



ARTIFICIAL INTELLIGENCE TECHNOLOGIES AND THEIRROLE IN REDUCING THE CRIME PHENOMENON

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Abstract:

Artificial intelligence is one of the biggest technological developments in today's world. Even though AI offers big chances to improve criminal justice, it also faces problems related to ethics and social fairness. Because of that, there's a need for strong legal rules and ethical guidelines to make sure there's a good balance between efficiency and human rights. This study tries to show how AI technologies can be used to deal with crime.

Keywords: Artificial Intelligence – Robots – Crimes – Criminal Law – Criminal Responsibility

Introduction:

With all the tech progress happening now, AI has become something we really need in many parts of life. Criminals are also starting to use these technologies to do their crimes. That's why this study is important — because using AI can really help in fighting crime. AI can quickly and accurately analyze huge amounts of data, predict criminal behavior before it happens, and help law enforcement work better. It can also help find out where a crime might happen and track the movement of the criminal. So, this study gives a practical look at how AI can help make

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society safer and more stable, while also respecting people's privacy and protecting their property.

First Topic: The Conceptual Framework of Intelligence

1. Definition of Artificial Intelligence:

Artificial intelligence, or machine intelligence, means what we see coming from a machine that acts smart. This kind of intelligence shows in things like problem-solving, learning, and doing tasks that usually need human thinking. AI is basically the study that tries to understand how human intelligence works by creating computer programs that can copy human smart behavior. It's about making a program that can solve a problem or make a decision based on a goal, and the program itself figures out how to do that. It also learns how to deal with new situations and notices similarities between different cases. AI focuses on how humans use knowledge to do intelligent tasks.

It's also said that AI is a branch of computer science that looks for advanced ways to do tasks and make conclusions, kind of like how humans do, even if only in a limited way. It's also a group of new techniques used in programming systems, especially accounting systems that help create programs which copy some aspects of human thinking. These programs can make conclusions based on facts and rules saved in the computer's memory. (Huda Abdul Razzaq Al-Asadi & Ali Youssef Al-Shukri, 2024, p217)

Another way to define it is: it's a part of computer science that tries to create and design computer programs that act like human intelligence. These programs can do tasks that usually need human thinking, understanding, or even movement, but in a logical and organized way. AI really started when the world moved away from basic programming systems after World War



II. People started making smart programs that could play games or solve puzzles, and that slowly grew into bigger systems that became what we now call artificial intelligence.

AI is also seen as the ability of machines and computers to do tasks that smart beings can do — like thinking or learning from past experience — and things that need mental effort. The goal of AI is to make systems that behave smart, just like humans, especially when it comes to learning and reacting. These systems can help people in many ways, like giving advice, teaching, or interacting.(Mohamed Abdel-Fattah & Shadi Ramadan Al-Kafarna , 2024, p 97)

Some also define AI as the study of how to make computers do things that humans currently do better. It's been said that AI is "the ability to perform at the human level in all kinds of mental tasks, in a way that the human brain couldn't tell whether it's a person or a machine doing it."(Mohamed Badawi Abdel-Aleem 2020, p339.)

Shrtcliffe and Buchanan had their own definition, focusing more on the programming side. They said AI is "a part of computer science that deals with symbols and non-numerical methods to solve problems."

2. The Origin and Development of Artificial Intelligence:

AI really started when **Alan Turing**, in 1950, came up with the famous **Turing Test**. This test was made to check if a machine could act smart like a human. It was one of the first serious ideas to show that machines might be able to think or do intelligent things.

Then in 1957, **John McCarthy** used the term "Artificial Intelligence" for the first time during a conference at **Dartmouth**

College in the US. There, he raised the question: “Can machines think?”(Osama Abdullah Mahrous , 2022, p184)

By the 1960s, people started taking that question seriously. One big step was by **Joseph Weizenbaum**, who created an electronic “chat bag” to talk with humans. Basically, a person would write a sentence, and the machine would reply by rewriting that sentence into a question. It was a very early version of what we now call chatbots.(Islam Mostafa Gomaa Mostafa,2020, p264)

In the **late 1970s**, AI started growing more in the science field. A team of researchers — **Edward Feigenbaum, Bruce Buchanan, Joshua Lederberg, Carl Djerassi**, and some students at the **Stanford Research Institute in California** — created the first “expert system.” This system could help make decisions and solve problems in organic chemistry. They called it **DENDRAL**.

