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Changing Dimensions in the Era of Artificial Intelligence: Re-envisioning the Indian Criminal Justice System in the 21st Century

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ABSTRACT

In the era of AI, the cybercrime rate has drastically increased, necessitating a shift from the traditional criminal justice system to a technologically driven criminal justice system. This research article, Changing Dimensions in the Era of Artificial Intelligence: Re-envisioning the Indian Criminal Justice System in the 21st Century, critically examines the potential of AI to reduce current system inefficiencies while complying with the constitutional standards. It describes the historical evolution of the criminal justice system. It begins with the integration of AI into the criminal justice system by identifying loopholes in the current criminal justice system, such as delays in trials, inadequate investigative capacity, poor coordination, etc. It highlights emerging technological initiatives in India, including predictive policing, evidence analysis, and correctional administration.

Through the comparison of different countries, this article illustrates the key concerns and legal safeguards of the United States, the United Kingdom, and China to get a balanced approach for India. The ethical dimensions of AI are also scrutinized in this study. It is concerned that over-reliance on technology may degrade the quality of decisions. Ultimately, this article proposes a reform-orientated framework for integration of AI in the Indian criminal justice system, ensuring compliance with constitutional provisions. By balancing innovation with constitutional safeguards, the study envisions a more accountable, efficient, and rights-orientated criminal justice system in India.

KEYWORDS

Criminal Justice System, Cybercrime, Artificial Intelligence, Technological Initiatives, Predictive Policing, Correct administration

1. INTRODUCTION

The Criminal Justice system (CJS) is the institutional framework that includes the judiciary, law enforcement, and other correctional systems. It includes the prosecution and conviction of those who violate the law and commit crimes. It focuses on upholding justice, maintaining social order, fairness, and ensuring public safety. Its core principle is to deliver justice. "The criminal justice system is a set of legal and social institutions to enforce criminal law in accordance with a defined set of rules and regulations."[1] In India, it is governed under the Bhartiya Nyaya Sanhita (2023), Bharatiya Nagarik Suraksha Sanhita (2023), and Bhartiya Sakshya Adhiniyam(2023).

In the ancient era, justice was served based on Dharma, following the principles of Manusmriti, Arthashastra, and Shrimad Bhagavad Gita. In the Colonial rule, Britishers introduced criminal laws like the Indian Penal Code (1860), the Criminal Procedure Code (1973), and the Indian Evidence Act (1872). After India gained independence, the introduction of the Indian Constitution (1950) infused the system with Fundamental rights. In 2023, India left its colonial legacy by implementing Bharatiya Nyaya Sanhita, Bharatiya Nagarik Suraksha Sanhita, and Bharatiya Sakshya Adhiniyam. In the era of AI, the crime rate has drastically increased, which requires a shift from the traditional Criminal Justice System to a technologically driven Judicial system. This 21st Century demands a paradigm shift from a human-based criminal justice system to an AI-based criminal justice system. The current criminal justice system is ineffective for AI-driven crimes like deepfakes and financial fraud.[2]. A manual system cannot keep pace with speedy digital crime. Rethinking the criminal justice system doesn't only mean making new laws or policies, but it is about the processes behind it. The need is not only for a reactive system but also for a predictive criminal justice system. The lacunae of the current criminal justice system can be the power features of the Re-envisioned Criminal justice system. Crimes can be predicted and controlled by the use of AI.

