city alone, cause extensive travel to all parts of the country.

Many advocates travel to Delhi every week from various parts of the nation for appearances before the Supreme Court. This produces a high range of carbon footprint excluding the local transportation within Delhi for court-related purposes. This situation stretches to the National Commissions too. The National Green Tribunal, National Human Rights Commission, and other specialized bodies in Delhi attract visitors from all over the country. A conservative calculation shows that these commissions together would have an average annual emission of around 30,000 metric tons of carbon through travel-related activities.

The centralization of higher judiciary bodies increases environmental impact through travel and raises questions about access to justice. With the location of the Supreme Court in New Delhi, litigants from far-off states like Kerala, Tamil Nadu, or the Northeastern states must travel more than 2,000 kilometers to attend hearings. This increases carbon emissions and creates disparities in access to justice.

5 Technological incorporation in judiciary

The integration of technology into the Indian judiciary has been a transformational journey aimed at improving efficiency, transparency, and accessibility in the dispensation of justice. With over 32 million cases pending in various courts across the country, according to the National Judicial Data Grid (NJDG), the paper-based judicial system has faced an uphill task in dispensing timely justice (Ministry of Law & Justice, 2023). To tackle these problems, the Government of India had initiated the National e-Governance Plan (NeGP) and later launched the e-Courts project. This is an initiative that aims to transform the judicial landscape using Information and Communication Technology (ICT) to make processes seamless and citizen centric.

5.1 E-committee of the supreme court

Historically, the judiciary in India has been known for its inefficiencies, delays, and non-transparency. The traditional paper-based system has not only ensured snail-paced case clearance but also denied litigants the right to know anything about their cases (Kumar and Dahiya, 2024). Rising arrears of cases further raised the need to reform it. The Government of India realized that such issues can be mitigated with the use of appropriate technology. In 2005, the Supreme Court of India established the e-Committee that would oversee the implementation of ICT (Information and Communication Technology) across the judiciary. This committee developed what became the e-Courts project, which aimed to provide a more efficient, accessible, and citizen-friendly judicial process through ICT. The mandate for the e-Committee is to monitor progress at various levels on different projects under its purview, along with facilitating process

re-engineering efforts across the high courts to modernize existing rules and procedures. It examines current practices in place and recommends changes consistent with modern technological capabilities and thereby ensures that technology works as an enabler within the judicial process, rather than an impediment (eCommittee Supreme Court of India, 2024a).

5.2 National e-governance plan (NeGP)

The National e-Governance Plan (NeGP) was launched in 2006 with a vision to make all government services accessible to citizens electronically. The plan aims to improve the efficiency of government operations and enhance the quality of services provided to citizens. Under this initiative, various sectors, including health, education, and public administration, have been targeted for digital transformation. The core objective of NeGP is to create a citizen-centric governance framework that leverages technology to simplify processes and improve access. One of the key components of NeGP is its focus on transforming traditional systems into digital platforms. This transformation is particularly crucial for the judiciary, where delays and inefficiencies have long been a concern. The NeGP emphasizes using ICT to move from a paper-based system to a paperless environment, thereby facilitating quicker case processing and better management of judicial records.

5.3 The e-courts project

Under the NeGP, the e-Courts project was initiated in 2007 with the vision of an ICT-enabled transformation of the Indian Judiciary. The project operates as an Integrated Mission Mode Plan with a view to enhancing judicial efficiency and access to justice. The e-Committee of the Supreme Court has played a vital role in formulating this initiative, which has been structured into multiple phases, ensuring comprehensive ICT enablement at all levels of courts (eCommittee Supreme Court of India, 2024b).

5.3.1 Phase I: establishing basic infrastructure

The first phase of the e-Courts project concentrated on putting in place the basic infrastructure needed for ICT integration. This involved setting up computer hardware, software systems, and internet connectivity in the districts and subordinate courts. It equipped judges and court staff with laptops and trained them in operating systems such as Ubuntu Linux to enhance the technological capacities of its personnel. CIS was implemented to streamline case management processes. It enabled real-time tracking of cases, and judges and court staff were able to monitor the case flow. Moreover, litigants were able to obtain information pertaining to their cases through web-based portals (eCommittee Supreme Court of India, 2024c).

5.3.2 Phase II: expansion and enhancement

Building on the platform laid in Phase I, Phase II of the e-Courts project received cabinet approval for a budget of ₹1,670 crores. This phase focuses on universal computerization, cloud computing for case records, and expanded electronic services, including e-filing and online payment gateways. This project will also link all courts through a Wide Area Network (WAN) and set

up centralized filing centers to ensure easier access for litigants. One of the most striking features introduced during this phase is video conferencing facilities in courtrooms and jails. This capability became very relevant during the COVID-19 pandemic when physical appearance became difficult. Video conferencing helped not only to keep the continuity of judicial proceedings but also to reduce the delays caused by the logistics involved in bringing prisoners to court for hearings (eCommittee Supreme Court of India, 2024a).