From 1980 and through the following ten years, AI applications started expanding into more commercial uses. It was during this time that marketing machines were improved, and the **first national conference** for the American Association for Artificial Intelligence took place. There was also progress in **parallel computing**, which gave AI more power to work with. This period also saw the development of **fifth-generation computer systems** and more use of **neural networks**.

A team led by **Ernst Dickmanns** built the **first robotic car**, and researchers created an early **computational model of speech** and a **theoretical description of the mind** as a set of cooperating elements. There were also new robots built based on behavior models, which were simpler and became a standard in AI development. During this time, a new generation of smart **strategic, management, and business advisory systems** was launched, using expert systems that could improve themselves. There was also a **financial expert system** that could interpret



data and models and included a full financial structure. By the late 1980s, developers created an **autonomous ground vehicle** using a neural network.(Mona Mohamed Al-Atrees Al-Desouky 2022, p211)

At the start of the 1990s and over the next twenty years, AI saw major progress in many fields like **machine learning, intelligent tutoring, planning and scheduling, reasoning, data mining, natural language understanding and translation, computer vision, virtual and augmented reality, and games**. AI was even used in the **First Gulf War**, especially through **unmanned drones**. At NASA, teams began working on **underwater robots** for icy areas and **satellite-guided vehicles** to help protect wildlife in the southern hemisphere.

Ian Horswill expanded the development of behavior-based robots, starting with a robot called **Polly**, which could move using visual input at a speed of one meter per second. There were also early efforts to create a **robotic child** that looked and acted like a human. Around this time, new tools like **dynamic analysis systems** and **replanning systems** were made.

Lotfi Zadeh from the University of California built a **global research network** known as **soft computing**, which brought together areas like neural science, fuzzy set theory, fuzzy systems, evolutionary algorithms, genetic programming, and chaos theory. Two robotic cars were developed that could drive more than **1,000 kilometers per hour** on highways using smart driving systems.(Magdy Abdel-Fattah Abu Al-Majd ,2023 p152)

NASA's team, led by **Cindy Mason**, held the **first workshop** on the connection between AI and the environment. After that, Europe followed by organizing a workshop titled **"Environmental Sciences and Artificial Intelligence."**

Also, **Steve Grand**, a robotics and computer scientist, worked on and released a popular **simulation of artificial life forms**, combining elements from **biochemistry, neuroscience, learning algorithms, and digital DNA**. Around this time, the **deep learning method for long-term memory in neural networks** was introduced. The **first research paper** discussing **internet networks** and the use of **web-based search tools** was also published.(Yehia Ibrahim Dahshan , 2020, p 93)

The period from **2000 to 2010** focused on what became known as **interactive robots** and **smart games** that people could buy online. One PhD dissertation at the **Massachusetts Institute of Technology (MIT)** studied **social machines** with faces capable of expressing emotions. During this time, **NASA** continued to use **autonomous vehicles** to explore **Mars**, and sent **robots to remote areas** of the **Antarctic** to search for **meteorite samples**.

AI was also used in the field of **biological intelligence**, and robots were built to help in **marketing** and even **preparing and serving food** to guests. Motion capture technology also advanced, leading to the development of the **first gaming device** that could track full human body movement. Around this time, **Google** created its **first self-driving car**.

Between **2011 and 2020**, a major turning point took place in the history of AI. This was when **deep learning models** made **visual recognition** much more accurate, reducing error rates dramatically. AI-powered robots won **Google Japan's disaster response challenge**, where they had to drive vehicles, walk through rubble, climb stairs, pass through doors, break down walls, close valves, and connect hoses.

