

UTILIZATION OF ARTIFICIAL INTELLIGENCE TECHNIQUES IN COMBATING CRIME

OMAYMA KHADIDJA HAMIDI¹

¹Legal Research and Sharia Policy Laboratory, Specialization International Criminal Law, Abbas Laghrour University Khenchela, Faculty of Law and Political Science (Algeria).

The E-mail Author: Oumayma.hamidi@univ-khenchela.dz

Received: 05/2024

Published: 11/2024

Abstract:

Artificial intelligence (AI) has become one of the most advanced tools for addressing various challenges faced by society, including crime prevention. AI technologies provide considerable opportunities for law enforcement and security agencies to analyze data more quickly and accurately, improving their ability to detect crimes before or to uncover them more swiftly after they happen.

AI assists in crime detection and prediction, effectively contributing to the prevention of potential future crimes. This study aims to identify AI's role in combating crime, its applications, challenges, and ethical issues related to these technologies.

Keywords: Artificial Intelligence, Crime, Predictive Policing, Algorithms

INTRODUCTION

The transition of traditional crimes toward a modern, scientific approach that leverages advanced technology, artificial intelligence, and digital information in planning, execution, and erasing crime traces does not simply present a legal dilemma regarding criminalization, punishment, or the classification of patterns and components, as some might think. The real challenge raised by modern crimes lies in the difficulties related to monitoring and tracking, the complexities of detection and control, the risks of evidence collection, and the investigation of highly intelligent criminals, alongside weak procedural legislation and outdated general rules of evidence.

Some leading police departments use artificial intelligence and various AI technologies to fight crime. For example, the New York City Police Department established a Crime Management Center, which employs data analysis and predictive analytics. The centre hosts a repository of crime data occurring in the city, and the system analyzes large volumes of crime data (communications, incidents, arrests, violations, and potential risks) to predict the likelihood of future crimes, prepare for them, and enhance response times by intensifying and allocating patrols in areas more susceptible to crime. AI also monitors traffic patterns to predict and avoid collisions with remarkable accuracy—an essential function for autonomous vehicles.

Problem Statement: How does the use of AI technologies contribute to crime prevention before it occurs?

To address this problem statement, we have divided this study into two main sections:

1. The concept of artificial intelligence and its applications in combating crime
2. Challenges faced by AI in the field of crime prevention

Section One: The Concept of Artificial Intelligence and Its Use in Crime Prevention

To identify artificial intelligence and its role in fighting crime, we must first define it and highlight its key features, followed by its applications in crime prevention.

First: Definition of Artificial Intelligence and Its Features

1. Definition of Artificial Intelligence

Artificial intelligence is a branch of computer science which aims to develop systems and software capable of performing tasks that mainly require human intelligence, such as learning, logical reasoning, pattern recognition, and decision-making in the context of crime prevention¹.

It is also defined as a branch of computer science that allows the creation and design of programs that emulate human intelligence, enabling computers to perform certain tasks in place of humans².

2. Features of Artificial Intelligence

Artificial intelligence includes a range of characteristics, including:

- The ability to think and perceive
- The capacity to discover and apply knowledge
- The ability to utilize past experiences and implement them to new situations
- The capability to respond quickly to new circumstances and situations
- The ability to handle difficult and complex situations³

Second: Applications of Artificial Intelligence in Crime Prevention

Artificial intelligence is employed in various areas, including medicine, education, agriculture, manufacturing, corporations, and hospitality.

Furthermore, worldwide judicial systems use AI to analyze large volumes of legal data, assisting lawyers in determining precedents, streamlining judicial processes, and supporting judges with predictions on sentencing duration and recidivism risks. Among its applications in criminology are the following:

1. Crime Prediction Before its Occurrence

The intelligent crime prediction system relies on leveraging vast amounts of big data shared across police departments to reduce crime rates by predicting potential crime locations and types. One example is the integration of AI in surveillance cameras that send alerts to the police. For instance, detecting a person in a dark alley exhibiting unusual behaviour could indicate the possibility of a crime about to occur⁴.

