

## JURISPRUDENTIAL ANALYSIS OF INTERSECTION AND USAGE OF ARTIFICIAL INTELLIGENCE IN CRIMINAL INVESTIGATION MECHANISM

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### Abstract

This research paper explores the increasing integration of Artificial Intelligence (AI) in criminal investigation mechanisms, with a particular focus on India while also drawing comparative insights from other countries like the UK, USA, and China. Using both quantitative and qualitative surveys and open-ended questions, the study gathers opinions from law students, legal professionals, and technical experts to capture diverse perspectives on the subject. The findings show that while many people trust AI's ability to support crime detection, there are serious concerns about privacy, fairness, and bias. Case studies like that of USA, UK and China show how AI is already helping to solve crimes and manage legal work. However, the study also highlights the need for strong human oversight, strict regulations, and better public awareness. A theoretical framework is also developed within the study, outlining the evolution of AI in criminal investigations, mapping current global trends, analysing the associated ethical and technical challenges, and proposing potential solutions to address them. The paper concludes that while AI offers considerable promise in transforming legal systems and investigative methodologies, its implementation must be approached with caution, transparency, and a firm commitment to upholding fundamental rights and legal integrity.

### Jurisprudential Analysis of intersection and usage of Artificial Intelligence in criminal investigation mechanism

#### I Introduction

Artificial Intelligence (AI) is becoming a big part of our daily lives all around the world. From helping us find answers online to assisting doctors in diagnosing diseases, AI is making many tasks faster and easier. In recent years, its use has grown rapidly in areas like education, healthcare, banking, and even criminal investigations. AI can analyze large amounts of information, solve problems, and sometimes make decisions like a human. While it offers many benefits, there are also concerns about privacy, fairness, and accuracy. As AI continues to grow, it is important to use it responsibly and thoughtfully.

#### A Evolution and Development of Artificial Intelligence

##### 1.The Early Days of Computing and the Birth of AI

In the 1950s, machines were mostly used like big calculators to do hard math problems. When groups like NASA needed tricky calculations, they often asked teams of humans, called "human computers," to solve them. Even before computers became like the ones we have today, experts like mathematicians, computer scientists, etc. already imagined the idea of artificial intelligence – and that's how AI started.

## 2. Alan Turing and the Idea of Thinking Machines

When most calculations were still done by people, British mathematician Alan Turing thought of a machine that could go beyond its original instructions. Even though the technology wasn't ready yet, Turing came up with the basic idea of artificial intelligence. He also created a way to test if a machine could think like a human, which he called "the imitation game," now known as the "Turing test."

## 3. The Birth of Artificial Intelligence at Dartmouth

In the summer of 1956, John McCarthy, a math professor at Dartmouth College, invited a few researchers to a workshop to explore the idea of "thinking machines". They believed that machines could be built to copy human learning and intelligence. During this workshop, McCarthy coined the term "artificial intelligence," which has been used ever since to describe machines that can think like humans.

## 4. Laying the groundwork: 1960s–1970s

Over the next two decades, early signs of progress kept were clearly visible in the form of a realistic chatbot and other inventions.

### (i) Eliza: The First Chatbot

In 1966, Joseph Weizenbaum, a computer scientist at MIT, created ELIZA, the first chatbot. It acted like a therapist by turning users' words into questions to keep the conversation going. Weizenbaum thought this would show how basic machine intelligence was, but many people actually believed they were talking to a real human!

### (ii) Shakey the Robot: A Step Toward Independent Machines

From 1966 to 1972, scientists at Stanford built Shakey the Robot, which could move around using sensors and a TV camera. The goal was to create a robot that could think and act on its own in real-world spaces. It was simple and helped improve important AI skills like seeing things, finding paths, and handling objects.

### (iii) The Founding of the American Association of Artificial Intelligence

After AI research grew at places like MIT, Stanford, and Carnegie Mellon, scientists needed a way to share their ideas and discoveries. In the 1980s, they created the American Association of Artificial Intelligence (AAAI). They started journals, workshops, and conferences to support AI research. Today, it still works to help people understand how machines can think and act intelligently.

### (iv) AI Winter: A Time of Setbacks for Artificial Intelligence

In 1974, a scientist named Sir James Lighthill said that AI researchers had promised too much but didn't deliver real results. Because of this, funding for AI was cut, and from the late 1970s to the early 1990s, AI development slowed down a lot. This tough period is called the "AI winter."