One of the biggest breakthroughs was the creation of a **deep neural network** with **hundreds of layers**, which became one of the most well-known neural models of the 21st century. Also



during this time, the **Asilomar Conference** was held to discuss the **ethics of AI** and how to make AI beneficial without falling into **existential risks**—especially those related to general AI.

Other achievements included the **first published algorithm** to beat human players in **games involving incomplete information**, major progress in **language processing**, and passing the **reading comprehension test** at **Stanford University**. Google also developed a **phone-based appointment booking assistant**, demonstrating how natural-sounding voice AI could be used in real-world services.

Then, from **2020 to 2023**, **Microsoft** introduced the **Turing Natural Language Generation model** with nearly **17 billion parameters**. This period also saw the release of **ChatGPT** and its newer versions, which became one of the most advanced **self-learning language models**, capable of generating everything from **computer code** and **poetry** to **articles** and **language-based tasks** that are hard to distinguish from work written by humans.

This led to the appearance of **OpenAI's chatbot**, powered by **ChatGPT**, which was able to engage in **natural, human-like conversations**. However, despite all these advances, AI development wasn't without problems. One of the major criticisms was about **bias**, or more specifically, **hallucination**—a phenomenon where AI gives confident but **incorrect answers**, raising concerns about its reliability. (Asmaa Mohamed El-Sayed 2020, p 221)

As a result, more and more research began to focus on **AI's broader effects on society**.

As part of efforts to keep up with the rapid pace of technological development, both the **French legislator** and the **European Union** have taken steps to introduce laws specific to **robots and**

artificial intelligence. In **2017**, the EU passed a law that **removed the label of "object" from robots**, instead referring to them as **"electronic or human agents"**. Then, in **2019**, the EU issued a set of **guidelines** outlining how to responsibly develop AI applications.(Mayada Mahmoud Mohamed Al-Azab, 2022 p 180)

In the **United States**, a law titled **"The Future of Artificial Intelligence and Its Global Prospects"** was passed in **2017**, marking it as the **first law focused specifically on AI systems**.

As for the **UK**, the **House of Lords** established a **select committee** on artificial intelligence in 2017 to examine the **economic, ethical, and social impacts** of AI. Meanwhile, in **2018**, the **European Parliament** proposed that member states create laws addressing the **legal aspects** of AI and robotics. The EU then issued **supplementary regulations** to the **General Data Protection Regulation (GDPR)**, including a regulation—**Regulation No. 1807 of 2018**—on the **free flow of non-personal data** across EU member states.

In **Egypt**, the government addressed AI through **Cabinet Decree No. 2889 of 2019**, which established a **National AI Council** tasked with **creating, implementing, monitoring, and updating national strategies on artificial intelligence** in line with global advancements.(Shaaban Raafat Mohamed Ibrahim 2021, p 328)

In the **United Arab Emirates**, a number of **principles and guidelines** have been laid out regarding the **use and regulation of AI systems**.

The **Jordanian legislator** included a definition of AI systems in the **Electronic Transactions Law No. 156 of 2015**, where Article 2 defines an **electronic intermediary** as:



“An electronic program used to perform or respond to an action automatically for the purpose of creating, sending, or delivering an information message.”

The **Iraqi legislator** addressed AI through **Law No. 78 of 2012 on Electronic Signatures and Electronic Transactions**. Article 8 defines an **electronic intermediary** as:

“A computer program or any other electronic tool used to carry out or respond to an action with the purpose of creating, sending, or receiving information.”

Meanwhile, the **UAE’s Electronic Transactions and Commerce Law of 2006**, in Article 1, defines the **electronic intermediary** as:

“A program or an electronic system, such as a computer, that can act independently, either fully or partially, without the supervision of a natural person at the time of the action or response.”(Abu Al-Qasim Anfis& Nasreen Abdulaziz Basheer Al-Sawani,2024, p79)

This definition reflects the technical core of AI systems, particularly **computer-based electronic systems**. It closely aligns with the **autonomous nature of AI**, highlighting how these systems can make decisions and perform tasks **without direct human intervention**.

