
ARTIFICIAL INTELLIGENCE IN CRIMINAL INVESTIGATIONS: NAVIGATING TECHNOLOGY INNOVATION AND DUE PROCESS, ACCOUNTABILITY AND HUMAN RIGHTS

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ABSTRACT

“The legitimacy of technology in justice lies not in its efficiency alone, but in its ability to preserve fairness, accountability, and human dignity.”

Artificial Intelligence (AI) technology employed for conducting criminal investigations is an innovative way of handling modern day criminal justice operations. Machine learning, natural language processing, advanced pattern recognition, and predictive analysis have been deployed to enable the police departments to analyze vast amounts of information and detect patterns in criminal behavior, identify suspects, and allocate resources accordingly. Indeed, through the development of AI technologies, the criminal investigation process has been dramatically improved in terms of both speed and quality. Nevertheless, despite the immense value of AI in criminal investigations, there appear to be many important legal and ethical implications. In particular, issues of algorithmic bias, lack of transparency in automated decisions, invasion of people's privacy, and an opaque process of generating output in AI applications raise serious problems in relation to the principles of due process, equal treatment before the law, and procedural safeguards. Inappropriate use of artificial intelligence tools may result in increased levels of social inequality and decreased public trust in the operation of criminal justice.

The current paper focuses on potential opportunities and problems related to criminal investigations powered by artificial intelligence. More specifically, it highlights the importance of adopting a rights-based approach when regulating technology. From this point of view, the paper argues that the deployment of AI systems calls for collaboration among different scholars, including specialists in law and civil society representatives. In turn, constant monitoring of the results of the work of such systems, as well as attempts to provide for their responsibility, is necessary to mitigate possible negative consequences and ensure people's rights. Therefore, the following conclusion may be made – although AI has the potential to increase

efficiency and consistency of criminal proceedings, its legitimacy depends on its conformity to the values of justice.

Keywords: Artificial Intelligence (AI), Criminal Investigation, Criminal Justice System, Predictive Policing, Machine Learning, Algorithmic Decision-Making, Digital Evidence, Law Enforcement, Due Process, Human Rights, Algorithmic Bias.

1. Introduction

The way we live has changed a lot because of technology. This change has even affected how we deal with crime. One of the important tools in law enforcement today is Artificial Intelligence or AI for short. Artificial Intelligence refers to computer systems that can do things that normally require intelligence like learning, reasoning and solving problems.

Crime is getting more complicated especially when it comes to cybercrime, fraud and organized crime. This means that the people who investigate crimes need to use technologies that can handle a lot of data quickly. In the past investigators relied on things like witness statements, forensic evidence and manual analysis of records. While these methods are still important they are not enough when dealing with the amount of digital information we have today.

Artificial Intelligence has become a tool in helping investigators analyze data quickly and efficiently. Some people are very excited about the use of Artificial Intelligence in investigations while others are concerned. The people who support Artificial Intelligence say it makes investigations more efficient and accurate and helps prevent crime. On the hand critics worry that Artificial Intelligence systems might be biased invade peoples privacy and threaten their rights.

This paper looks at the bad things about using Artificial Intelligence in criminal investigations. It also explores the ethical implications of using Artificial Intelligence in the criminal justice system.

2. Evolution of Technology in Criminal Investigations

Technology has been used in investigations for a long time. In the past we used things like fingerprint analysis and DNA profiling to solve crimes. The use of Artificial Intelligence is the step in this process.

At first law enforcement agencies used computers to store and manage records. Now computers can do much more than that. They can analyze data. Help investigators make decisions. The development of data technologies has also helped Artificial Intelligence become a bigger part of the criminal justice system.

Law enforcement agencies can now collect data from sources, including surveillance cameras, mobile devices and social media. Artificial Intelligence systems can analyze this data to find patterns and relationships that might indicate activity. The use of Artificial Intelligence is part of an effort to modernize law enforcement and deal with complex crimes. However it also raises concerns about accountability, transparency and civil liberties.

3. Applications of Artificial Intelligence in Criminal Investigation

3.1 Predictive Policing

Predictive policing uses algorithms to forecast where crimes might happen. By looking at data from the past law enforcement agencies can identify areas that're more likely to have crime. This approach helps law enforcement agencies to be more proactive. Of just responding to crimes after they happen they can send officers to areas where crimes are more likely to occur. However some people are concerned that biased data might lead to outcomes and targeting of certain communities.