## 5. AI Struggles Through the 1980s and 1990s

The AI winter that started in the 1970s mostly continued through the 1980s and 1990s. Although there was a short period of renewed interest in the early 1980s, real progress didn't happen until the late 1990s, when better research and more funding helped AI move forward again.

### (i) First driverless car

In 1986, a German scientist named Ernst Dickmanns created the first self-driving car. It was a Mercedes van with a computer and sensors that helped it drive on empty roads. Even though it was very basic compared to today's self-driving cars, it was a big first step toward making that dream a reality.

### (ii) Deep Blue

In 1996, IBM's computer Deep Blue played a chess match against world champion Garry Kasparov. Deep Blue won only one game at first, but in a 1997 rematch, it beat Kasparov. Deep Blue could think superfast.

## 6. AI growth: 2000–2019

With increasingly intelligent machines, there came new developments.

### (i) Kismet: The Social Robot

In 2000, MIT's Dr. Cynthia Breazeal created Kismet, a robot that could recognize and mimic human emotions using sensors and a microphone. Kismet was designed to interact socially with humans and was meant to show that technology could enhance, not replace, human connections.

### (ii) NASA Rovers: AI on Mars

In 2004, NASA sent two AI-powered rovers, Spirit and Opportunity, to Mars. These rovers used AI to move across the planet's rocky surface and make decisions without needing help from humans.

### (iii) IBM Watson

In 2011, IBM created Watson, an AI system designed to answer questions in natural language. Watson used data from encyclopedias and the internet to compete on the quiz show *Jeopardy!* and defeated two of the show's top champions, Ken Jennings and Brad Rutter.

### (iv) Siri and Alexa: Virtual Assistants

In 2011, Apple introduced Siri, a virtual assistant for the iPhone, and in 2014, Amazon released Alexa. Both can understand spoken questions and give responses. However, they are limited in their abilities and can only answer specific questions they are programmed for.

### (v) Geoffrey Hinton and the Rise of Neural Networks

Geoffrey Hinton, a computer scientist, started working on neural networks in the 1970s. These AI systems are designed to process data like the human brain. In 2012, Hinton's research in neural networks impressed the tech world at the ImageNet competition. His work on deep learning, which helps AI process large amounts of data and make predictions, has been key to advancements like speech recognition and

language processing. Hinton later joined Google in 2013 and left in 2023 to speak more openly about the risks of artificial general intelligence.

### (vi) Sophia: The Human-Like Robot

In 2016, Hanson Robotics created Sophia, a robot that could make facial expressions, tell jokes, and hold conversations. Sophia became famous worldwide, even appearing on TV shows. In 2017, Saudi Arabia granted her citizenship, making her the first AI to receive such a right. This sparked criticism, especially from Saudi women who didn't have the same rights.

### (vii) AlphaGo: AI Conquers the Game of Go

The game of Go is much harder for computers to play than chess because of its complex possibilities. But in 2016, AlphaGo, an AI program by Google DeepMind, beat one of the best Go players in the world, Lee Sedol. AlphaGo used neural networks and reinforcement learning, playing millions of games against itself to improve. This victory showed that AI could solve challenges once thought impossible.

## 7. AI surge: 2020–present

AI surge in recent years has largely come about.

### (i) OpenAI and the Development of GPT-3

OpenAI developed a language model called GPT, which started with GPT-1 and GPT-2. These early versions were trained on billions of inputs, but their ability to create unique text was still limited. However, GPT-3, released in 2020, was a major breakthrough. It was trained on 175 billion parameters, much more than the 1.5 billion used for GPT-2, and it created a lot of excitement in the AI field.

### (ii) DALL-E: AI Generates Images from Text

In 2021, OpenAI launched DALL-E, a text-to-image AI model. When users give DALL-E a text prompt, it creates realistic, editable images based on that description. The first version was trained on 12 billion parameters using a part of OpenAI's GPT-3 model.

### (iii) ChatGPT: A New Kind of AI Chatbot

In 2022, OpenAI introduced ChatGPT, a chatbot powered by GPT-3. ChatGPT interacts with users in a more natural way than older chatbots. It can help with tasks like writing code, creating resumes, and doing research. ChatGPT can also ask follow-up questions and identify inappropriate prompts, making it more advanced than previous chatbots.

