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# Artificial Intelligence and Modern Penal Policy: Legal Foundations, Challenges, and Transformative Implications for Criminal Justice

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**Abstract**

The rapid advancement of artificial intelligence (AI) has significantly reshaped contemporary legal inquiry, particularly in the domain of criminal justice and penal policy. AI technologies not only facilitate automated decision-making processes but also introduce new legal challenges concerning accountability, liability, and procedural fairness. As AI systems expand across judicial and administrative frameworks, legal scholars confront the complexity of integrating intelligent machines into established legal norms. This article examines the conceptual foundations of artificial intelligence and its evolving legal status within penal policy. The discussion highlights the difficulty of formulating a unified legal definition of AI and the implications this has for regulating criminal conduct, forensic analysis, judicial discretion, and punishment. Through analytical and comparative methodologies, drawing upon multidisciplinary legal and technological sources, the study explores how AI alters traditional assumptions regarding intent, responsibility, and evidence. The findings suggest that AI is not merely a technological tool, but a transformative legal actor influencing the nature and objectives of modern penal systems. The research concludes with recommendations for establishing transparent regulatory frameworks and ensuring that AI remains aligned with principles of justice, human dignity, and due process.

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## Introduction:

Since the legal mind settled on the concept of crime as an assault against society as a whole, the state assumed its right to impose punishment on anyone who dares to commit a criminal act. This became its intended purpose and legitimate function, for which it mobilized all material and human resources, ensuring that no one who defies its commands and prohibitions escapes the grip of the law.

As life evolved generation after generation, the state emerged and societies transitioned into a phase of legal organization, resulting in the emergence of various schools and legal theories specializing in penal studies. These aimed to develop the concepts and functions of punishment as the optimal means of crime prevention. Efforts

focused on the idea that punishment serves the function of general deterrence, intended to prevent the commission and recurrence of criminal behavior, thereby achieving justice and upholding the rule of law.

Moreover, the qualitative and rapid advancements brought about by the technological revolution, especially in the twentieth century in the field of information technologies, led to the emergence of diverse and innovative applications and programs. This has enabled artificial intelligence to permeate all fields, with penal policy being among the most prominent.
Given the significant importance addressed by most criminal legislations in confronting and curbing criminal phenomena through the rationalization of penal policy, we pose the following question: **What is the impact of artificial intelligence on modern penal policy?**

To explore this topic, we adopted a classical bipartite structure comprising two sections, each divided into two subsections. The first section addresses the conceptual framework of artificial intelligence; its first subsection discusses the definition of artificial intelligence, while the second examines its technological applications. The second section analyzes the impact of artificial intelligence on the rationalization of penal policy; the first subsection explores the legal nature of artificial intelligence in this context, and the second focuses on its role in security measures. Finally, the study concludes with a summary presenting a set of findings and recommendations.

Our approach relied on analytical methodology to determine how artificial intelligence affects penal policy across its various dimensions. We then supplemented the study with a comparative methodology to analyze different studies on artificial intelligence and its applications to legal criminal measures concerning offenders, with the aim of achieving their rehabilitation and reform.

**First Section: The Conceptual Framework of Artificial Intelligence.** Computers have reached a level of complexity that enables them to solve intricate problems, puzzles, and perform calculations; however, they have not yet matched the capabilities of the human mind. In response, modern scientists sought to endow machines with such capabilities by inventing the second generation of intelligent systems. Accordingly, this section will address the concept of artificial intelligence and its various applications.
**First Requirement: The Concept of Artificial Intelligence.** To arrive at a comprehensive understanding of artificial intelligence, we begin by defining the technology, followed by a brief historical overview, and conclude with its key characteristics.
**First Part: Definition of Artificial Intelligence Technology.** The term "artificial intelligence" consists of two components. Therefore, we first define "intelligence," then proceed to "artificial."
The word "intelligence" carries multiple definitions. It is sometimes associated with abstract thinking, and at other times with learning and adaptation. Some scholars define it as "the ability for abstract reasoning," while others describe it as "the capacity to acquire experience." Another definition refers to it as "the integrative analytical unit of cognitive, perceptual, and hierarchical mental activity that enables the individual to respond to environmental demands and adapt to its complex and changing manifestations." A further definition considers it "a general mental ability for reasoning, problem-solving, and learning, integrating cognitive functions such as perception, attention, memory, language, and planning." These varied interpretations underscore the difficulty of establishing a precise definition of intelligence due to the diversity of explanatory approaches.
As for the term “artificial” (istina’ii in Arabic), it is derived from the verb “to make,” (sana’a in Arabic) as in: he made, makes, making; it is made or manufactured, meaning it is the product of action. As stated in the Qur’anic verse, *“[This is] the making of Allah, who perfected all things.”* The noun is“making,” (sina’a or son’e) the agent is “maker,” (sani’e) the plural is “makers,” (sona’e) and the craft is the work of the maker. Based on this explanation of the word “artificial” in Arabic, it can be defined as the result of a set of efforts represented by human inventions and innovations.
Artificial intelligence is defined as: “the authorized method for discovering the mechanisms of human intelligence through the experimentation of computer programs”; however, it has not stopped at merely uncovering these mechanisms. It has evolved into a scientific field aimed at understanding the nature of human intelligence and projecting it onto computers and digital machines, enabling them to simulate human behavior in all its