5.3.3 Phase III: advanced features and integration

As technology advances, the e-Courts project is now going into its Phase III: incorporating the latest features such as artificial intelligence and machine learning in judicial processes. They can be of great use in analyzing huge volumes of legal data, thereby aiding judges to arrive at a decision most efficiently. Similarly, AI may be used in predictive analytics to help establish trends in case law and predict case outcomes based on historical data. Another notable feature would be the provision of mobile applications for litigants to further increase access. Users will be enabled to file cases electronically and receive updates on case statuses and view judgments from their mobile phones (eCommittee Supreme Court of India, 2024b). The developments are expected to help bridge the digital divide and render justice accessible to all citizens.

5.4 Initiatives in Indian courts

The adoption of Information and Communication Technology (ICT) varies across Indian High Courts, with each implementing distinct initiatives to enhance judicial efficiency.

The Gujarat High Court has implemented 'CIS 2.0' in district courts, emphasizing the use of video conferencing (VC) and media facilities (Damle and Anand, 2020). In order to utilize these technologies effectively, the High Court organizes training programs for judges, as part of the larger goals of the e-Courts project. Additionally, Taluka Courts upload data on orders and judgments through GSWAN/NICNET connectivity to a staging web application server at the High Court. A major achievement is the introduction of online bail applications, which have considerably enhanced access to legal aid services (Rehn et al., 2011).

The Uttarakhand High Court inaugurated its official website on March 16, 2010. The website interlinks all the thirteen District Courts in the state (National Informatics Centre, 2024). The Court developed the 'District Court Information System' (DCIS) software to impart training to the officials engaged in computerization work at the district level. The software helps in the conceptualization and implementation of ICT related initiatives besides ensuring compliance with the guidelines issued for the central government websites (Bhardwaj, 2013).

Karnataka High Court has pioneered the successful utilization of ICT. It uses SMS based services to update advocates and litigants on the status of cases; 177 of the 199 courts are using this facility. Available with the 'HC2LC application,' this system facilitates communication from the High Court to the subordinate courts (Karnataka Judiciary, 2024). For example, once appeals or revisions are made on interim orders, the judges concerned receive SMS updates regarding the stay of proceedings and the status thereof, so they may prepare the relevant

paper for the hearing of such matters. In this way, much precious time in court is saved. On the recruitment front, the Karnataka High Court has introduced the use of ICT tools to its online processes, increasing the applications in this regard.

6 AI in Indian judiciary

India has undertaken a more ambitious path toward incorporating AI into its judicial ecosystem through the Ministry of Electronics and Information Technology (MeitY), NITI Aayog, and the AI Committees of the Supreme Court. The launch of AI-based tools like SUPACE, SUVAS, and SCI-Interact is, therefore, a giant stride toward increasing judicial efficiency, reducing human error, and ensuring better access to justice.

6.1 Ministry of Electronics and Information Technology (MeitY)

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6.2 NITI Aayog

NITI Aayog, the premier policy think tank of the Indian government, has played a vital role in promoting the adoption of Artificial Intelligence for effective governance. In its flagship strategy document, National Strategy for Artificial Intelligence, NITI Aayog lays much emphasis on the application of AI in crucial sectors such as healthcare, education, agriculture, and the judiciary. The strategy underlines the transformative potential of AI in addressing systemic inefficiencies within the judicial system (NITI Aayog, 2024).

NITI Aayog urges the adoption of AI-driven instruments that can analyze vast legal datasets, predict the outcome of cases, and help the judiciary in decision-making. In this context, the think tank builds a collaboration framework between the judiciary and technology companies to develop indigenous AI systems that cater to the complexities of the Indian legal system and the country's linguistic diversity. In this manner, the proposal tries to harness the prowess of AI to improve efficiency, accessibility, and transparency in judicial proceedings (NITI Aayog, 2022).

6.3 The Supreme Court's AI committee

In 2019, the Supreme Court of India set up the Artificial Intelligence Committee to explore the potential of AI in judicial processes. The committee, led by Supreme Court Justice L. Nageswara Rao, focuses on how to use AI to improve efficiency and case management. More specifically, it has been mandated to identify AI solutions that can reduce the burden on courts, minimize delays, and

enhance access to justice. This committee works in collaboration with other judicial bodies, IT experts, and academic institutions to ensure AI adoption does not violate ethical standards and legal principles. It is an assistive tool, not a decision-making authority, with the focus on retaining the human element in judicial adjudication (IndiaAI, 2024a).

6.4 SUPACE

One of the flagship initiatives of the AI Committee of the Supreme Court is in developing SUPACE—Supreme Court Portal for Assistance in Court Efficiency. SUPACE will be a multi-dimensional AI-driven platform to enhance the efficiency of the judiciary (Sharma, 2023). It has quite a few components, each serving a unique purpose.