3.2 Facial Recognition Technology

Facial recognition technology is a tool that compares pictures of peoples faces to identify them. It can help find suspects identify missing people and make public places safer.

However some studies have shown that facial recognition systems can make mistakes especially when identifying women and people from minority groups. This raises concerns about fairness and discrimination.

3.3 Digital Forensics

Digital forensics involves collecting and analyzing evidence like emails and text messages. Artificial Intelligence-powered tools can help investigators review amounts of digital information quickly. The use of Artificial Intelligence in forensics has become essential in

criminal investigations. It helps investigators find information and make decisions more quickly.

3.4 Natural Language Processing

Natural Language Processing allows computers to understand and analyze language. Investigators use this technology to examine communications and identify potential crimes. Given the amount of online content, Natural Language Processing tools are very helpful in finding suspicious communications and uncovering relationships between suspects.

3.5 Cybercrime Detection

Cybercrime is a growing problem and Artificial Intelligence systems can help detect it. They can identify network activities detect malware and analyze patterns of cyberattacks. This is particularly important in fighting identity theft, financial fraud and online exploitation. Artificial Intelligence is a tool in the fight, against cybercrime.

4. Benefits of AI in Criminal Investigations

- **Enhanced Efficiency:** AI significantly improves investigative efficiency by automating routine analytical tasks. Large volumes of information that would require weeks of manual examination can be processed within minutes. This enables investigators to focus on strategic decision-making and complex investigative activities.
- **Improved Accuracy:** Machine learning algorithms can identify patterns and relationships that may not be immediately apparent to human investigators. Consequently, AI can improve the accuracy of evidence analysis and reduce the likelihood of investigative errors.
- **Resource Optimization:** Law enforcement agencies often operate under resource constraints. AI assists in prioritizing investigative efforts and allocating personnel more effectively. Predictive analytics can identify high-risk areas and emerging crime trends, allowing agencies to deploy resources strategically.
- **Crime Prevention:** AI facilitates proactive crime prevention by identifying risk factors and forecasting criminal activity. Early detection of criminal patterns may prevent

offenses before they occur, thereby enhancing public safety. Strengthening Digital Investigations: As criminal activities increasingly occur within digital environments, AI provides essential tools for analyzing electronic evidence and detecting cyber threats. This capability is particularly important in addressing contemporary forms of crime.

5. Legal and Ethical Challenges

Despite its considerable benefits, AI presents significant legal and ethical concerns.

- **Algorithmic Bias:** One of the most serious criticisms of AI involves algorithmic bias. AI systems rely upon historical datasets to generate predictions and recommendations. If these datasets reflect existing social inequalities, AI systems may perpetuate discriminatory outcomes (Mittelstadt et al., 2016). For example, predictive policing systems trained on biased arrest records may disproportionately target specific communities. Such outcomes undermine constitutional principles of equality and fairness.
- **Lack of Transparency:** Many AI systems operate as “black boxes,” meaning that their decision-making processes are difficult to understand or explain. This lack of transparency creates challenges for accountability and judicial review. Individuals affected by AI-generated decisions may be unable to understand the basis of those decisions or challenge them effectively. Such opacity is particularly problematic in criminal investigations, where individual rights and liberties are at stake.
- **Privacy Violations:** AI-driven surveillance technologies often involve extensive data collection and monitoring. Facial recognition systems, biometric databases, and predictive policing tools may intrude upon individual privacy and increase state surveillance capabilities (Solove, 2021). The tension between public security and privacy remains one of the most significant challenges associated with AI deployment in criminal justice systems.
- **Accountability Deficits:** Determining responsibility for AI-generated outcomes presents a complex legal challenge. When an AI system produces inaccurate or discriminatory results, questions arise regarding whether responsibility lies with

software developers, law enforcement agencies, or governmental authorities. The absence of clear accountability mechanisms may undermine public trust and weaken legal protections.

6. Human Rights Implications

The use of AI in criminal investigations directly affects internationally recognized human rights.