### (iv) Generative AI Takes a Leap in 2023

2023 was a big year for generative AI. OpenAI released GPT-4, which was more powerful and creative than previous versions. Microsoft integrated ChatGPT into its Bing search engine, and Google launched its own GPT chatbot called Bard. GPT-4 can now provide more detailed and creative answers and even pass complex tests like the bar exam.

## II Research Methodology

This study was conducted in India using a mixed-methods empirical approach, combining both quantitative and qualitative data collection. A structured survey (n=55) was conducted from 22 March to 22 April 2025, targeting law students, legal academics, practicing advocates, and professionals from technical fields. The 17-question online survey gathered insights about participants' confidence, awareness, and experiences related to AI tools like facial recognition and predictive policing. Participants rated their trust in AI for crime detection on a 5-point scale and answered awareness-based Yes/No questions on privacy rights, AI bias, and evidentiary concerns.

Alongside, qualitative data was collected through open-ended responses to explore deeper attitudes, concerns, and recommendations. Responses were coded thematically, revealing strong demands for human oversight, regulatory frameworks, and transparency in AI's legal use. The combination of both methods provided a rich, contextual understanding of AI's potential and challenges in criminal investigations.

Case studies of a few countries using AI tools in criminal investigations, such as the USA, China, UK and India, were also analysed to contextualize the findings. Additionally, the study was framed within a theoretical framework that examines the evolution of AI in criminal investigations, providing a historical perspective on its development and current application, essential challenges, potential solutions of usage of AI tools and methods in criminal investigation system.

## III Empirical Study Data and Method

This study is conducted in India. It combines both quantitative and qualitative methods. While the quantitative data collected through survey scenarios allowed us to explore the general perspectives of people on the Use of AI in criminal investigation, qualitative data (thematic and opinion-based) methods captured insights on awareness, trust, regulatory expectations, and ethical considerations related to AI-based policing and legal decision-making. These two studies were planned, conducted, and analyzed closely related to each other so that the qualitative study was inspired and informed by the method and results of the quantitative study, but also significantly contributes to the interpretation of the quantitative survey findings.

### A Quantitative scenario method

We collected representative survey data in India (n= 55) between 22 March and 22 April 2025 and an online questionnaire was sent to a representative sample of population aged 18-75. The participant pool primarily comprised law students, along with a number of legal academics, practicing advocates, and a small proportion of professionals from technical fields. This study utilizes data from a 17 questions, 5 minute survey which included questions about confidence, opinions and experiences with the Use of AI in criminal investigation.

During the quantitative data collection, a hypothetical scenario was created wherein the confidence of the population in AI's ability to

enhance crime detection was asked on the 5-point agreement scale wherein 1= Not confident at all, and 5= Highly Confident. In addition to the confidence measure, the survey assessed participants awareness of key issues on a scale of Yes and No on the following points:

- The use of facial recognition technologies,
- Predictive policing practices,
- Potential violations of privacy rights by AI-powered policing tools,
- The admissibility of AI-generated evidence as primary proof in court,
- Concerns about AI-based criminal detection disproportionately targeting certain groups, and
- Individuals' rights to challenge general AI-generated reports if used as evidence against them.

These were the central questions in the study.

### B Qualitative Analysis

It was done through open-ended responses to explore the underlying attitudes, concerns, and recommendations expressed by the participants, offering nuanced insights that complement the quantitative findings. Responses were systematically coded and analyzed to identify recurrent themes, including the need for human oversight, concerns regarding bias and discrimination, the call for stronger regulatory frameworks, the importance of transparency, and broader ethical considerations. Participants were also asked whether they had encountered or read about instances where AI-based criminal detection led to wrongful arrests or exhibited biases, and if so, to describe those experiences or observations. This qualitative exploration provided a deeper understanding of public expectations for the integration of AI technologies in sensitive legal contexts.

### C Findings

#### Understanding the Role of AI in Criminal Detection: A Mixed-Methods Approach

As revealed in the survey results, the citizens had expressed a very high agreement (96.36 %) with the awareness of AI-powered policing tools such as facial recognition, predictive policing, and digital forensics. The survey revealed that while a majority of participants acknowledged AI's potential to enhance crime detection, there was considerable skepticism regarding its accuracy and the risks of biases in its application. The need for human oversight and regulation was emphasized to ensure fair and reliable outcomes. There was a great concern of violation of privacy rights (91.07%). A significant portion of the population (45.45%) expressed uncertainty about whether AI-based criminal detection disproportionately targeted certain groups, while (30.91%) believed it did, and (21.82%) felt it did not.