6.4.1 File preview system

The file preview feature allows judges to access summarized versions of lengthy case files. Using NLP algorithms, the system will identify key points, extract relevant facts, and organize data in a format that is easy to digest. This significantly reduces the time spent by judges on preliminary case review and allows them to focus on substantive legal issues.

6.4.2 AI-driven chatbot

SUPACE will also include a chatbot feature to make interactions possible between legal professionals and the AI system. It provides answers to queries on case status, clarification of the law, or procedural instructions. This greatly reduces the volume of routine inquiries by clerical staff and improves overall user experience.

6.4.3 Logic gate mechanism

The logic gate mechanism is a decision-support system that helps judges in the evaluation of legal precedents and arguments. The mechanism applies machine learning algorithms to the analysis of past case data, identification of relevant judgments, and prediction of potential case outcomes. Such predictive capabilities allow judges to make informed decisions while maintaining judicial discretion.

6.4.4 Notebook system

SUPACE has an inbuilt notebook system where judges and researchers can annotate case files, add comments, or store observations. The notebook works like a digital workspace that enhances case management and helps in collaborative efforts.

6.5 Development of SUPACE

The technical foundation for SUPACE was laid in 2020. This phase involved training the AI algorithms for NLP, data extraction, and machine learning on large datasets of judgments and legal documents. It was formally launched by then-Chief Justice of India S. A. Bobde in April 2021. Initially, a proof-of-concept demo of the system was demonstrated in order to show what it could do in processing and summarizing case files. The first step in SUPACE's implementation entailed the running of a pilot project across select benches of the Supreme Court. This means judges could test its ability in real-time and also offer feedback to better it. As of 2024, SUPACE operates within the Supreme Court—it mainly focuses on assisting judges with

complex, data-heavy cases. It has not been rolled out to lower courts since the judiciary is gradually testing the applicability and scalability of SUPACE. The apex court plans to extend the utility of SUPACE to high courts and, eventually, lower courts across the Indian expanse (CLPR, 2024).

6.6 SUVAS

SUVAS stands for Supreme Court Vidhik Anuvaad Software, an AI-driven translation software designed to overcome the linguistic barrier in Indian jurisprudence. As India is a multilingual country, the drafting of legal documents takes place in regional languages, which affects accessibility and understanding. In this regard, SUVAS uses machine translation algorithms to translate legal texts from regional languages to English and vice versa. This will result in improved comprehension among legal professionals and also ensure that litigants who hail from diverse linguistic backgrounds can access justice without any barriers (Economic Times, 2024). The software works to translate judgments delivered on several important legal matters, including: Labor matters, Rent Act matters, Land Acquisition and Requisition matters, Service matters, Compensation matters, Criminal matters, Family Law matters, Ordinary Civil matters, Personal Law matters, Religious and Charitable Endowments matters, Simple money and Mortgage matters, Eviction under the Public Premises (Eviction) Act matters, Land Laws and Agriculture Tenancies, Matters relating to Consumer Protection. The app provides updates and translations in six primary languages: English, Hindi, Kannada, Marathi, Tamil, and Telugu. Additionally, it has the capacity to translate documents into nine vernacular languages, which include Bengali, Gujarati, Malayalam, Punjabi, and others (PIB, 2024b).

6.7 Development of SUVAS

SUVAS was officially launched on November 26, 2019, during a program marking Constitution Day. As of 2023, SUVAS has made significant progress in its mission. It has successfully translated over 31,000 judgments by the end of the year, a substantial increase from just 2,238 translations at the beginning of the year. The highest number of translations has been in Hindi, with 22,396 judgments translated, followed by Punjabi (3,572), Kannada (1,899), Tamil (1,172), and Gujarati (1,112). As on 05.08.2024, 36,271 Supreme Court Judgments have been translated in Hindi language and 17,142 Judgments of Supreme Court have been translated in other 16 regional languages and the same are available on the e-SCR portal. Currently, SUVAS is actively translating judgments related to various legal matters such as labor disputes, family law, criminal cases, and consumer protection (PIB, 2024a).

7 International perspective on AI in judiciary and global practices

7.1 International perspective

International regulation of artificial intelligence has evolved over a series of interrelated frameworks, each contributing to the

development of ethical and regulatory standards. In May 2019, the OECD AI Principles were endorsed and became the world's first intergovernmental AI standard, reaffirming inclusive growth, human-centered values, transparency, robustness, and accountability (OECD, 2025). More than 40 states have endorsed these principles, their global scope exceeding the size of OECD membership (Nquiringminds Ltd, 2024). These principles have become a necessary reference framework for AI policy-making at a global level on the basis of five value-driven, interdependent principles focused on the need for AI systems to act for the benefit of humanity and the environment. Five policy recommendations provided by the OECD framework are directly aimed at policymakers: investment in AI research, development of digital ecosystems, designing supportive policy settings, building human capacity, and encouraging international co-operation. Although these principles lack legally enforceable implications, they have established a standard vocabulary and metric for AI governance that aims to harmonize innovation with responsible growth (OECD 2025).