Algorithmic crime prediction⁵ traces its concept back to American writer Philip K. Dick, whose fictional work involves the novel *The Minority Report*, published in 1956. The story is about three individuals capable of predicting crimes, known as "Predictive policing". However, the idea of crime prediction was not solely born from AI. Before AI, experts aimed to evaluate the risk levels of specific individuals in society. Generally, crime prediction refers to the process of anticipating criminal behaviour in particular individuals. Previously, it relied on psychological analysts and criminology experts, whereas today, predictions are made through AI techniques, including

¹ Karim Ayat Fatima Al-Zahra, *The Mechanical Mind: How Artificial Intelligence Contributes to Enhancing the Security Field and Reducing Crime*, *Annals of the University of Algeria*, Volume 38, Issue 03, 2024, p. 92.

² Ahmed Ibrahim Mohamed Ibrahim, *Criminal Liability Resulting from Artificial Intelligence Errors in Emirati Legislation - A Comparative Study*, Thesis Submitted for a PhD Degree, Ain Shams University, Egypt, Academic Year 2020/2019, p. 34.

³ Digital Giving Initiative Platform, *Article on Artificial Intelligence: Basic Information*, Accessed on 18/10/2024 - <https://attaa.sa/library/view/646->

⁴ Mahmoud Salama Abdel Moneim Al-Sharif, *The Legal Nature of Crime Prediction Using Artificial Intelligence and Its Legitimacy*, *The Arab Journal of Forensic Sciences and Forensic Medicine*, Volume 3, Issue 2, 2021, p. 343.

⁵ Amir Faraj Youssef, *Criminal and Civil Liability of Artificial Intelligence in Attacks on Information Security*, *Dar Al-Matbu'at Al-Jami'iyah*, Alexandria, 2023, p. 70.

algorithms¹. Police now employ "AI algorithms" in the preliminary stage to determine individuals more likely to commit crimes and those regarded as potentially dangerous².

2. The Use of Artificial Intelligence in Detecting Terrorism and Drug Crimes

This is fulfilled through numerous techniques, including:

- **Ground Penetrating Radar (GPR) Technology:** AI helps detect buried objects such as bodies, drugs, weapons, and explosives utilizing Ground-Penetrating Radar technology. This technology measures changes in the Earth's layers by recording the reflection of electromagnetic waves. This technology is employed by police officers, forensic doctors, and investigators without the need for digging or excavation. It is distinguished by speed and accuracy with just a press of a button and is particularly useful in areas where excavation is difficult.
- **Wall-Penetrating Radar Technology:** This technology enables the covert detection of movement behind solid walls to identify if someone is inside. It employs radio waves and can be mounted on drones to detect hideouts where terrorists hide in the mountains.
- **Woodpecker Technology:** This is a small wireless listening device used remotely to eavesdrop through walls, ceilings, and doors. It is used in tactical operations for hostage rescue and counterterrorism efforts. The device works for 24 hours and transmits sound over a distance of up to 50 meters.

3. The Role of Artificial Intelligence in Combating Riots and Demonstrations

Artificial intelligence predicts riots by analyzing tweets on platforms like Twitter. Machine learning algorithms can determine "serious incidents" locations that may lead to riots even before the news reaches the police. These algorithms can also predict where the riots will spread.

In 2011, protests erupted in London, quickly escalating into violent riots. It started as an isolated incident in the Tottenham area but rapidly spread across the city. The AI system analyzed 6.1 million tweets posted then, and machine learning algorithms examined their locations, timing, and the frequency of specific keywords to help police determine potential threat locations. The data allowed the system to offer insights into where riots might occur and areas where protesters might gather. It could also detect smaller related events, such as car burnings and shop destructions, which pose risks to public safety and social order³.

4. Intelligent Surveillance

Surveillance cameras have become one of the most significant tools in recent years, significantly reducing uncertainty in solving several crimes in different areas and helping the police fulfill impressive successes. These cameras provide various advantages in revealing detailed information that might be overlooked by human officers. They assist in detecting infiltration attempts, tracking down criminals after they commit their crimes, and even predicting crimes before they occur, thanks to their unique characteristics. Surveillance cameras, particularly those with motion detection capabilities, send alerts when they detect movement within their view. Furthermore, night vision, audio recording, and image capturing help determine criminals' faces. Moreover, cameras can connect to Wi-Fi networks, enabling home security cameras to link to the household's Wi-Fi system⁴.