dimensions. It is also defined as: "a branch of computer science focused on creating machines capable of engaging in behaviors that humans consider intelligent."

Artificial intelligence transforms computers and digital devices from merely programmed tools performing specific tasks into intelligent systems capable of analysis, inference, goal-setting, and purposeful action, much like the human mind. Although achieving this transformation in its entirety remains a complex challenge, AI encompasses numerous applications that will be discussed later.

The overarching goal of artificial intelligence is to enable computers to perform tasks that require intelligence when carried out by humans; it resembles the human brain, wherein a level of human-like intelligence is embedded within machines by analyzing and decoding the brain's operational mechanisms, then translating the resulting data into executable and applicable AI structures. This process aims to develop more efficient, flexible, and capable technological systems; hence, AI constitutes a vital component of modern industry and technology

**Part Two: Historical Foundations of Artificial Intelligence.** Some researchers and historians trace the origins of artificial intelligence to ancient times, where thinking machines and artificial beings appeared in myths and literary narratives. However, the real foundations emerged through philosophical and mathematical debates on logic and reasoning, which led to the development of mathematical logic and diversified modes of thought. These developments laid the groundwork for modern computing and artificial intelligence.In 1642, physicist and mathematician Blaise Pascal invented thefirst mechanical calculator capable of performing addition. Thirty years later, Gottfried Leibniz improved the design, enabling multiplication and division.

Subsequent efforts by scientists and researchers focused on building machines capable of computation, data storage, and information retrieval. The first computer appeared after World War II, along with the emergence of programming, a set of rules that determine the sequences of symbols forming a program and the operations it is designed to execute. These rules are embedded in the system's database. Programming began as a manual process in the 1940s, relying on designated switches; later, electronic boards replaced these switches. As computers evolved, programming techniques advanced accordingly.

In 1956, a conference was held at Dartmouth College, where John McCarthy proposed the term "artificial intelligence" to describe machines capable of performing functions associated with the human mind. AI systems thus encompass all individuals, procedures, hardware components, software, data, and knowledge necessary to develop intelligent computing systems. Researchers, scientists, and experts collaborate to understand human thought processes and, in parallel, develop specialized software to manage knowledge. Today, artificial intelligence technologies have permeated nearly every domain of life.

**Part Three: Characteristics of Artificial Intelligence**

The proliferation of modern technologies makes it difficult for non-specialists to distinguish between them; therefore, it is necessary to establish criteria or identify the distinctive features of this technology to differentiate it from other technological systems.

- **Symbolic Representation**: This refers to the use of a specialized language for the development of artificial intelligence, which is rooted in computer language. It involves the use of symbolic expressions such as (7, B, 5), and allows for the creation of multiple lists containing these symbols for programming purposes.
- **Automated Processing**: The use of software to reduce human effort is not a new development; however, artificial intelligence has opened entirely new horizons by introducing automation through integration. This enables individuals to significantly reduce, or even eliminate, the need for human intervention. This type of automation is known as continuous automatic execution, with robotics serving as a prime example.
- **Learning Capability**: Artificial intelligence features a technique known as machine learning, which is considered one of its branches. It allows software applications to improve the accuracy of their predictions without being explicitly programmed. Machines can be built to process data and learn independently without constant supervision.
- **Knowledge Representation and Reasoning**: This means that an intelligent artificial system is capable of adapting to its environment, acquiring knowledge that describes that environment, and storing it in a way that enables rapid and adequate responses to stimuli generated by the environment. In short, it refers to the structure of knowledge representation and the method of acquisition; it is the ability of intelligent systems to adapt, acquire, store, and retrieve knowledge efficiently when needed.