UNESCO sustained this pace in November 2021 with its Recommendation on the Ethics of AI, the world's first internationally agreed normative standard accepted by 193 countries (United Nations Educational, Scientific and Cultural Organization (UNESCO), 2021). The standard is further inclusive, covering ethical concerns throughout the entire AI lifecycle and ecosystem. It prescribes a whole-of-society approach through values and principles of respect for human rights, environment protection, diversity and inclusiveness, and peace and security. UNESCO's Recommendation is significant not least because it has global application and because it has a specific focus on developing countries, where concerns such as the digital divide and knowledge gaps are particularly pertinent. It addresses new emerging ethical concerns such as the effect of AI on labor markets, the environment, culture, education, and healthcare. While not having a legal status, universal uptake of this recommendation imposes strong normative pressure on member states and stakeholders to align their AI activities with the established principles of ethics.

Global Partnership on AI in 2020 was a multi-stakeholder initiative involving countries, industry leaders, civil society, governments, and scholars joining together to bridge the theory-practice gap in responsible AI. Initially founded by 15 states and the European Union, GPAI has expanded in numbers but continued to be focused on applied governance through experiential work. What is novel to GPAI among frameworks is the attempt to engage working groups for responsible AI, data governance, future of work, and innovation. The partnership facilitates projects such as privacy-preserving methods in the face of a pandemic and inclusive design approaches to AI systems. GPAI has a unique institutional arrangement with the OECD serving as its Secretariat, setting up a lab to pilot-test governance approaches by combining representation by democratic governments and multi-stakeholder expertise (GPAI, 2025).

The IEEE Global Initiative is a prominent methodological framework for technical standards in artificial intelligence ethics, blending engineering standards with ethical principles. Established in 2016, it created the extensive "Ethically Aligned Design" framework and has published a series of standards under IEEE P7000 that define technical guidelines for incorporating ethical considerations into AI development. These standards tackle concerns such as transparency, algorithmic bias, data privacy, and other significant concerns,

converting principle-based frameworks into actionable engineering methodologies. The IEEE framework is particularly notable for its pragmatic focus on industrial use and system development, providing certification pathways for technologies that meet compliance standards. By focusing on actionable technical guidelines rather than abstract ethical principles, the IEEE framework effectively closes the gap between ethical ideals and the practical implementation of AI systems (*The IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems*, 2017).

The International Electrotechnical Commission (IEC) and the International Organization for Standardization (ISO) have established a specialized joint technical committee for artificial intelligence standardization. The committee aims to develop international standards that provide a common framework for AI technologies for countries and industries. Published essential standards provide basic terminology, a methodological framework for trustworthiness, and governance implications for organizations. The highly anticipated ISO/IEC 42001 will establish an overall standard for AI management systems, with expected implications similar to other management system standards. The ISO/IEC approach provides unique legitimacy through its formal international standardization process, with the involvement of national standards bodies from more than 160 countries. The standards provide interoperability across different AI systems and technologies across international borders, hence enhancing global trade and technology transfer (*ISO*, 2025).

The UN Secretary-General's Roadmap for Digital Cooperation, launched in June 2020, provides a framework for global cooperation on digital technologies such as AI. It situates digital cooperation in the wider context of realizing the Sustainable Development Goals while preventing risks and ensuring compatibility with human rights. The Roadmap calls out priority areas of action such as universal connectivity, digital public goods, digital inclusion, and human rights in the digital age. The Roadmap is the first to link AI governance to wider digital ecosystem challenges and has influenced a range of implementation initiatives such as the Global Digital Compact. The framework links AI governance directly to international human rights law and humanitarian principles, situating technical governance in the current legal frameworks and encouraging a precautionary approach to applications of high-risk AI (*United Nations*, 2020).

The G20 AI Principles, endorsed by G20 leaders in the 2019 Osaka Summit, are a significant extension of the OECD AI Principles to encompass leading non-OECD countries like China, India, Indonesia, and Saudi Arabia. The G20 endorsement of the principles has greatly extended their global reach across economies with more than 80% of the world's GDP and demonstrating a wide range of governance models. The endorsement of the principles by nations with different political systems demonstrates an unprecedented degree of consensus on the basic AI governance principles despite the different styles of technology regulation and digital rights. The principles are a bridge between Western and non-Western styles of AI governance, promoting a common language among different regulatory cultures while at the same time offering flexibility in the approach to implementation (*G20*, 2019).

World Economic Forum's AI Governance Alliance, formed in 2023, is an alliance of various stakeholders with a mandate to create usable governance tools to ensure responsible development of AI. It concentrates on four areas of utmost importance: designing frontier AI model governance structures, designing risk assessment

frameworks, designing implementation mechanisms, and building capacity. The Alliance has brought together the major AI companies with government officials from various nations, adding to the existing governance activities toward creating new norms but more practical implementation. It puts further emphasis on inclusive governance that will take inputs from both developed and developing economies and ensure fairness and AI access issues (*World Economic Forum*, 2025).