¹ Wafa Mimoumi, The Use of Artificial Intelligence in the Modern Criminal Justice System, *Annals of the University of Algiers* 01, Volume 38, Issue 03, 2024, p. 65.

² Omar Abdel Majid Musbah, The Use of "Predictive Justice" Algorithms in the Criminal Justice System: Prospects and Challenges, *International Journal of Law*, Volume 10, Issue 01, 2021, published by the Faculty of Law, Qatar University, p. 250.

³ Fayek Awadeen, The Use of Artificial Intelligence Technologies Between Legitimacy and Illegitimacy, *National Criminal Journal*, Volume 65, Issue 1, 2022, pp. 27-28.

⁴ Mohamed Abdel Hakim Mohamed Abu El-Naga, The Role of Security Strategies in Combating Artificial Intelligence and Information Technology Crimes, Presentation at the "Legal and Economic

5. Identifying Suspects

Artificial intelligence programs have evolved to the point where they can now learn how to predict interactions with humans. For instance, the Artificial Intelligence and Computer Science Lab at the Massachusetts Institute of Technology designed an algorithm that analyzed over 600 hours of YouTube videos to study human behavior. The algorithm then could predict human actions correctly 43% of the time based on test samples, which is only 28% less accurate than humans¹.

Facial recognition technologies are utilized in many cities to monitor public spaces and identify wanted or suspected individuals through:

a. Brain Fingerprinting:

This technology scans brainwaves employing specialized equipment to analyze signals emitted by the brain. This concept was invented by American scientist "Farwell." Unlike traditional fingerprinting, this method does not depend on traces left by the perpetrator at the crime scene. Instead, it focuses on the **biological DNA** stored in the criminal's mind, including details, events, and facts associated with the crime they committed. This technique is based on identifying that the brain is the main source of all human actions, responsible for planning, executing, and recording what occurred during the crime. The actual perpetrator stores these events in their memory. Brainwave fingerprinting utilizes brain scans to capture how the suspect's brain reacts when questioned by the police².

B. Iris Recognition System

Iris recognition involves two types:

Iris Pattern:

The iris consists of a series of holes and slits, some of which are concentrated around the pupil. These patterns vary from person to person in terms of number, shape, and even the spacing between them. Furthermore, iris pigmentation differs from one individual to another, even among people with similar color tones. This variability makes the iris a unique and distinctive biometric feature, making iris recognition one of the most secure methods for verifying a person's identity. The iris scanning process employs a device similar to the traditional lenses used by ophthalmologists but in a smaller form. These lenses capture an image of the iris and generate encrypted codes. The eye's biometric data can also be examined with a device called the "Slit Lamp," which emits a light beam that penetrates the eye at an angle to reveal its layers. This device can magnify the iris details up to 300 times, allowing a clear display of the iris's unique patterns on a screen, much like a doctor's observation.

Retina Pattern:

Retina scanning captures the unique map of blood vessels in the retina by shining a light beam into the back of the eye. The blood vessel pattern, stemming from the optic nerve and extending across the retina, is unique to each individual³.

6. Data Analysis

Analysis of Criminal Patterns and Trends

The importance of artificial intelligence in crime reduction lies in its ability to use big data to analyze criminal patterns and trends, allowing law enforcement agencies to respond quickly and effectively to prevent and fight crimes before they occur. AI is a proactive tool that helps identify

Aspects of Artificial Intelligence and Information Technology" Conference, Alexandria, 2021, pp. 950-944.

¹ Abdullah Moussa and Ahmed Bilal, *Artificial Intelligence: A Revolution in Modern Technologies*, Dar Al-Kutub Al-Misriyah, Cairo, 2019, First Edition, p. 57.

² Azza Hazem, *Modeling a Software System for Identity Verification through Iris Biometrics*, Iraqi Journal of Statistical Sciences, Issue 22, 2012, p. 150.