- **Automated Control**: This feature is well known due to its significant technological advancement in modern civilizations. In domestic settings, control devices are used to regulate air conditioner temperatures for comfort, indicating that this technology is present even in homes. It is therefore expected to be integrated across all sectors of life, particularly in industrial domains such as robotics, computing, transportation systems, and beyond.

**Second Requirement: Applications of Artificial Intelligence Technology**

Artificial intelligence is now used across various military, economic, and technological fields. Two key applications are highlighted below, along with examples of AI-based products.

**Part One: Language Processing Applications**

Technology has transformed the world into a global village, with machine translation playing a central role. As a scientific and cognitive activity, it requires the integration of two distinct disciplines: linguistics and computer science. Machine translation emerged within artificial intelligence research projects and is structured as a system composed of interconnected software programs that receive the source text and process it according to a defined methodology.

**Part Two: Expert Systems**

Expert systems are knowledge-based information systems that apply domain-specific expertise to complex tasks, acting as intelligent consultants for end users. These systems can perform various functions; for example, in the medical field, they can issue alerts regarding changes in a patient's condition, identify and interpret medical images, assist in diagnosing diseases, and even suggest appropriate treatments.

**Part Three: Examples of Artificial Intelligence Models**

- **Intelligent Robots**: The International Federation of Robotics (IFR) defines an industrial robot as: "an automatically controlled, reprogrammable, multipurpose machine, which may be fixed in place or mobile, and carries industrial automation applications."
  In the healthcare sector, thanks to major technological advances, doctors now use AI-powered machines to assist in diagnosing diseases. These robots help perform medical tasks and can be found in devices that support mobility or replicate movements patients are unable to perform naturally, thereby improving care and facilitating medical services. Additionally, high-tech miniature robots are used in the military sector, such as unmanned aerial vehicles (drones) for surveillance purposes.

- **Autonomous Vehicles**: Many vehicles now operate autonomously; for example, cars capable of driving without human intervention. This technological innovation aims to develop and produce vehicles that can navigate traffic independently, with the goal of saving lives on the road. Autonomous control also extends to aircraft, spacecraft navigation, and drones; all relying on artificial intelligence.

- **Autonomous Military Weapon Systems**: Even the military sector has seen the integration of artificial intelligence, with the development of semi-autonomous weapon systems capable of executing attacks and mobilizing forces without human supervision or control[1].

**Second Section: The Impact of Artificial Intelligence on Rationalizing Penal Policy**

Given that artificial intelligence has permeated all fields, including penal policy, this section examines the role and impact of AI in rationalizing penal policy. To clarify this, the first requirement will address the definition of penal policy and its related concepts, followed by an analysis of AI's contribution.

**First Requirement: The Legal Nature of Artificial Intelligence in Rationalizing Penal Policy**

Before defining penal policy, it is necessary to refer to the concept of criminal policy, which is generally defined as: "a set of measures and procedures adopted by the state during a specific period to combat crime and maintain

[1]Malidaclaussen-karlsson, op.cit, p: 19-20.

security and stability within its territory"; or as "a set of measures and procedures that the state must employ to suppress crime with the highest possible degree of effectiveness.[2]"

Penal policy, in turn, is defined as: "a branch of criminal policy responsible for establishing the rules that guide the formulation of criminal law provisions, whether related to criminalization, punishment, prevention, or deterrence." Penal policy serves as the mechanism for implementing a specific segment of criminal policy, primarily through criminal law and criminal procedure, which are the two central tools for determining society's response to crime[3].

Punishment is no longer society's sole instrument in combating crime, as it has failed in many instances to achieve its intended objective. This has necessitated, in such cases, the search for alternative sanctions to replace punishment, sanctions that, while inherently aimed at inflicting pain on the offender, may also fulfill the intended function of penal response. The performance of penal sanctions and the realization of their objectives have required a diversification of methods and approaches, leading to the emergence of criminal measures which, in essence, serve as rehabilitative responses to the offender. These measures now stand alongside punishment as a new form of penal sanction.