In parallel, industry and private sector approaches have also had a significant impact on the global AI governance landscape. With its establishment by large technology companies in cooperation with civil society in 2016, the Partnership on AI has been working on research and development of best practice on AI ethics. The Montreal Declaration for Responsible AI offers a holistic framework of ethical principles, which has resonated deeply among academic and civil society communities (*Montréal Declaration on Responsible AI*, 2025). Large technology companies have established their own AI principles, such as Microsoft's Responsible AI Principles (*Microsoft*, 2025) and IBM's Principles on Trust and Transparency (*IBM*, 2025). These industry approaches tend to offer much more comprehensive implementation guidance, including specific technical tools and organizational practices. While they have no formal regulative authority, they affect marketplace behaviors through market competition and are often used as test beds for governance approaches to be later implemented in official rules.

Despite the proliferation of frameworks sharing common ethical foundations, international AI governance faces significant harmonization challenges. These various standards differ in implementation specifics, enforceability mechanisms, and particular areas of focus. Countries typically adopt elements selectively from these frameworks when developing their national AI strategies and regulations, leading to a patchwork of approaches. India, with its burgeoning tech sector and AI ambitions encapsulated in initiatives like Digital India and the National Strategy for Artificial Intelligence (NITI Aayog), navigates a unique regulatory path balancing innovation with ethical considerations while addressing specific developmental challenges. Like other developing nations, India grapples with implementation for various other reasons discussed in the later sections of this paper.

7.2 Across the globe

The application of artificial intelligence in judicial systems has shown significant development in numerous countries, each with different approaches for optimizing their legal systems. In California, the United States, the use of chatbots has revolutionized the courts by handling crucial advisory functions and mundane tasks, thus allowing judges to focus on more complex legal matters (*Hodge*, 2023). This development has greatly improved judicial transparency and efficiency of operations. The United Kingdom has also seen significant improvements through the use of sophisticated online court systems that aim to resolve and address disputes. The AI tools created have attained a significant accuracy level of 79% in predicting legal outcomes, and law firms have successfully implemented case prediction models, leading to significant improvements in civil litigation processes (*Krook et al.*, 2024).

The European Union is at the forefront in the concept of referring to highly developed robots as "electronic humans" and conferring

rights and responsibilities upon them (Cui and Cui, 2020). They have also established regulations for data sharing across borders and established concrete legal and ethical standards for the use of AI in courts. Japan is concerned about new legal problems associated with autonomous vehicles in Asia (Ki, 2020), whereas China is striving to establish “Intelligent Courts,” “Intelligent Procuratorial work,” and “Intelligent Public Security” systems (Cui, 2020). These systems have significantly enhanced their court system and the way they govern society.

AI application in courts is much more advanced in other nations than in India. This indicates that the application of AI in courts benefits the environment in numerous ways. Transition to digital documents and e-filing has significantly reduced the use of paper. Online court hearings and virtual appearances have also reduced carbon emissions from travel. Sophisticated AI court systems typically function better by streamlining tasks and enhancing buildings. These digital shifts have eliminated the necessity for large physical storage areas and have reduced the overall carbon footprint of court activities. All these arguments demonstrate that although digital shifts in courts primarily focus on enhancing legal procedures, they largely benefit the environment.

The future of artificial intelligence in the judicial system looks very promising, as more and more countries recognize its ability not just to improve legal processes but also to advance broader societal goals, such as environmental sustainability. With the continued development of these technologies, we expect to see more innovative uses emerge that will enhance both judicial effectiveness and environmental protection. The use of algorithms in legal systems represents a major step forward in the modernization of judicial processes, at the same time supporting global efforts to protect the environment by reducing the use of resources and improving the enforcement of environmental laws.

8 Discussion: the legality, feasibility and promise of invoking AI in Indian judiciary

8.1 Legality of invoking AI

India lacks comprehensive legislation specifically addressing AI's use in the judiciary. However, various existing laws can be interpreted to govern its application. The Constitution of India guarantees fundamental rights that must be upheld in any technological integration within the judicial system. Article 14 ensures equality before the law and prohibits discrimination and Article 21 guarantees the right to life and personal liberty, which includes the right to a fair trial. These articles lay a groundwork on which AI applications should be examined to ensure they are aligned with constitutional requirements.

Lack of laws on AI makes it very difficult to ensure accountability and transparency (Didin et al., 2024). The Indian government has indicated interest in promoting AI technologies through various initiatives, such as NITI Aayog's approach paper on responsible usage of AI. Without well-crafted regulatory frameworks for AI implementation, there will be an increase in probable violations of rights and lapses in ethical standards.