Section II: Applications of Artificial Intelligence in Combating Crime

Artificial intelligence technologies have been increasingly applied in the **security field**, particularly within the concept of **smart cities**, where one of the core goals is to use advanced technologies—like AI—to ensure the **safety and security of urban residents**. Examples of these technologies include:

- **Smart surveillance cameras** that can analyze images and videos to detect suspicious individuals, wanted persons, or unusual activity and send real-time alerts to control centers.
- The use of **machine learning** in **cyber security**.
- **Predictive policing applications** and the use of **unmanned aerial drones** for aerial monitoring during public events such as sports games, festivals, and celebrations.

A notable example is the **New York Police Department (NYPD)**, which has established **crime management centers** using **data analysis and predictive analytics**. These centers include a comprehensive **crime data repository**, which helps analyze large volumes of criminal data and assess potential risks. The goal is to **predict where crimes are likely to occur** and prepare in advance, improving **response times** by deploying patrols more effectively in high-risk areas.

AI is also used in **traffic pattern monitoring**, with impressive accuracy in predicting and preventing road accidents. Similarly, AI technologies are applied in **detecting and preventing fraud, forgery, and scams**.(Ben Aouda Haskar Mourad ,2022, p 257)

Moreover, **law enforcement agencies** now use **social media analysis** tools to study patterns and data from platforms like Twitter and Facebook to anticipate potential **riots or protests**. An example is **IBM's Watson system**, which was used by NYPD. They fed Watson crime data from 2010 to 2015 to help understand the correlation between incidents, injuries, and fatalities.

Anothe advancement involves AI programs capable of **understanding human behavior** to **predict interactions**. For instance, MIT's **Computer Science and Artificial Intelligence**



Lab developed an algorithm that analyzed **over 600 hours of YouTube footage** to study human actions. The algorithm achieved a **43% success rate in predicting behavior** from test samples—only **28% less accurate than humans**. While not perfect at the time, such systems are steadily improving, and with further development, **AI could become remarkably accurate in forecasting human actions**, which could greatly **enhance urban security and safety**.

Below are some **examples of AI-based innovations in crime prevention**:

1. **CrimePrediction**

AI technologies help **predict potential crimes** and **identify the most likely types of crimes to occur**, including potential **future crime hotspots**. These systems rely on specialized **algorithms** trained on extensive datasets to provide predictive insights. One critical reason for developing such tools is that **criminals and organized crime groups** now use modern technologies to commit crimes. Therefore, **law enforcement agencies** must also rely on predictive AI tools.

For example, AI can help identify customers buying **suspicious quantities of chemical substances** that could be used in **terrorist activities**—like making explosives—by using a concept known as **predictive or preemptive policing**.

2. **Crime Scene Reconstruction**

The powerful predictive capabilities of artificial intelligence tools can aid in **reconstructing crime scenes** through the use of **Bayesian network models**, which represent a set of variables and their probabilistic relationships in a graphical form. These models help

identify the perpetrator by using specific algorithms to uncover the details of a case and analyze the suspect's mental and physical condition to determine whether they were capable of committing the crime. However, despite the important role AI plays in the criminal field, its usage **varies across countries** due to differences in technological advancement and economic capabilities.

3. 3. Facial Recognition and Technological Surveillance

Facial recognition systems are among the most significant AI-based technologies used in monitoring and tracking suspects. These systems rely on complex algorithms to **analyze human facial features** and accurately identify individuals. They are increasingly being deployed in many countries for security purposes.

4. 4. AI in Police Pursuits

Artificial intelligence is used in **police chases** by analyzing a criminal's personality and determining the best approach for engagement. Unlike humans, who may make errors under pressure, AI systems can **quickly access the offender's criminal record and behavioral history** to identify weaknesses and exploit them for a smoother arrest.