- **Right to Privacy:** Privacy is a fundamental human right recognized in numerous international instruments and constitutional frameworks. Excessive surveillance and indiscriminate data collection may violate individuals' reasonable expectations of privacy.
- **Right to Equality and Non-Discrimination:** Biased AI systems may disproportionately affect marginalized groups and reinforce existing social inequalities. Such outcomes conflict with the principle of equality before the law.
- **Right to a Fair Trial:** Transparency is essential for ensuring procedural fairness. Defendants must have the opportunity to understand and challenge evidence presented against them. Opaque AI systems may undermine this fundamental right (UNESCO, 2021).
- **Presumption of Innocence:** Predictive policing systems risk encouraging suspicion based upon statistical probabilities rather than actual criminal conduct. Such practices may threaten the presumption of innocence, a cornerstone of criminal justice systems.

7. Indian Legal Framework

The Indian Constitution provides important safeguards relevant to AI-assisted criminal investigations. Article 14 guarantees equality before the law and equal protection of laws. Any AI system producing discriminatory outcomes may conflict with this constitutional guarantee.

Article 21 protects life and personal liberty. In Justice *K. S. Puttaswamy (Retd.) v. Union of India* (2017), the Supreme Court recognized privacy as a fundamental right. This landmark decision has significant implications for AI-powered surveillance and data collection practices.

India has also enacted the Digital Personal Data Protection Act, 2023, which seeks to regulate the processing of personal data and strengthen privacy protections. Although the legislation does not specifically address AI governance, it establishes important principles relevant to data-driven investigations. Despite these developments, India currently lacks comprehensive legislation specifically regulating AI in criminal investigations. The development of a dedicated regulatory framework is therefore essential.

8. Case Studies on the Use of Artificial Intelligence in Criminal Investigations

The use of Artificial Intelligence in investigations can be better understood through real-life examples. These examples show both the benefits and concerns of using AI in investigations.

A. Facial Recognition Technology and Criminal Investigations

Facial Recognition Technology (FRT) is a debated AI application in law enforcement. Governments and police use FRT to identify suspects find missing people and monitor areas. The technology compares images from surveillance footage or digital databases with existing records.

In the UK and US law enforcement agencies have used recognition to identify suspects in serious crimes and terrorist activities. However, studies have shown that facial recognition algorithms can produce results especially when identifying women and minority groups. This can lead to identification, detention and violations of individual rights. The use of facial recognition technology raises legal concerns. The collection and storage of data raise privacy issues while algorithmic inaccuracies challenge fairness and due process. Courts and policymakers recognize the need for safeguards when using facial recognition in investigations. Transparency, oversight and judicial review are essential to prevent these technologies from undermining protections.

B. Artificial Intelligence in Cybercrime Investigations

Cybercrime is a challenge for modern law enforcement agencies. Crimes like identity theft, financial fraud and cyberterrorism involve digital networks across national borders. Traditional investigative methods often fail to address these crimes. Artificial Intelligence has become a tool in cybercrime investigations. AI-powered systems analyze network traffic, detect anomalies identify software and predict cyber threats. Machine learning algorithms learn from

attacks enabling investigators to respond effectively to emerging cyber risks. Financial institutions and cybersecurity agencies use AI systems to detect transactions in real-time. Law enforcement agencies use AI to monitor activities, trace cryptocurrency transactions and identify cybercriminal networks. These capabilities have improved the detection and prevention of cybercrime.

However using AI in cybercrime investigations raises legal questions about surveillance, data retention and cross-border jurisdiction. Authorities must ensure compliance with privacy laws and data protection regulations. The challenge is balancing crime prevention with protecting fundamental rights. These case studies show that AI can enhance effectiveness with proper legal safeguards. They highlight both the opportunities and limitations of AI-assisted investigations. Reinforce the need for responsible governance.

9. Prospects of Artificial Intelligence in Criminal Justice

Artificial Intelligence is expected to play a role in the future of criminal investigations and justice administration. As technology evolves AI systems will become more sophisticated, accurate and integrated into investigations. Emerging technologies like learning, predictive analytics and blockchain-based evidence management may transform law enforcement practices. One significant area of development is predictive crime analysis. Advanced AI systems may identify trends more precisely enabling law enforcement to implement targeted crime prevention strategies. Such technologies have the potential to reduce crime rates and improve safety through proactive interventions.