Security measures[4], as defined by Dr. Galal Tharwat in his explanation of precautionary measures, are: "a set of procedures aimed at addressing an individual's criminal risk in order to prepare them for a socially sound and free life, through rehabilitation, correction, or treatment, in anticipation of a potential future offense.[5]" Accordingly, security and preventive measures are considered foundational to the rationalization of penal policy, particularly through systems applied to inmates with the aim of rehabilitating and reintegrating offenders into society as law-abiding individuals.

**Second Requirement: The Role of Artificial Intelligence in Rationalizing Penal Policy**

Criminal justice systems increasingly resort to new tools and methods in the post-conviction phase, where artificial intelligence is employed to automate prison security and rehabilitation processes. For example, in one of China's prisons housing some of the most prominent and dangerous offenders, an AI network has been installed and utilized to identify and track each inmate around the clock, alerting guards whenever irregular behavior is detected[6].

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[2] Rachid Ben Seddik, *Criminal Policy in Confronting the Phenomenon of Corruption: A Comparative Study Between Sharia and Law*, Master's Thesis, Department of Islamic Sciences, Faculty of Humanities and Social Sciences, University of El Oued, Algeria, Academic Year: 2013–2014, p. 9.

[3] Linda Ben Dhib, *op. cit.*, p. 38.

[4] Precautionary measures are referred to by various terms. Some jurists use the designation "penal measures" (see: Mohamed Zaki Abu Amer, *A Study in Criminology and Punishment*, p. 441; and Mohamed Mohamed Mesbah Al-Qadi, *Penology*, unpublished, undated, 2004–2005, p. 88). See also Article 109 of Federal Law No. 03 of 1987, as amended by Legislative Decree No. 07 of 2016, concerning the UAE Penal Code.

Others refer to them as "social measures" (see: Mohamed Nasr Mohamed, *The Intermediate Text in Criminal Law – General Part According to Comparative Systems*, Law and Economics Library, Riyadh, Saudi Arabia, 1st ed., 2012, p. 196).

Some criminal legislations consider them synonymous with "preventive measures" (see: Article 135 of the Libyan Penal Code of 1954, issued on 20 February 1954; and Articles 61–104 of Dahir No. 1.59.413 dated 28 Jumada II 1382, corresponding to 26 November 1962, ratifying the Moroccan Penal Code).

Others refer to them as "security measures" or "measures of security" (see: AhsèneBousakria, *op. cit.*; AhsèneBousakria, *Concise Guide to General Criminal Law*, Houma Publishing, Algeria, 17th ed., 2018, p. 362; and Abdelrahman Khalfi, *General Criminal Law – A Comparative Study*, Balqis Publishing, Algeria, 2017, p. 340). See also Article 1 of Ordinance No. 66-155 dated 18 Safar 1386, corresponding to 8 June 1966, which sets forth the Algerian Code of Criminal Procedure, as amended and supplemented.

[5] Galal Tharwat, *The Structure of the General Part in Criminal Law*, revised edition, unpublished, no place of publication, 1999, p. 557.

[6] Aleš Završnik, Criminal justice - artificial intelligence systems and human rights ,Journal of the Academy of European Law forum, the Academy of European Law, Germany, Volume 20, issue 4, March 2020, p: 572.

Some researchers have also explored the potential of artificial intelligence to address the crisis of solitary confinement[7] in the United States by deploying intelligent assistants as virtual companions for inmates. This approach aims to alleviate the psychological pressure experienced by individuals in isolation[8]. Several criminal law systems, both Arab[9] and foreign[10], have incorporated such measures to protect inmates from self-harm and harm by others.

Moreover, certain criminal legislations have adopted electronic monitoring systems. The Algerian legislator defines electronic monitoring as: "a procedure that allows the convicted person to serve all or part of the sentence outside the penal institution. This system consists of the individual wearing an electronic bracelet for the duration specified by law, enabling authorities to track their presence within the designated residence as determined by the enforcement judge."

France has adopted this system as an innovative method for executing custodial sentences; or as an alternative to imprisonment, in a form inspired by the Swedish model. Its provisions are codified in Articles 723:7 to 723:13 of the French Code of Criminal Procedure. Several amendments have been made to this system: including Law No. 2000:516 of 15 June 2000, amended by Law No. 2002:1138 of 9 September 2002; Law No. 2004:204 of 9 March 2004; and Law No. 2005:1549 of 12 December 2005 on combating recidivism, which introduced the use of mobile electronic monitoring. This was later amended by Law No. 2008:1130 of 4 November 2008 and Law No. 2010:242 of 10 March 2010.