AI is one of the significant tools in many sectors in the current times, including the Criminal justice system. The most important reason for incorporating AI in the criminal justice system is its ability to analyze and evaluate large volumes of data, providing supporting ideas to think

[1]The Criminal Justice System, Lumen Learning (n.d.), https://courses.lumenlearning.com/

[2] Crime in India — Table, Additional Table & Chapter Reports, National Crime Records Bureau, Ministry of Home Affairs, Government of India, https://www.ncrb.gov.in/crime-in-india-table-additional-table-chapter-reports

beyond human perception and help in collecting evidence. "In the criminal justice system, AI is generally used for crime prevention, crime prediction, crime analysis, and recidivism risk assessment, and technologies designed by private companies are used especially for law enforcement."[3] As the technology is developing rapidly, the use of AI in the criminal justice system is also diverging, and it can shift various aspects of the criminal justice system, including evaluating data, processing files, predicting crime, verifying evidence, making decisions, and redefining the criminal justice system along with the enforcement of laws. AI has the capability to predict crime, prevent crime, and detect crime.[4] The involvement and use of AI in the criminal justice system in the form of machine learning and deep learning highlights the need for careful consideration of its social, legal, and ethical implications and states the need for a precautionary approach to its use in the criminal justice system. Fundamental rights must be protected through a commitment to the integration of AI into the criminal justice system. Therefore, the utilization of the use of AI in the criminal justice system must be regulated by some legal safeguards and ethical principles to reduce all the risks related to the utilization of AI in the criminal justice system.

2. KEY CHALLENGES IN INDIAN CRIMINAL JUSTICE SYSTEM

The first step of the Criminal justice process is carried out by the Police. However, some problems often affect investigations, such as limited training, shortage of staff, and outside influence. The support from forensics is not as strong as needed; also, delayed examinations and results degrade the quality of evidence.

The prosecution is the one that bridges the investigation into courts. The prosecutors often lack coordination with the police because there is a huge no. Of cases to handle by them. This affects the fairness of trials and weakens the presentation of cases. In India, courts have a huge no of backlogs (cases pending).[5] The process is slowed down by the frequent adjournments and

[3] Asma Idder & Stéphane Coulaux, *Artificial Intelligence in Criminal Justice: Invasion or Revolution?* (International Bar Association, 13 Dec. 2021), https://www.ibanet.org/dec-21-ai-criminal-justice

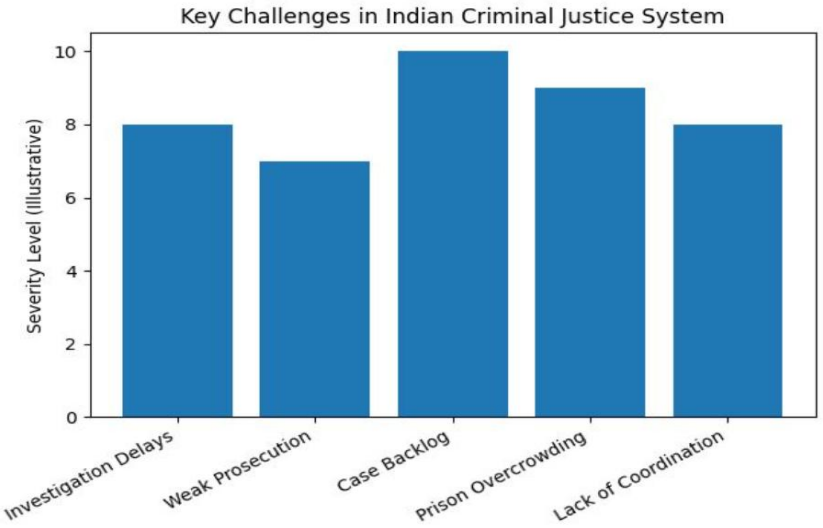
[4] Oghenevovwero Zion Apene, Nachamada Blamah & Gilbert Imuetinyan Osaze Aimufua, *Advancements in Crime Prevention and Detection: From Traditional Approaches to Artificial Intelligence Solutions*, 2 *European Journal of Applied Science, Engineering and Technology* 285 (2024), https://ejaset.com/index.php/journal/article/view/41

[5] A. Dalmiya, *The Impact of Pending Court Cases on the Efficacy of the Judicial System in India: Justice Delayed Is Justice Denied*, 10 *Int'l Journal of Social Science & Econ. Rsch.* 45 (2023), https://ijsser.org/the-impact-of-pending-court-cases-on-the-efficacy-of-the-judicial-system-in-india

shortage of Judges. Due to this, the undertrial prisoners spend a long period of time in custody, waiting for decisions, and justice is delayed.