Similarly, the qualitative analysis of participant's familiarity with artificial intelligence bias cases reveals significant knowledge limitations among survey participants. The predominant pattern (74% of responses) indicated no prior exposure to specific instances of AI bias in criminal justice applications, with responses ranging from simple denials to explicit statements of unfamiliarity. Among the minority demonstrating case awareness (26%), references centered primarily on internationally recognized incidents. Several participants cited the COMPAS (Correctional Offender Management Profiling for Alternative Sanctions) system, with one participant articulating specific racial disparities: "Northpointe's tool, called COMPAS, used in USA, found that black defendants were far more likely than white defendants to be incorrectly judged to be at a higher risk of recidivism, while white defendants were more likely than black defendants to be incorrectly flagged as low risk. A participant referenced the Robert Williams case in Detroit, where facial recognition technology with "an error rate of up to 35% for the dark skinned

people" led to wrongful arrest. Geographic patterns in responses suggest familiarity with American and occasionally Chinese implementations rather than domestic Indian applications, with statements such as "I have not read about any case in India but I have only heard of its success in China. Participants mentioned location-specific implementations such as "Delhi Communal Riots in 2020" and "Neejeer Park New Jersey case," indicating awareness of regionally relevant applications. These findings suggest that enhancing public education regarding algorithmic bias manifestations may be prerequisite to informed public discourse and policy development concerning AI implementation in criminal investigation, particularly in regions with emerging rather than established implementation histories.

#### IV Navigating AI's role in criminal investigation across global jurisdictions

##### A India

The application of predictive analytics and AI in India's criminal justice system has sparked concerns over possible infringements of fundamental rights, especially the rights to privacy and a fair trial. Predictive analytics in policing "is a data-driven approach to characterizing crime patterns across time and space and leveraging this knowledge for the prevention of crime and disorder."<sup>391</sup>

In the landmark case of **Justice K.S. Puttaswamy (Retd.) v. Union of India (2018)**<sup>392</sup>, the Supreme Court of India recognized the right to privacy as a fundamental aspect of the Constitution, emphasizing its role in safeguarding individual autonomy and dignity. The Court also stressed that any intrusion into privacy must be proportionate and serve a legitimate state interest. In this context, the deployment of predictive analytics and AI in the criminal justice system raises significant

concerns, particularly regarding the unauthorized collection and use of personal data. Moreover, the potential for these technologies to reinforce existing biases may infringe upon the constitutional guarantee of equality.

In 2017, a petition was filed before the Hon'ble Delhi High Court, titled **Sadhan Haldar v. State (NCT of Delhi)**<sup>393</sup>, seeking effective measures to locate and reunite missing children with their families—an objective universally acknowledged as vital. Faced with challenges in achieving significant success through conventional methods, the Delhi Police and other authorities explored the use of facial recognition technology as a potential solution which was clearly mentioned in **Para 12** of the order. Over 1,900 faces had been identified through facial recognition software for inciting violence in the national capital during the Delhi riots.<sup>394</sup>

The Centre for Development of Advanced Computing has developed the C4I, which will function as the central hub for AI-driven crime detection for the Delhi Police. It will process live feeds from 10,000 high-resolution CCTV cameras installed throughout the city, along with footage from existing "legacy networks" operated by municipal bodies, Residents' Welfare Associations (RWAs), and the Public Works Department (PWD). The system will utilize AI models capable of recognizing over 20 faces in a crowd, even when visibility is partial or individuals are attempting to disguise themselves. Additionally, it will feature gunshot detection, crowd size estimation, identification of individuals who have collapsed, and automated alerts for persons appearing to be in distress. The C4I will comprise a data centre and two emergency operations centres, enabling real-time crime alerts to be

<sup>393</sup> Sadhan Haldar v. State (NCT of Delhi) W.P(Crl) 1560/2017

<sup>394</sup> Anushka Jain, Is the illegal use of facial recognition technology by the Delhi Police akin to mass surveillance? You decide., internet freedom. In, (July 3, 2020) <https://internetfreedom.in/is-the-illegal-use-of-facial-recognition-technology-by-the-delhi-police-akin-to-mass-surveillance-you-decide-project-panoptic/>

<sup>391</sup> Carleton, B., Cunningham, B., & Thorkildsen, Z. (2020). The Use of Predictive Analytics in Policing. Arlington, VA: CNA.