One of the most prominent examples of modern electronic monitoring is the use of electronic bracelets: the monitoring officer installs the bracelet on the monitored individual within the correctional facility. This system enables remote control and restriction of liberty through advanced and intelligent means. The bracelet is typically worn like a watch on the wrist or around the ankle; it transmits continuous, specific signals to a receiver installed at a designated location. The receiver is configured to test warning signals and define the geographical boundaries for transmission and reception: an application that falls squarely within the scope of artificial intelligence.

Some criminal legislations resort to surveillance through the implantation of tracking devices (GPS) in offenders. In certain cases, members of a criminal gang are apprehended; but during interrogation, it becomes impossible to identify the remaining members due to the offender's resilience, intelligence, and evasiveness. The individual

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[7] The Algerian legislator defines solitary confinement as: "A regime under which the inmate is subjected to isolation from other prisoners both day and night. It applies to specific categories of inmates, such as those sentenced to death, those sentenced to life imprisonment—provided the duration does not exceed three years—dangerous inmates, as well as ill or elderly inmates for whom it is applied as a health measure to ensure their safety." See: Article 46 of Law No. 05-04 dated 27 Dhu al-Hijjah 1425 AH (corresponding to 6 February 2005), concerning the Regulation of Prisons and the Social Reintegration of Inmates.

[8] Aleš Završnik, Criminal justice,op.cit,p:573.

[9] Various criminal legislations have stipulated the application of this regime to specific categories of prisoners, for durations determined by each respective law. See:
Article 46 of Algerian Law No. 05-04 dated 27 Dhu al-Hijjah 1425 AH (corresponding to 6 February 2005), concerning the Regulation of Prisons and the Social Reintegration of Inmates;
Article 42 of Omani Royal Decree No. 48/98, issuing the Prisons Law;
Article 58 of Kuwaiti Law No. 26 of 1992, concerning the Regulation of Prisons;
Articles 51–52 of Libyan Law No. 19 of 1962, concerning Prisons;
Article 7 of Dahir No. 1.99.200 dated 13 Jumada I 1420 AH (corresponding to 15 August 1999), implementing Moroccan Law No. 23.98 on the Organization and Management of Penal Institutions;
Article 62 of Palestinian Law No. 06 of 1998, concerning Reform and Rehabilitation Centers (Prisons).

[10] Section 89, German Prison Act of 16 March 1976 as last amended by Article 1 of the Act of 19 June 2019 said:

"(1) Continuous segregation of a prisoner (solitary confinement) shall not be permissible unless this is indispensable for reasons inherent in the prisoner's person.

(2) Solitary confinement for a total duration of more than three months per year shall require the consent of the supervisory authority. This period shall not be deemed to be interrupted by the fact that the prisoner attends Divine Service or takes part in outdoor exercise.

may be sedated during detention and fitted with a tracking device without their awareness; subsequently, they are allowed to escape from prison without realizing the escape was prearranged. Upon release, the individual is likely to remain alert to any signs of surveillance, whether behind or ahead, believing they are being watched. They may disguise themselves in ways that would evade traditional surveillance methods. Once the target feels secure, they initiate contact with their associates and proceed to meet them; at that moment, the entire cell is apprehended. This operation is made possible by artificial intelligence embedded in GPS technology. Such procedures may also be applied to released inmates or those who have completed their sentences, particularly individuals known to have connections to mafia-related crimes, drug trafficking, international smuggling, terrorism, and other offenses that threaten public safety and societal security.

To protect all prison inmates and reinforce security within correctional institutions, the use of an intelligent agent may be employed: a system capable of perceiving its environment through sensors and responding via actuators or execution mechanisms. It is one of the applications of data mining from the internet and operates through a software package designed to perform specific tasks; it is characterized by rapid perception, responsiveness, and rationality.

All categories of inmates benefit from medical services provided within the correctional institution; and when necessary, in external healthcare facilities. Upon entry into the institution, the convicted individual undergoes a series of comprehensive medical examinations and screenings, followed by continuous and automatic monitoring of their health status. In addition, health units are established in all prisons and supported with the necessary medical and paramedical staff, equipped with appropriate tools, and supplied with essential medications.