The infrastructure is overburdened due to the overcrowded prisons; they focus more on punishment, not on reform. The rehabilitation programs and basic facilities are limited. Efforts for reform exist, but their implementation is slow and uneven.

Overall, the main reason behind all this is that the system suffers from a lack of modern infrastructure and poor coordination. At every stage, there is a common issue, i.e., delays and inefficiencies in the Indian criminal justice system. This shows that reforms are needed to make the system fairer and more effective.



Graph 1.1[6]

This graph depicts the severity levels of the key challenges in the Criminal justice system. The most severe challenge is the case backlog, which affects the credibility of the criminal justice system to a great extent.

3. AI APPLICATIONS IN CRIMINAL JUSTICE SYSTEM

In today's era, some technological tools of technology, especially artificial intelligence, have entered the Indian criminal justice system slowly. It aims to reduce delays and enhance

[6] National Crime Records Bureau, Ministry of Home Affairs, Government of India, *Crime in India* (latest ed.), https://www.ncrb.gov.in .
-Law Commission of India, *Report No. 221: Need for Speedy Justice* (2009), https://lawcommissionofindia.nic.in

efficiency. However, their use must be tested against constitutional safeguards such as privacy, fairness, and due process because these tools deal with personal data and decision-making. This was recognized in the landmark case of K.S. Puttaswamy Vs. Union of India.

Some AI tools like facial recognition systems and prime mapping software are used by the police authorities. It helps them identify suspects and monitor public spaces. It also explores predictive policing to analyze the patterns of crime and to prevent them. However, some concerns about privacy and misuse of power are raised through the use of AI. The Supreme Court has also laid down some safeguards against arbitrary surveillance.[7]. For large-scale data collection, the principles have even become more important. As discussed in the case of K.S. Puttaswamy, any use of such technology must satisfy some test of legality, proportionality, and necessity.

In cybercrime cases, AI plays a critical role in analyzing digital evidence. It also helps in identifying relevant information about the case and summarizing large volumes of data quickly. This makes the investigation more effective and efficient.

At the same time, the legal validity of evidence must be ensured. The Supreme Court has also stated in a landmark case that electronic evidence must comply with the procedural requirements established under the Bharatiya Sakshya Adhiniyam. [8] Means the data or evidence that is AI-generated or a processed document cannot be considered authentic and cannot be accepted as evidence in court. It must meet the legal standards to be presented as evidence in court.

The judiciary has made progress through the E-courts project, which allows virtual hearings and online case filing. Some AI tools are also being used for case management and legal research. However, these tools only assist and do not replace judicial decision-making. The importance of fair procedure mentioned in the Bharatiya Nagarik Suraksha Sanhita requires that the decision provided by the court be just, reasonable, and fair.[9] Any use of AI in future decision-making cannot infringe these principles and cannot override human judgment.

[7] People's Union for Civil Liberties v. Union of India, (1997) 1 SCC 301 (India).
[8] Arjun Panditrao Khotkar v. Kailash Kushanrao Gorantyal, (2020) 7 SCC 1 (India).
[9] Maneka Gandhi v. Union of India, (1978) 1 SCC 248 (India).

AI is also used to assess the offender's behavior in prisons and evaluate risk levels of prisoners, which may influence important decisions like parole. Such practices raise concerns about transparency and fairness.

The principle that arbitrariness violates Article 14 becomes relevant.[10] AI systems may lead to unfair treatment of individuals if they produce biased and unclear outcomes. Many states have shown a shift towards technologically driven systems by introducing pilot projects using AI tools like facial recognition and predictive policing. In the absence of proper regulation, the lack of accountability and the concerns of misuse remain constant. The need for safeguards becomes important so that technological advancement should not come at the cost of fundamental rights.