Integration of AI raises concerns over data privacy and security (Karinda et al., 2024). The judicial systems are also dealing with sensitive information that must be protected against unauthorized access or breaches. Strong cybersecurity measures must be put in place to ensure personal data is safe (Srinivas et al., 2019). Individuals have a right to know how their data will be used within an AI system, following Article 21 of the Constitution. Wherever possible, data should be anonymized to protect the identity of the individual and still allow for meaningful analysis.

Globally, different jurisdictions have already started developing frameworks for governance of AI. The European Union's General Data Protection Regulation (GDPR) has provided a strong emphasis on data protection and privacy rights that could be the model for India (Amonkar, 2023). Accordingly, GDPR provides individuals with rights such as informed consent and data portability, which could be adapted in safeguarding citizens' rights in India's judicial context.

In conformity with these international standards, India has legislated on the Digital Personal Data Protection Act (DPDPA), its first all-inclusive data privacy law. Passed on August 11, 2023. This aims at regulating the processing of digital personal data, while in line with protecting individuals' fundamental right to privacy and offering them greater control over their personal data.

The DPDPA shares similarities with the GDPR, including provisions for informed consent and individual rights regarding data processing. It introduces concepts such as “data fiduciaries” who are responsible for managing personal data and “data principals,” referring to individuals whose data is processed. Notably, the DPDPA also mandates the establishment of a Data Protection Board to oversee compliance and address grievances related to data breaches and privacy violations.

By borrowing from the GDPR, the DPDPA will establish a much more transparent and accountable data protection framework in India, which is very important since AI technologies depend on vast realms of personal data. As India goes ahead to implement this law, it will be necessary that AI applications in the judiciary are aligned with these new legal standards to ensure effective protection of citizens' rights.

A thorough review of existing judicial AI uses around the world shows a number of areas where the potential for discrimination and bias is clear. For instance, the stated accuracy rate of 79% for the legal case prediction system in the United Kingdom raises questions about the implications of the 21% of cases outside of this accuracy, and whether certain demographic groups may be disproportionately affected within this margin of error. The use of chatbots in United States courts, while effective in offering basic services, could inadvertently pose accessibility barriers to those with limited technical knowledge or who speak non-dominant languages (Queudot et al., 2020). AI systems are trained on past legal databases, which themselves may contain embedded societal biases and discriminatory patterns. In particular, if past judicial decisions contain inherent systemic bias against particular racial, ethnic, or socioeconomic groups, AI systems trained from such data can replicate and amplify these biases.

The European Union's move to classify advanced robots as “electronic humans” with certain rights poses complex issues regarding accountability and fairness. The possibility of granting legal personhood to artificial intelligence systems calls for an assessment of the safeguards needed to avert the reinforcement of current social biases or the creation of new types of discrimination. This is a

particularly salient issue when such systems engage in decision-making processes that affect marginalized communities or vulnerable populations. An example of this is the use of AI predictive models by law firms in the United Kingdom for personal injury claims, raising issues of transparency and procedural fairness. It is crucial that defendants and their lawyers have a transparent understanding of the decision-making process and maintain the ability to object to assessments generated by AI.

China's use of "Intelligent Courts," combined with widespread social governance systems enabled by AI, raises important questions about the fairness and transparency of algorithms. It is important to closely monitor the use of AI in public safety and judicial systems to avoid the risk of reinforcing current societal biases or creating new types of systemic discrimination.

Japan's treatment of accidents involving autonomous vehicles complicates the determination of liability and responsibility, especially in situations where AI systems affect or influence judicial decisions. This situation creates significant accountability issues when AI-generated decisions result in discriminatory outcomes.

The 2016 *State v. Loomis* case, decided by the Wisconsin Supreme Court, illustrates the complex issues that come with the incorporation of artificial intelligence in judicial processes. At the center of the case was Eric Loomis, who was sentenced to six years in prison, a decision that was informed in part by a risk assessment score generated by COMPAS (Correctional Offender Management Profiling for Alternative Sanctions), a proprietary algorithmic tool. Loomis's challenge over the use of COMPAS in his sentencing procedure raised important questions regarding due process rights, including the transparency of proprietary algorithms used in judicial determinations, the use of gender as a risk assessment variable, and the use of aggregate data for individualized prediction (Freeman, 2016). These questions mirror the general issues faced by modern AI deployments in judicial contexts around the world, as discussed in our earlier analysis of varied national approaches to judicial AI.

The ruling handed down by the Wisconsin Supreme Court in the *Loomis* case provides critical guidance for the future integration of artificial intelligence into judicial systems, determining that while algorithmic tools can aid in sentencing, it is necessary for judges to be aware of their limitations and avoid relying on them as absolute determinants. This ruling is consistent with the cautious approach exemplified in the European Union's far-reaching regulatory policies regarding AI, as well as Japan's focused approach to dealing with specific technological issues. The case highlighted the supreme importance of transparency in AI systems affecting basic rights, despite the widespread use of AI by the global judiciary to promote efficiency and environmental benefits. The balance struck by the Wisconsin Supreme Court—enabling the use of AI tools while demanding rigorous regulation and recognition of their limitations—provides a critical template for fully understanding the ethical application of AI in judicial systems.