Artificial intelligence has played a significant role in the field of medicine; thanks to expert systems, it is capable of delivering various healthcare services that can benefit hospitals, particularly those serving prison inmates. These systems assist in diagnosing the medical condition of prisoners, especially those suffering from psychological or mental disorders; they also help distinguish medical images and similar diseases, among other functions previously mentioned.Among the most prominent expert systems used in the medical field are: Dxplain, which supports disease diagnosis; Puff, which interprets pulmonary function tests; and Peirs, which is designed to diagnose and interpret thyroid function tests and tolerance assessments for substances such as Cortisol and Gastrin, among other analyses.

In conclusion, artificial intelligence has made a substantial and transformative contribution to penal policy, marking a qualitative leap compared to previous practices, particularly in terms of security, medical, and operational services.

## Conclusion

A century ago, no one would have believed in the existence of computers, smartphones, and other electronic devices, just as today we tend to dismiss the possibility of achieving what we see in science fiction films and their portrayal of artificial intelligence technologies.

Science has consistently provided solutions to assist human beings in performing their functions; yet these solutions often come with unintended side effects or are misused for purposes other than those for which they were originally designed. Artificial intelligence will be no exception to this pattern.

Nevertheless, AI stands out as one of the most practical technologies for facilitating human tasks, particularly in the field of justice: it enables comprehensive surveillance without the need for large personnel, supports case analysis, and delivers results that serve sentencing adaptation programs, as well as vocational education and training initiatives.

Through our examination of the topic, we reached the following conclusions:

- Scientists have not yet arrived at a precise definition of artificial intelligence technology due to its diverse characteristics and wide-ranging applications.
- AI applications span multiple fields.
- AI technologies possess unique features that distinguish them from other systems.
- Numerous projects and applications have been developed to implement AI in correctional institutions across several advanced countries.
- There is a notable delay and deficiency in Arab criminal legislation in keeping pace with Western legal frameworks, particularly regarding correctional institutions and the rehabilitation and reintegration of offenders.

Following the key findings derived from this study, we present the most important recommendations in relation to this field:

- ❖ It is essential that most Arab legislations incorporate artificial intelligence technologies into their criminal law provisions within penal policy; and keep pace with the advancements achieved by Western countries in this domain.
- ❖ Studies on penal policy should be strengthened through the integration of artificial intelligence techniques.
- ❖ Seminars, training sessions, and internships should be organized for specialists in criminal policy in general, and for personnel working in correctional institutions in particular; with the aim of equipping them to operate devices based on artificial intelligence technologies.
- ❖ International conferences on modern penal policy should be held to explore developments in criminal policy across Western jurisdictions.
- ❖ We recommend conducting further in-depth studies on this subject, given its significance.

## Methodology

This research adopts a dual-layered methodological approach:

1. Analytical Methodology:

Legal and technological literature is analyzed to identify the conceptual, normative, and jurisprudential implications of artificial intelligence in penal policy. This includes examination of statutory sources, judicial opinions, doctrinal analyses, and contemporary AI ethics documents.

2. Comparative Methodology:

Comparative references to legal systems — including Anglo-American, European, and Arab jurisdictions — are employed to illustrate different national responses to AI in criminal proceedings, enforcement measures, surveillance mechanisms, and offender rehabilitation programs.

The combined methodology ensures a comprehensive and multidisciplinary interpretation of the legal challenges associated with artificial intelligence.

## Novelty and Scientific Contribution

This study provides a unique contribution by positioning artificial intelligence not as a passive technological instrument, but as an emerging legal phenomenon capable of altering penal concepts and justice mechanisms. The originality of the work lies in:

proposing a legal-philosophical interpretation of AI within criminal law,
analyzing its effect on penal objectives such as deterrence, prevention, and rehabilitation,
identifying conceptual gaps in current legislation,
and offering forward-looking proposals for legal adaptation to AI-driven governance.

This perspective fills an existing research gap and contributes to ongoing discussions on the future of criminal justice in a digital society.

## Ethical Considerations

This research is based entirely on theoretical legal analysis and review of publicly accessible texts. It involves no human participants, confidential data, or experimental procedures requiring ethical approval. All referenced materials are cited appropriately in accordance with academic standards, ensuring intellectual property respect and citation transparency.

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## Conflict of Interest

The author declares no conflict of interest regarding the research, authorship, or publication of this paper.

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