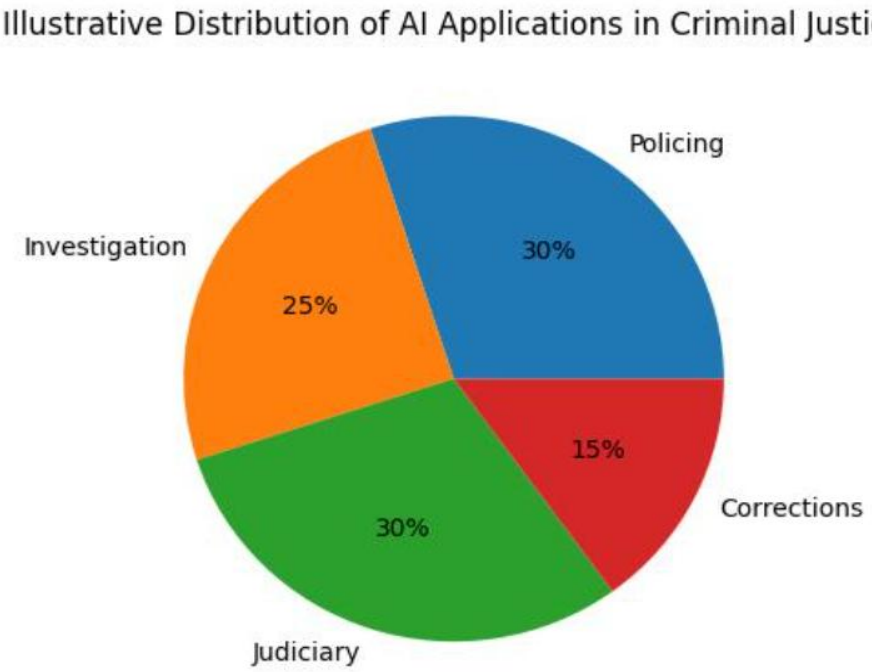


Fig 2.1[11]

4. CONSTITUTIONAL CONCERNS IN AI-BASED CRIMINAL JUSTICE SYSTEM

The use of Artificial Intelligence in the criminal justice system is not just a technical change—it raises serious constitutional questions. The use of technologies that deal with personal data,

[10] E.P. Royappa v. State of Tamil Nadu, (1974) 4 SCC 3 (India).
[11] NITI Aayog, Government of India, *National Strategy for Artificial Intelligence (#AIForAll)* (2018), https://www.niti.gov.in

decision-making, and state power must be tested against fundamental rights guaranteed under the Constitution.

The right to privacy is recognized as a fundamental right under Article 21.[12] This becomes highly relevant in the context of AI, especially where technologies like facial recognition and data profiling are used. These systems collect and process large amounts of personal data, often without clear consent. It can lead to excessive state surveillance if such data is not properly regulated. Therefore, the scope of AI must be limited to what is strictly necessary and be backed by clear legal frameworks.

The Supreme Court made it clear that any procedure affecting life or liberty must be "just, fair, and reasonable"[13] There is a risk that outcomes may be based on systems that are not fully transparent if AI is used in decision-making. This can affect the right to a fair trial, especially if an accused person does not understand how a decision was reached.[14]

Principles of natural justice, such as the right to be heard and the requirement of a reasoned decision, may also be affected. If AI systems function as "black boxes," it becomes difficult to challenge their conclusions, which goes against basic legal principles.

The use of AI in monitoring public behavior and online activity also raises concern and article 19(1)(A), which guarantees freedom of speech and expression to every citizen. The Supreme Court also holds that laws must be clear and should not be open to misuse. The court has also struck down vague restrictions on online speech. [15]

AI-based surveillance systems may lead to indirect restrictions on speech if they are not properly controlled. Therefore, the use of AI must be limited and should not compromise the individual freedoms given to the citizens.