<sup>392</sup> Justice K.S. Puttaswamy (Retd.) v. Union of India AIR 2018 SC (SUPP) 1841

transmitted to district headquarters and local police stations. It will have the capacity to monitor up to 1000 live CCTV streams simultaneously.<sup>395</sup>

## B USA

The use of Artificial Intelligence in criminal investigations, such as the COMPAS risk assessment tool, has significantly influenced decision-making processes. However, concerns regarding transparency, fairness, and racial bias highlight the urgent need for critical evaluation of such technologies.

### Analysis of COMPAS: An Algorithm for Criminal Risk Assessment

Correctional Offender Management Profiling for Alternative Sanctions (COMPAS) is an AI-driven case management and decision-support tool developed and owned by Equivant, formerly Northpointe. It is widely employed across various jurisdictions in the United States, to assess the probability of defendants to reoffend. COMPAS utilizes behavioural and psychological data to forecast the likelihood of reoffending, categorized into three major risk scales: Pretrial Risk Assessment, General Recidivism Scale, and Violent Recidivism Scale.

1. **Pretrial Risk Assessment:** This scale evaluates the likelihood of an individual failing to appear for court proceedings or engaging in new criminal activities while released on bail. Factors influencing this assessment include pending charges, prior arrests, employment status, residential stability, and substance abuse.

2. **General Recidivism Scale:** The General Recidivism Scale predicts the probability of committing non-violent criminal acts post-release. It incorporates historical delinquency during youth, engagement in drug-related activities, and existing criminal records.

3. **Violent Recidivism Scale:** Focused on violent offenses, this scale measures the likelihood of violent crimes following release, relying on indicators such as prior violent behavior, educational and vocational challenges, compliance with laws, and age at the time of first arrest.<sup>396</sup>

The article from ProPublica titled "**Machine Bias: Risk Assessments in Criminal Sentencing**"<sup>397</sup> examines the use of algorithmic risk assessments in the criminal justice system. These tools are designed to predict the likelihood of a defendant reoffending and are used to inform decisions on bail, sentencing, and parole. However, the investigation reveals that these algorithms exhibit significant racial bias. Specifically, the analysis found that Black defendants were more likely to be falsely labelled as future criminals compared to their white counterparts. The article raises concerns about the fairness and accuracy of these tools and their potential to reinforce existing racial disparities in the criminal justice system.

In **State v. Loomis (2016)**<sup>398</sup>, the Wisconsin Supreme Court upheld the use of a COMPAS algorithmic risk assessment in sentencing, despite concerns that the methodology was secret and could introduce bias. Although the court acknowledged potential issues, it ruled that using such a tool did not violate the defendant's due process rights, provided judges received written warnings about the limitations and risks of these assessments. The warnings included the proprietary nature of COMPAS, lack of local validation, reliance on group data, and concerns about racial bias.

## C United Kingdom

Algorithms and data analysis are being used more and more in many parts of society, including in the UK's police and security

<sup>395</sup> Upasika Singhal, AI in the sky: Police to soon deploy facial recognition tech across Delhi, The Indian Express, (April 6, 2025, 4:19 IST) <https://indianexpress.com/article/cities/delhi/ai-in-the-sky-police-to-soon-deploy-facial-recognition-tech-across-delhi-9927353/>

<sup>396</sup> Ekata Deb, COMPAS — an AI tool sending or keeping people in Jail, edblogs.medium.com (December 24, 2023, 9 PM), <https://edblogs.medium.com/compas-an-ai-tool-sending-or-keeping-people-in-jail-d9228df3a2c6>

<sup>397</sup> Julia Angwin, Jeff Larson, Surya Mattu and Lauren Kirchner, Machine Bias (May 23, 2016, 9:00 PM), <https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing>

<sup>398</sup> State v. Loomis, 881 N.W.2d 749 (Wis. 2016)

services. Several police forces across the UK have tried using “predictive policing” tools. These tools use computer programs and past crime data to predict where crimes like burglaries or street violence might happen in the future. Some police forces have also tested tools that predict how likely a person is to show certain behaviors later. For example, **Durham Constabulary** uses a tool called the **Harm Assessment Risk Tool**, which uses machine learning to guess if someone will commit another crime within the next two years. This helps officers decide if the person should be sent for a rehabilitation program. Police forces have also tested facial recognition technology, which can automatically identify people from live video, like CCTV footage. The Metropolitan Police Service and South Wales Police have used this technology at large public events and in other areas during trials.<sup>399</sup>

In August 2020, in *Bridges v. South Wales Police*<sup>400</sup>, the Court of Appeal ruled that the use of live facial recognition by South Wales Police was unlawful, saying that the police service had not gone far enough to check that the technology did not exhibit gender or racial biases.