The implications of the *Loomis* case go beyond individual rights, pointing to larger systemic concerns regarding bias and discrimination in artificial intelligence. The case highlights the need for rigorous methodologies, as seen in the AI implementations of various countries, such as the predictive models used in the United Kingdom and China's "Intelligent Courts," to be complemented with strong protections against algorithmic bias. It highlights the importance of performing regular audits, promoting diverse development teams, and

creating open appeal mechanisms in AI-facilitated judicial systems. Furthermore, the case illustrates the delicate balance that needs to be struck between using AI for improved judicial efficiency and environmental sustainability while at the same time protecting individual rights and reducing discrimination. This balance becomes ever more critical as courts around the world continue to implement AI technologies, moving from simple administrative tasks to more advanced decision-support systems.

The consequences of *State v. Loomis* continue to inform international debate regarding the incorporation of artificial intelligence into the judicial system, requiring an integrated approach that balances technological innovation with strong procedural protections. Such an approach must resolve near-term concerns of bias and discrimination while, at the same time, address more fundamental issues of transparency, accountability, and fair access to justice. As jurisdictions around the world increasingly implement AI technologies, the *Loomis* case is a critical reminder that the benefits of judicial AI such as enhancing environmental sustainability through reduced paper consumption and travel must be balanced against the fundamental principles of fairness and transparency in judicial proceedings. Such a balance requires careful assessment of the effects of AI systems on diverse demographic groups, in conjunction with the implementation of robust protection against discrimination, all while maintaining the efficiency and environmental advantages provided by such technologies (Van Wynsberghe, 2021, 215).

AI applications need to respect the human rights principles, such as the right to fair trial and right against biasness and discrimination. Any use of AI cannot compromise an individual's right to a fair trial as guaranteed under Article 21 of the Constitution of India.

Climate change is a growing concern being common for all countries. The impact of climate change in India is immense in different aspects such as causing extreme heat, changing rainfall patterns, droughts, reducing ground water levels, glacier melt in Himalayan region, sea level rise, loss in agricultural production/ yield, lack of food security or increase in price of food grains, causing energy scarcity by affecting hydropower and thermal power generation, lack of water security, causing health issues, resulting in migration and related conflicts. Though India being part of various international treaties, it is currently lacking a dedicated domestic policy for climate change mitigation based on ICT invoking approach. While addressing the different pressing legal issues, AI can be invoked in Indian judiciary for addressing the climate change challenges as well. This can be one of the domestic actionable plans in addressing climate change issues.

8.2 Feasibility and potential of invoking AI

It is undeniable that AI is of immense use to the Indian judiciary. The required technological infrastructure for developing AI in support of the judiciary will require allocation of finance by the government. The effectiveness of AI systems lies mostly with the quality of data that is used for training of algorithms (Liang et al., 2022). Inaccurate or biased data can cause flawed outcomes. The implementation of AI requires huge investment in technology and training for legal professionals (Waisberg and Hudek, 2021). Building public trust in AI systems is a must for their acceptance within the judiciary (Fine and Marsh, 2024).

In the recent Union Budget for the fiscal year 2024–25, the Indian government has allocated ₹1,500 crore for the implementation of Phase III of the e-Courts Project. This project aims to leverage technological solutions, including artificial intelligence (AI), to reduce case backlogs and enhance access to justice across the country. The e-Courts Project is part of a broader initiative to digitize court records and processes, making the judicial system more efficient and user-friendly (WebNyay, 2024).

Additionally, the budget for the Ministry of Law and Justice has been set at ₹6,788.33 crore, which includes funding for various initiatives aimed at improving judicial infrastructure and services (The Week, 2024). This allocation reflects a significant commitment to modernizing the judiciary through technology.

Moreover, as part of the larger IndiaAI Mission, which received over ₹10,300 crore in total funding, there is a specific allocation of approximately ₹551.75 crore earmarked for AI research and applications (IndiaAI, 2024b). This mission aims to bolster India's AI ecosystem, including its application within the judiciary, thereby enhancing data analysis capabilities and overall judicial efficiency.

These financial commitments underscore the Indian government's focus on integrating advanced technologies like AI into the judiciary. While the digitalization of judicial systems enhances efficiency, it also risks exacerbating existing inequalities, creating what is commonly referred to as the digital divide. This divide manifests in multiple ways, lack of access to technological infrastructure, economic constraints limiting device and internet affordability, and insufficient digital literacy among certain demographics (Singh and Singh, 2021, 181). In the Indian context, these challenges are particularly pronounced in rural and economically weaker sections of society.