AI is increasingly used in handling electronic evidence, but this raises questions about admissibility and reliability. The Supreme Court clarified that electronic evidence must comply with the requirements of the Bhartiya Sakshya Adhiniyam.[16]. This means that even if AI tools

[12] K.S. Puttaswamy v. Union of India, (2017) 10 SCC 1 (India).
[13] Maneka Gandhi v. Union of India, (1978) 1 SCC 248 (India).
[14] Zahira Habibullah Sheikh v. State of Gujarat, (2004) 4 SCC 158 (India).
[15] Shreya Singhal v. Union of India, (2015) 5 SCC 1 (India).
[16] Arjun Panditrao Khotkar v. Kailash Kushanrao Gorantyal, (2020) 10 SCC 596 (India).

process or generates evidence, such evidence must still meet legal standards.[17] Courts cannot rely on outputs without proper certification and verification.

Another issue is the possibility of errors in AI systems. If an algorithm produces incorrect results, it may be difficult to trace the source of the error. This creates uncertainty in evidentiary value and may affect the outcome of cases. One of the most important issues in the use of AI is accountability. When a decision is influenced by an algorithm, it becomes unclear who is responsible—the developer, the authority using it, or the State.

If AI systems are used by public authorities, the State cannot avoid liability by blaming technology.[18] The lack of clear rules on accountability creates a legal gap. Without proper safeguards, there is a risk that individuals may suffer harm without any effective remedy. [19]This makes it necessary to develop clear guidelines on the use of AI and clarify responsibility in case of misuse or error.

5. ETHICAL CONCERNS IN AI-BASED CRIMINAL JUSTICE SYSTEM

Artificial Intelligence (AI) is slowly becoming part of criminal justice systems—helping police, courts, and prisons make decisions. While it can make processes faster and more efficient, it also raises serious ethical concerns. These concerns are important because criminal justice directly affects people's rights, freedom, and dignity. One of the biggest problems with AI is bias.[20]. AI systems learn from past data. If that data already contains discrimination—based on caste, class, gender, religion, or race—the AI may repeat or even strengthen those biases.

For example, if police data shows more arrests in certain communities, an AI system may wrongly assume those communities are more likely to commit crimes. This can lead to unfair targeting and violate the principle of equality before the law.[21]

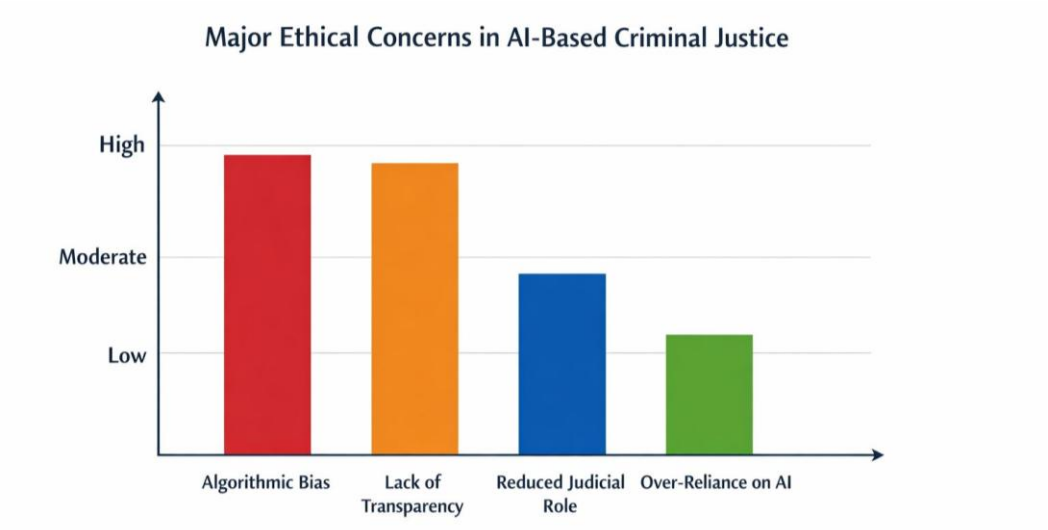
In simple terms, AI may look neutral, but it can still be unfair because it depends on human-created data. This raise concerns under constitutional values like equality and non-