³ Azza Hazem, *Modeling a Software System for Identity Verification through Iris Biometrics*, Iraqi Journal of Statistical Sciences, Issue 22, 2012, pp. 152-156.

areas and times with the highest crime rates¹. It also analyzes data from social networks, mainly focusing on extremist content on the internet or attempts to prevent suicides on related websites².

7. Use of Artificial Intelligence in Policing Field

a. Smart Police:

This concept imagines the future of policing in the form of robots that could potentially replace human officers or even police vehicles. It combines both police vehicles and officers in one, revolutionizing policing by assisting in the capture of dangerous criminals, particularly criminal gangs.

b. Black Beetle:

This is an electric vehicle designed by scientist Karl Archambault. It is 100% electric and assists law enforcement in high-speed chases and traffic regulations.

c. Armored "Trak":

The "Trak" is a small, multi-purpose armored vehicle that helps police officers in various tasks. It is known for its safety, flexibility, rapid response, and high maneuverability in challenging terrains. Despite its small size, it can carry up to eight police officers and is equipped with multiple front and rear shields to protect against gunfire and projectiles. Furthermore, it contains 10 ports for firing weapons, and the armor includes wireless cameras.

d. The Use of GPS Technology

This approach involves mounting surveillance cameras on glasses, shirts, or earpieces to capture movements and events surrounding the officer while they perform their duties. Furthermore, it can use GPS technology to determine the locations travelled, especially in desert areas.

e- The Future Police Helmet:

This is a motorcycle helmet for police officers with advanced technical characteristics. It displays information on the visor to enhance response times in emergencies and save lives. It features a display screen between the wearer's eyes, integrated with a location-tracking system, and enables communication with the nearest police station, hospital, or fire department.

f- The Smart Belt for Police Officers:

This belt maintains digital connectivity and records every time an officer draws his weapon from the holster. This technology can hold the officer accountable for not utilizing his weapon in non-emergency situations. It also helps monitor the officer's coordinates and speed at different times³.

g- Drones

Recent studies on drones have demonstrated that they outperform weapons and technological equipment employed by military forces for decades. One of their significant applications is the efficient collection of information across crowded cities. In law enforcement, drones have proven particularly valuable; for example, thieves are often aware of the expected arrival time of police units, but drones can significantly reduce response time. This effectiveness was indicated by the police in Ensenada, where drones lowered the city's crime rate by up to 10%.⁴

¹ Karim Ait Fatima Al-Zahra, *Op. cit.*, p. 97.

² Farghali Bonieh, *Artificial Intelligence: Its Reality and Future*, National Council for Culture, Arts, and Letters, Beirut, 2019, p. 222.

³ Fayek Al-Awadeen, *Op. cit.*, p. 25.

⁴ Mohamed Abdel Hakim Mohamed Abu Al-Naja, "The Role of Security Strategies in Confronting Artificial Intelligence and Information Technology Crimes," presented at the conference Legal and

Second Section: Challenges Facing the Use of Artificial Intelligence in Crime-Fighting

Despite the significant benefits that AI technologies offer in crime prevention, several challenges limit their effectiveness in fighting crime, including:

1. Biases in Algorithms

Some AI systems may include hidden biases due to the historical data utilized to train them. For instance, specific systems may exhibit bias against particular racial or social groups if the input data includes prior biases. This can exacerbate problems rather than solve them. For example, in some cases, predictive systems have demonstrated bias against poorer neighbourhoods or racial minorities.

2. Privacy and Data Protection

The gathering and analysis of large datasets employing AI technologies raises sensitive issues around privacy. Continuous surveillance and facial recognition can lead to violations of individual privacy rights and breaches of constitutionally protected rights.

3. Use of AI in Crimes

AI can also be employed by criminals to commit crimes. For instance, cybercriminals may utilize machine learning techniques to hack into security systems or improve their abilities to commit digital crimes. This introduces a significant cybersecurity threat and requires the development of advanced security technologies to counteract it.

4. Legal and Ethical Challenges:

There are legal and ethical issues surrounding the use of AI in crime combating, including identifying who is liable for an intelligent system's error (such as arresting an innocent person due to a mistake in data analysis). Furthermore, ensuring transparency when employing these technologies is a critical concern.