For instance, remote hearings, while reducing travel-related carbon emissions, inadvertently exclude litigants and lawyers who lack stable internet connectivity or access to appropriate devices. Studies indicate that rural areas face significant broadband penetration gaps, and elderly litigants may struggle with digital procedures due to a lack of familiarity with technology (People's Archive of Rural India, 2025). Furthermore, language barriers in digital legal interfaces further alienate non-English-speaking populations.

To ensure equitable access to AI-driven judicial processes, systemic interventions are necessary. Expanding affordable internet access, introducing multilingual legal tech solutions, and implementing nationwide digital literacy initiatives for legal professionals and litigants can help mitigate these disparities. Additionally, hybrid models combining in-person and digital access could prevent exclusion while maintaining environmental benefits.

9 Conclusion

The environmental impact of the judiciary in India is quite massive and varied, from paper usage to storage demands and emissions due to travel. While attempts at mitigating these challenges are in the offing, much is yet to be done. The adoption of digital solutions, coupled with modernization of infrastructure and strategic policy reforms, can very well reduce the environmental footprint of the judiciary while enhancing access to justice.

The need for systematic reforms and innovative approaches is emphasized by this granular analysis of the environmental impact of the judiciary. With India working hard to meet its environmental commitments, the judiciary plays a dual role—of being a protector of

the environment through its judgments and an institution responding to its own environmental footprint. The next few years will be crucial in determining how well the judiciary can balance its essential functions with environmental sustainability. Notably, virtual hearings, which gained momentum during the COVID-19 pandemic, hold great promise in reducing travel-related emissions. According to data from the E-Committee of the Supreme Court, virtual hearings held from March 2020 to December 2023 saved an estimated 50,000 metric tons of carbon emissions by reducing travel.

Strong legal frameworks for the integration of Artificial Intelligence in judicial proceedings must also be developed. This will ensure that the judiciary harnesses the potential of AI while being cognizant of the risks associated with it and works toward a more efficient and sustainable delivery of justice. This research has thrown light on the same to have our judiciary in an environmentally friendly approach and at the same time having legal acceptance of it. It is also known that technological incorporation would have a negative impact over environment, but India has not yet progressed to that stage. This negative impact should also be given importance while framing the legal regulations to have sustainable growth.

AI taking the role of human decision makers is not advisable as it leads to many complicated issues such being bias and discriminatory, lack of transparency and affects the right to fair trial. It is highly encouraged to have AI supporting the judges and judiciary rather than playing its role. It is critical to protect key human oversight and intervention capabilities, particularly in situations related to core rights or complex social relationships. This should be prioritized while integrating new technological and legal advances into the judicial system. Thorough assessments of artificial intelligence systems are crucial to detect and rectify potential biases in decision-making. Additionally, setting clear standards to ensure that AI-augmented judicial services continue to be accessible to diverse demographic groups, including provisions for alternative access mechanisms, is of the highest importance in developing nations.

India currently lacks a dedicated domestic policy for climate change mitigation based on ICT invoking approach, despite being part of various international treaties. This context of incorporating AI in judiciary can be a better recommendation to include in climate change policies. To support these efforts, the authors propose several policy recommendations: A phased approach to rolling out AI-powered tools like SUPACE in district courts, ensuring effective oversight and gradual adaptation for all sets of users. A comprehensive regulatory framework that defines AI's role in the judiciary and ensures it remains a tool for human decision-making, with regular AI audits for bias and ethical compliance. Investment in infrastructure to develop secure, AI-compatible digital courtrooms, especially in High Courts and district courts, alongside an expansion of virtual hearings to maximize accessibility and reduce environmental impact. Training programs for the judiciary, lawyers, and court staff to familiarize them with AI-assisted tools while ensuring human oversight is maintained. Finally, policies that account for the environmental impact of AI, promoting energy-efficient AI technologies and fostering climate-conscious approaches to judicial digitization.

Additionally, to guarantee equitable participation in the digital judiciary, it is imperative to ensure free access to the internet. This can be achieved through government-funded public Wi-Fi networks, subsidies for low-income individuals, and partnerships with private providers to ensure internet access in underserved regions. Legal frameworks should recognize internet access as a fundamental right,

ensuring that every citizen has the ability to access legal services, including virtual hearings, without financial or technological barriers. Public initiatives should ensure that internet access is available in all judicial spaces and critical public institutions, with a focus on affordability, sustainability, and universal digital literacy programs. Ensuring free internet access will eliminate barriers and promote inclusivity in India's digital transformation of the judiciary.

Looking forward, this paper will provide a spark for future empirical research on AI's efficiency in courts, public perceptions of automated justice, and the legal challenges in integrating AI into the judiciary.

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The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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The authors declare that Gen AI was used in the creation of this manuscript. Generative AI was used only to edit the paper and for using appropriate vocabulary. It was strictly not used to generate the content by itself and used only for improving the language and for preparing the exact citation style.

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