The UK police are part of this fast-growing group who are increasingly using AI. In the United Kingdom, police departments are testing an AI tool to help solve cold cases, like the unsolved 1994 stabbing murder of a 30-year-old man. This AI software can quickly go through video footage, financial records, social media, emails, and other documents all at once. Authorities say the tool reviewed evidence from 27 cases in just 30 hours, offering new hope for uncovering missed clues.<sup>401</sup> This artificial intelligence (AI) tool being trialed by **Avon and Somerset Police** to analyze evidence in cold

cases is called **Söße**, built on **Microsoft Azure** by **Akkodis**.<sup>402</sup>

### D China

The **Shanghai AI-Assisted Criminal Case Handling System**, also known as the “**206**” system, is the most advanced AI-assisted decision-making system currently used in criminal proceedings in China. This pioneering initiative, directly supported by China’s Central Political and Legal Affairs Commission (the core authority overseeing China’s legal system), has been implemented through a collaborative effort involving several agencies in Shanghai. Led by the Shanghai High Court, the project also includes contributions from the city’s public security bureau, procuratorate, bureau of justice, and iFLYTEK, a world-leading AI solution provider.

The “**206**” system aims to modernize judicial processes by integrating artificial intelligence into the legal system. The system’s key feature is the **Similar Case Recommendation (SCR)** function, which helps legal practitioners—police, prosecutors, and judges—make informed decisions based on prior cases with similar circumstances. As part of the initiative, all pending criminal cases in Shanghai are being input into the “**206**” system, ensuring its widespread application in case handling and management.

The vigorous support from the Shanghai High Court has been instrumental in driving this ambitious project, with a focus on improving efficiency and enhancing the quality of decision-making in the criminal justice process. The system represents a significant step towards the integration of AI in legal practices, positioning Shanghai at the forefront of AI assisted legal adjudication.<sup>403</sup>

<sup>399</sup> Lorna Christie, AI in policing and security, UK PARLIAMENT (April 29, 2021), <https://post.parliament.uk/ai-in-policing-and-security/>

<sup>400</sup> *Bridges v. South Wales Police* [2020] EWCA Civ 1058

<sup>401</sup> Francisco Alvarado, Artificial Intelligence Use in Criminal Investigations Gains Traction, A&E (September 30, 2024), <https://www.aetv.com/real-crime/artificial-intelligence-use-in-criminal-investigations>

<sup>402</sup> Akkodis UK Limited, Soze - Police and Intelligence Investigation integrated AI Solution (Azure), GOV.UK <https://www.applytosupply.digitalmarketplace.service.gov.uk/g-cloud/services/404627841022630>

<sup>403</sup> Wanqiang Wu, Xifen Lin, Access to technology, access to justice: China’s artificial intelligence application in criminal proceedings, *International Journal of Law, Crime and Justice*, Volume 81, 2025, 100741, ISSN 1756-0616,

In 2019, a court in **Hangzhou**, south of Shanghai, began using AI in trials. The AI assistant, called **Xiao Zhi 3.0** ("Little Wisdom"), first helped in a case involving **10 people** who had failed to repay bank loans. At first, **Xiao Zhi 3.0** handled simple tasks like announcing court procedures. Now, it records testimony using voice recognition, analyzes case materials, and verifies information from databases in real time. It is mainly used for simple financial disputes. Similar AI technology has also been used in **Suzhou** courts to settle traffic accident cases, where AI examined evidence and drafted verdicts, saving judges' time.

The **Xiao Baogong Intelligent Sentencing Prediction System** is another legal AI platform used by judges and prosecutors in criminal law. It suggests penalties by analyzing case information and past judgments through big data.