These technologies are also applied in maintaining public order and in **criminal enforcement stages**, such as **classifying offenders** and **applying alternative sanctions** to short-term prison sentences. One example is **electronic monitoring through smart bracelets**, which was adopted by **the French legislator** through the **Law of December 19, 1997**, incorporated into the Code of Criminal Procedure. (Faeq Awadein, 2022, p336)



5. 5. Investigations and Evidence Detection in Terrorism, Explosives, and Narcotics Cases

AI technologies are also applied in detecting evidence in terrorism, drug, and weapon cases using **Ground Penetrating Radar (GPR)**. This system detects buried objects—such as drugs, weapons, explosives, or human remains—**up to 2.5 meters below the surface** by recording the reflections of electromagnetic waves. Such tools are used by **investigators, forensic teams, and medical examiners** to search for evidence without the need for excavation. This reduces the **time, labor, and cost**, and enables **seamless digital integration** of images and data into detailed reports. It is particularly useful in areas where **traditional excavation is difficult**.(Motawea Abdel Qader 2012 p 119)

One example is a **county in the United Kingdom**, which applied AI techniques to **detain suspects with criminal records** upon their presence in high-risk locations such as shopping centers and banks.

Mobile Radar for Wall-Penetrating Detection

Another innovation is **mobile radar** capable of **detecting movement through solid walls**, including **human breathing**, from a distance of over **6,000 USD in value per device**. These radars use **radio waves** and can be **mounted on drones** for discreet surveillance of **terrorist hideouts in mountains or caves**.

Smart Camera Systems and Their Role in Crime Prevention

The state seeks to utilize all that modern technology offers in the fight against crime. Among these tools is the

installation of **surveillance cameras** in streets, squares, and critical facilities—not to monitor people, but rather to **serve them** by continuously recording events around the clock. These **surveillance cameras** play a vital role in **crime prevention**, as simply knowing that an area is under camera coverage often **deters potential offenders** from committing crimes.

Are many areas where surveillance cameras can be used to prevent crimes?

A. Securing Critical Facilities:

Surveillance cameras have become an urgent and essential need to secure vital institutions such as ministries, hospitals, police departments, banks, and schools. These cameras help detect all violations occurring within these facilities. Announcing that a place is equipped with surveillance cameras often makes a potential offender think twice before committing a crime, for fear of being identified, quickly apprehended, and brought to justice.

B. Monitoring repeatoffenders:

This involves tracking individuals with a history of reoffending through **electronic surveillance** using a **Telemetric System** as a method for observing individuals and collecting information related to their physiological functions and neurological status remotely via electrical waves. Some of this data—particularly those related to breathing, stress levels, and adrenaline in the blood—can indicate certain behaviors. When combined with the person's location, this data can reveal suspicious activity. For example, it may indicate intent to reoffend if a person recently released on parole is found in a high-risk area.(Saud Abdel Qader Al-Shaer 2020 p 68)



Conclusion:

In conclusion, while **artificial intelligence offers great opportunities** to enhance criminal justice, it also **faces significant ethical and social justice challenges**. This highlights the urgent need for **strict legal regulations and ethical frameworks** to ensure a balance between efficiency and the **protection of human rights**.

Findings:

- Although artificial intelligence technologies offer numerous advantages, they are not without flaws.
- With the rapid and continuous development of AI technologies, it has become essential to recognize their legal personality.
- Recognizing the legal personality of these entities is the first step toward establishing criminal liability for their independently committed criminal acts.

Recommendations:

- Granting artificial intelligence a form of **legal personality** in proportion to its nature, similar to legal entities, as a prelude to establishing **criminal liability** for crimes it commits independently.
- Legislations must keep pace with technological advancements and enact **new laws** to address emerging crimes related to artificial intelligence, to prevent a gap between theory and the applicable legal framework that could harm society and individuals.
- We propose the **establishment of specialized judicial courts** to address cases related to AI technology, alongside **training programs for judges** to build expertise in this field.

- There is a need to **develop and update traditional penalties** and to introduce **new sanctions** that are compatible with the nature of AI entities.
- Lawmakers should implement **mandatory insurance for robots** and establish **compensation funds** for victims harmed by AI-related crimes, with clear and objective liability criteria based on the degree of harm, as well as defining the scope of exemption for damages caused by AI crimes.

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