[17] Anvar P.V. v. P.K. Basheer, (2014) 10 SCC 473 (India).
[18] Nilabati Behera v. State of Orissa, (1993) 2 SCC 746 (India).
[19] D.K. Basu v. State of West Bengal, (1997) 1 SCC. 416 (India).
[20] E.P. Royappa v. State of Tamil Nadu, (1974) 4 SCC 3 (India).
[21] Navtej Singh Johar v. Union of India, (2018) 10 SCC 1 (India).

discrimination. Many AI systems work like a "black box." This means we can see the result, but we do not fully understand how the system reached that decision.

In criminal justice, this is dangerous. If an AI system suggests that a person is high-risk or likely to reoffend, the accused has a right to know why.[22] Without transparency, it becomes difficult to challenge such decisions in court. Judges play an important role in deciding cases by using their experience, reasoning, and understanding of human circumstances. However, if courts start relying heavily on AI tools, there is a risk that human judgment may be reduced. AI works on patterns and probabilities, but it cannot fully understand emotions, social conditions, or unique facts of a case. If judges simply follow AI recommendations, it may lead to mechanical justice instead of fair justice. There is also a growing risk that people may start trusting AI too much. This is known as over-reliance. Just because a system is based on technology does not mean it is always correct.

Technological determinism means believing that technology should control decisions. In criminal justice, this can be harmful. AI should only assist decision-making, not replace it. Human oversight is necessary to ensure fairness, accountability, and protection of rights. In the end, justice cannot be fully automated. Human values, reasoning, and fairness must remain at the centre of the system.



Graph 3.1[23]

[22] Mohinder Singh Gill v. Chief Election Commissioner, (1978) 1 SCC 405 (India).
[23] NITI Aayog, Government of India, *Responsible AI for All: Approach Document* (2021), https://www.niti.gov.in

6. AI SYSTEMS IN DIFFERENT COUNTRIES

Artificial intelligence is widely used in the form of risk assessment tools in countries like the United States. These tools help judges make decisions about granting bail and keeping someone in custody. The COMPAS algorithm is a well-known example.[24]. These tools are designed to make decisions faster, but they raise constitutional concerns. Another issue is transparency; most of the algorithms cannot be fully examined in court. This creates the problem that the accused cannot challenge the process of decision. Overall, the United States experience shows that AI can improve efficiency, but it must be checked carefully so that it does not violate equality and due process.

The United Kingdom has focused more on predictive policing.[25]. AI systems help police allocate resources effectively by analyzing crime data and predicting crime areas. However, predictive systems can lead to over-policing, which affects public trust and indirectly discriminates against vulnerable communities. The UK is addressing these issues with oversight mechanisms and strong data protection laws.

In China, courts use AI tools for many tasks such as drafting judgments, reviewing evidence, and identifying relevant case information.[26]. China also has a data tracking system and a large-scale surveillance system using facial recognition. China's model shows that AI can be used extensively, but it highlights the risk of a lack of safeguards.

The United States shows the need to protect fair trial right and need to prevent bias. The United Kingdom depicts the importance of protection or data and accountability. China demonstrates both the dangers and potential of large-scale AI use. For India, the key is a balanced approach - AI can be used for policing but without compromising fundamental rights. Individuals must have the right to challenge AI-based decisions, and transparency should be there in how

European Commission High-Level Expert Group on Artificial Intelligence, *Ethics Guidelines for Trustworthy AI* (2019), https://digital-strategy.ec.europa.eu

[24] Julia Angwin, Jeff Larson, Surya Mattu & Lauren Kirchner, *Machine Bias*, ProPublica (May 23, 2016), https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing

[25] U.K. Home Office, *Predictive Policing and the Use of Algorithmic Tools in Law Enforcement* (2020), https://www.gov.uk

[26] Rogier Creemers, *China's Social Credit System: An Evolving Practice of Control* (SSRN, 2018), https://ssrn.com/abstract=3175792

algorithms work. India must ensure that technology supports justice rather than replacing human judgements.