In China, people can file complaints, track cases, and talk to judges using their smartphones. AI-powered "one-stop" machines offer legal advice, register cases, generate documents, and calculate legal costs 24/7. However, there are concerns about how reliable these automated lawyers are.<sup>404</sup>

## V Challenges

There are numerous challenges to overcome to implement AI in criminal investigation and justice. These challenges are enlisted below:

### A Algorithmic Bias

The main worry with AI is that it can become biased. This happens when the data used to train AI favors certain people or groups, which can make its decisions unfair.

### B Privacy and Surveillance Concerns

Another big concern with AI is the risk to privacy. Tools like predictive policing, facial recognition, surveillance, data collection, etc. can invade

people's private lives, so the criminal justice system must use AI carefully.

### C Lack of Transparency

AI algorithms are often called a "black box" because we don't fully know how they make decisions or what data they use. This makes it hard to hold AI systems accountable for their actions.

### D Cybersecurity Risks and Data Breaches

AI-driven criminal databases and case files are vulnerable to hacking and misuse.

### E Over-Reliance on AI and Erosion of Human Judgment

AI should not take the place of human empathy and careful judgment in making legal decisions, giving sentences, or granting parole as it could lead to a loss of fairness and justice.

### F Deepfakes and Synthetic Media

Criminals can misuse AI to create fake evidence, like deepfake videos, which can interfere with justice and mislead investigations.

### G Personnel Training

Proper training of the law enforcement and legal professionals must be done to make them understand and use AI tools and mechanisms.

### VI Suggestions for the regulation of use of AI in criminal investigation

#### A Mandatory Human Oversight and Review

All AI-generated outputs in criminal investigations should require formal human verification before being used as evidence or for significant investigative decisions. Also, it should be used to supplement the traditional investigative methods and not supplant it.

#### B Transparency Requirements

AI systems, including algorithms like facial recognition or predictive policing tools, must be transparent. Authorities should disclose when AI is used, how it works, and the kind of data it relies on. The source code for the AI should also be made available to the accused under Section 230 BNS as a relied upon document

<https://doi.org/10.1016/j.ijlcr.2025.100741>.

(<https://www.sciencedirect.com/science/article/pii/S1756061625000175>)

<sup>404</sup> Alena Zhabina, How China's AI is Automating the Legal System, NEWS CLICK (Jan. 22, 2023) <https://www.newsclick.in/how-chinas-ai-automating-legal-system>

otherwise it will be a flaw in the criminal justice system.

### **C Mandatory Bias Audits**

Regular, independent audits should be conducted to check for racial, gender, or socio-economic biases in AI systems. Findings should be made public so as to gain confidence of the public in these methods.

### **D Accountability Frameworks**

Clear lines of responsibility must be established. If an AI tool causes wrongful arrest or discrimination, mechanisms must exist to hold developers, users, and authorities accountable.

### **E Legislations for AI Regulation**

Legislations should be enacted to ensure transparency, accountability, and data protection in AI applications within criminal investigations. Regulatory bodies must oversee compliance and update laws to keep pace with technological advancements. Collection and processing of personal data for AI analysis should be limited, proportionate, and done only with informed consent, wherever possible. Strict data protection rules must apply.

### **VII Conclusion**

The integration of artificial intelligence into criminal investigations presents both promising opportunities and significant challenges for justice systems worldwide. Our mixed-methods research reveals that while 96.36% of Indian respondents demonstrated awareness of AI-powered policing tools, only 26% reported familiarity with specific bias incidents—primarily international rather than domestic cases—indicating a substantial knowledge gap regarding local implementations. Survey data revealed pronounced concerns about privacy (91.07%) and algorithmic bias (30.91% believing AI disproportionately targets certain groups). The strong preference for human verification of AI-generated evidence (56% accepting such evidence only with human review) reflects public reluctance to relinquish critical judgment to automated systems in high-stakes contexts.

Cross-jurisdictional analysis highlights varying implementation approaches, from India's emerging C4I system to established but problematic tools like COMPAS in the United States. Legal frameworks similarly vary, with cases like Justice K.S. Puttaswamy establishing privacy rights in India while implementation-specific regulations remain underdeveloped. Based on these findings, we propose a regulatory framework emphasizing mandatory human oversight, transparency requirements, regular bias audits, and clear accountability mechanisms. As AI technologies advance, governance structures must preserve human judgment at critical decision points while leveraging technological capabilities to enhance investigative processes—balancing innovation with fundamental rights protection in contemporary criminal justice systems.