5. Future Opportunities and Trends:

As AI technologies continue to advance, their efficiency in crime combating is expected to increase. AI capabilities can be enhanced by training algorithms on more diverse datasets and simultaneously developing privacy protection techniques. Moreover, it is anticipated that the ability of intelligent systems to predict future crimes and analyze forensic evidence will enhance, leading to improved effectiveness and efficiency in security systems.

Conclusion

Combating crime with methods that align with this intelligent evolution is necessary in the face of criminal globalization. Therefore, using artificial intelligence technologies to address criminal phenomena before they occur has become imperative. The transition from simply fighting crime to preventing it beforehand is crucial to ensuring a secure future without crime.

The increasing utilization of AI technologies in combating crime reveals vast potential to enhance the effectiveness of security agencies, whether through crime prediction, identifying perpetrators, or analyzing evidence. However, these technologies must be employed cautiously, considering their challenges, particularly regarding privacy. It is essential to develop clear laws to regulate their use while upholding the principle of legality in crimes and punishments. Striking a balance between employing this technology to improve security and protecting individuals' fundamental rights will be critical in the future.

References:**Books:**

1. Amir Faraj Youssef, *Criminal and Civil Liability of Artificial Intelligence in Information Security Breaches*, Dar Al-Matboo'at Al-Jamia'iya, Alexandria, 2023.
2. Farghali Bounih, *Artificial Intelligence: Its Reality and Future*, National Council for Culture, Arts, and Letters, Beirut, 2019.
3. Abdullah Moussa and Ahmed Bilal, *Artificial Intelligence: A Revolution in Modern Technologies*, Dar Al-Kutub Al-Masriya, Cairo, First Edition, 2019.

Doctoral Dissertations:

1. Ahmed Ibrahim Mohamed Ibrahim, *Criminal Liability Resulting from Artificial Intelligence Errors in UAE Legislation - (A Comparative Study)*, Thesis Submitted for the PhD Degree, Ain Shams University, Egypt, Academic Year 2020/2019, p. 34.

Journals:

1. Karim Ait Fatima Al-Zahra, *The Mechanical Mind: How Artificial Intelligence Contributes to Enhancing Security and Reducing Crime*, *Algeria University Annals*, Volume 38, Issue 03, 2024, p. 92.
2. Mahmoud Salama Abdel Moneim Al-Sheikh, *The Legal Nature of Crime Prediction Using Artificial Intelligence and Its Legitimacy*, *Arab Journal of Forensic Sciences and Legal Medicine*, Volume 3, Issue 2, 2021, p. 343.
3. Wafa Mimoumi, *Employing Artificial Intelligence in the Modern Criminal Justice System*, *Algeria University Annals*, Volume 38, Issue 03, 2024, p. 65.
4. Omar Abdel-Majid Musbah, *The Use of "Predictive Justice" Algorithms in the Criminal Justice System: Prospects and Challenges*, *International Journal of Law*, Volume 10, Issue 01, 2021, Published by Qatar University College of Law, p. 250.
5. Fayek Awadeen, *Applications of Artificial Intelligence Technologies: Legitimacy and Illegitimacy*, *National Criminal Law Journal*, Volume 65, Issue 1, 2022, pp. 27-28.
6. Azza Hazem, *Modeling a Software System for Identity Verification via Eye Iris Biometrics*, *Iraqi Journal of Statistical Sciences*, Issue 22, 2012, p. 150.
7. Azza Hazem, *Modeling a Software System for Identity Verification via Eye Iris Biometrics*, *Iraqi Journal of Statistical Sciences*, Issue 22, 2012, pp. 152-156.

Conferences:

1. Mohamed Abdel Hakim Mohamed Abu Al-Naja, *The Role of Security Strategies in Confronting Artificial Intelligence and Information Technology Crimes*, Presentation at the Conference on "Legal and Economic Aspects of Artificial Intelligence and Information Technology", Alexandria, 2021, pp. 950-944.

Websites:

1. *Digital Giving Initiative Platform*, Article on Artificial Intelligence: Basic Information, Accessed on 18/10/2024 - <https://attaa.sa/library/view/646>