Another promising development is AI- forensic tools. These tools may enhance the analysis of fingerprints DNA samples, digital evidence and crime scene reconstruction. By automating analytical processes these technologies can improve accuracy and reduce investigative delays. Furthermore AI may facilitate the identification of overlooked connections between cases strengthening criminal investigations. The future of AI in justice also extends to judicial administration. AI-assisted legal research, case management systems and evidence analysis tools may improve efficiency within courts and prosecutorial agencies. However using AI to support decision-making remains controversial due to concerns about transparency, accountability and judicial independence.

Despite these opportunities future developments must be approached with caution. The

increasing sophistication of AI systems may intensify concerns about surveillance, privacy and algorithmic discrimination. Governments may possess capabilities to monitor citizens through interconnected surveillance networks and biometric databases. Without safeguards such technologies could threaten democratic freedoms and civil liberties. The future success of AI in investigations depends on developing comprehensive governance frameworks. Policymakers must ensure that technological innovation remains consistent with values, human rights principles and the rule of law. Regulatory mechanisms should emphasize transparency, explainability, accountability and human oversight. Audits and impact assessments should be conducted regularly to evaluate the social and legal consequences of AI deployment.

International cooperation will play a role in shaping the future of AI governance. States must collaborate in developing standards and best practices. International organizations like UNESCO and the United Nations have emphasized the importance of AI principles and human-centered approaches to technological governance. Ultimately AI should assist than replace human decision-makers. While technology can enhance efficiency and accuracy the responsibility for safeguarding justice, fairness and human dignity must remain with institutions. The future of investigations depends not merely on technological advancement but on the ability of legal systems to integrate innovation within a framework of democratic accountability and respect, for fundamental rights.

10. Comparative International Perspectives

When we look at how countries are dealing with Artificial Intelligence regulations we can see that they are all doing things a little differently.

The European Union is really leading the way when it comes to Artificial Intelligence governance. They have adopted the Artificial Intelligence Act, which's a framework for regulating Artificial Intelligence systems based on the level of risk they pose. If an Artificial Intelligence application is considered risk like some law enforcement technologies it has to go through extra checks to make sure it is being used properly. The United States is taking an approach with regulations that are specific to certain industries rather than one big law that covers everything. Organizations like UNESCO and the United Nations are also talking about how important it is to use Artificial Intelligence in a way that is fair and respectful of people's rights.

All of this is really helpful for countries that are trying to figure out how to regulate Artificial Intelligence when it is used to help with investigations.

11. Recommendations

To make sure that Artificial Intelligence is used responsibly in investigations we need to take the following steps:

- a. People need to create laws that are specifically about Artificial Intelligence and how it is used by law enforcement.
- b. People need to make sure that Artificial Intelligence decision-making processes are transparent and easy to understand.
- c. People need to check the algorithms used by Artificial Intelligence to make sure they are not biased.
- d. People need to have people overseeing how Artificial Intelligence is being used.
- e. People need to make sure that humans are involved in the decisions made by Artificial Intelligence.
- f. People need to protect peoples privacy and make sure their data is safe.
- g. People need to get experts from fields like law and technology to work together to make sure Artificial Intelligence is used in a way that is fair and just.
- h. People need to get the public involved in discussions about how Artificial Intelligence's governed.
- i. People need to create standards for using Artificial Intelligence in a way that is ethical and fair.

12. Conclusion

Artificial Intelligence has really changed the way we do investigations. It has made things more efficient and accurate. Has even helped us predict crimes. Technologies like policing, facial recognition and natural language processing have given law enforcement agencies more tools

to use when investigating crimes.

These new technologies also raise some big questions about the law, ethics and human rights. If Artificial Intelligence is biased or if we do not know how it is making decisions it can be a problem. We also need to make sure that peoples privacy is protected and that those in charge of Artificial Intelligence are accountable for what it does. So if we want to use Artificial Intelligence in investigations we need to have strong laws, in place and make sure that humans are overseeing what is going on. We should not just be looking at how Artificial Intelligence is working but also at whether it is fair and just. The important thing is to make sure that Artificial Intelligence is used in a way that respects peoples rights and upholds the law.

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