AI in Criminal Justice Systems				
	United States	United Kingdom	China	Lessons for India
Primary Use of AI	Risk assessment in bail & sentencing	Predictive policing	Adjudication + surveillance	Mixed use (policing + courts)
Key Concern	Racial bias & due process issues	Data privacy & over-policing	Privacy concerns & state control	Protect fundamental rights
Transparency	Limited (private algorithms)	Moderate (regulated systems)	Very low transparency	Ensure algorithmic transparency
Legal Safeguards	Constitutional challenges in courts	Strong data protection laws	Weak individual remedies	Need robust legal framework
Human Oversight	Present but debated	Strong emphasis	Limited oversight	Essential requirement
Risk Level	Bias in judicial decisions	Discriminatory targeting	Mass surveillance	Balanced & rights-based AI

Table 4.1[27]

7. SUGGESTIONS

The growing use of Artificial Intelligence requires a careful legal framework. AI must work under constitutional limits. Reforms should be adopted to ensure fairness, transparency, and accountability while using such technologies. India should create a separate regulatory authority to regulate the use of AI in the criminal justice system that would monitor the testing, design, and implementation of AI by law enforcement and courts. It should set some ethical standards to comply with fundamental rights. An independent authority would help build public trust in the AI system by acting as a safeguard against misuse of AI.

The functioning of AI must be transparent and understandable when they affect legal decisions like bail or sentencing. Regular audits should be conducted to ensure fairness. Transparency is

[27] Table 4.1 National Institute of Justice, U.S. Department of Justice, https://nij.ojp.gov . Centre for Data Ethics and Innovation, Government of the United Kingdom, https://www.gov.uk/government/organisations/centre-for-data-ethics-and-innovation Supreme People's Court of the People's Republic of China, http://english.court.gov.cn .

closely linked to the principles of natural justice, ensuring fairness in legal procedures. Judges, lawyers, and police officers must be trained to understand AI so that they neither rely too much on AI nor fail to question its accuracy. A well-informed judicial system will be better equipped to balance technological benefits with constitutional protections.

India must ensure that personal data used in the criminal justice system is processed securely and lawfully by AI. This aligns with the fundamental right to privacy recognised under constitutional law. AI should assist judges do not replace judges. The 'human in the loop' model ensures that a human remains responsible for final decisions. This approach allows room for human judgment and prevents blind reliance on algorithms. Human oversight is essential to avoid unjust outcomes and to maintain accountability.

For legitimate use of AI, public accountability is necessary. There should be a mechanism to raise complaints and seek remedies if AI is causing harm. Democratic control over such technologies is crucial to prevent misuse and to protect individual freedoms.

8. CONCLUSION

Many key challenges persist in the Indian criminal justice system, like investigation delays, weak prosecution, case backlogs, prison crowding, and lack of coordination, but they can be combated by efficient use of AI. AI helps in identifying ideas, summarizing, and analyzing large volumes of data. In the criminal justice system, AI can be applied to investigations, policing, corrections, and the judiciary to achieve effective results within a time frame. The use of AI should not compromise the principles of natural justice and fundamental rights. The use of technologies that deal with personal data should be tested to ensure transparency. Therefore, the scope of AI must be limited to what is actually necessary and be backed by clear legal frameworks. It is necessary to develop clear guidelines on the use of AI and fix responsibility in case of misuse or error. Human oversight is necessary to ensure fairness, accountability, and Protection of rights. Justice cannot be fully automated; human values, reasoning, and fairness must remain at the centre of the system. In India, individuals must have the right to challenge AI-based decisions; it must ensure that technology supports justice rather than replacing human judgements. Human oversight is essential to maintain accountability and avoid unjust outcomes.