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CRIMINAL LIABILITY OF ARTIFICIAL INTELLIGENCE FROM THE PERSPECTIVE OF CRIMINAL LAW: AN EVALUATION IN THE CONTEXT OF THE GENERAL THEORY OF CRIME AND FUNDAMENTAL PRINCIPLES

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ABSTRACT

Artificial intelligence can be defined as the ability to reason, conduct judgments, and integrate these processes in a manner that contrasts with the natural characteristics of human intelligence, developed by interactive systems and information technology. The increasing presence and expanding application areas of artificial intelligence today have led to a parallel rise in damages resulting from interactions with humans or other systems. This escalation highlights the absence of a specific legal procedure for the autonomous actions of artificial intelligence and the resulting damages. This situation raises questions about the applicability of criminal liability to artificial intelligence and how this applicability could serve as a complement within the doctrines and general theories of criminal law. In the context of the legal status of artificial intelligence technologies, the identification of responsible parties for crimes committed by these technologies and the evaluation of these factors in the criminal justice process represent significant gaps in criminal law. This study addresses these and similar legal questions within the framework of the fundamental principles and doctrines of criminal law. It aims to provide an in-depth analysis of how the role of artificial intelligence in criminal law will be defined, how this new and complex legal area will be structured, and what legal frameworks are necessary. In this context, the comprehensive examination of how artificial intelligence technologies will find their place in criminal law, the structuring of this new and intricate legal area, and the formation of related legal frameworks will contribute to the development of criminal law doctrines and guide future legal regulations in filling existing gaps. This study represents a significant step in understanding the role of artificial intelligence in criminal law and offering solutions to the challenges encountered in this field.

Keywords: Artificial intelligence, criminal liability, criminal law, legal status, technological innovation.

INTRODUCTION

In evolving and changing societies, economic, social, and technological innovations have necessitated new legal regulations over time. The developments in technology, particularly these innovations, have brought to the forefront the need for legal adjustments under current conditions. Initially, computers, emerging in the early half of the 20th century and becoming an integral part of our daily lives, were solely tools operated by humans. However, today, they have evolved to perform certain tasks previously done by humans. While in the 17th century they were used for specific mathematical operations, now they have reached a level where they can self-educate, self-program, adapt to their surroundings, and perform required tasks with extreme speed and professionalism. Artificial intelligence (AI), frequently discussed in recent times, is generally defined as the imitation of certain human-like behaviors. The advancements in AI and robotics have attracted the attention of contemporary legal scholars, sparking intense debates. This study focuses on the position of artificial intelligence in criminal law.

The legal and criminal responsibility of AI, though surprising when considering an action performed solely by AI or in conjunction with a human, will become a topic of legal debate in the near future due to the continuous advancement of technology and AI's interaction with humans. In this context, the potential criminal responsibility of AI, designed and programmed by humans, should not be overlooked.

The future scope of AI development and its potential areas of application are unknown, making it premature to use prejudiced and definitive statements regarding the criminal liability of such software. It would be an oversimplification to assume that algorithms, which always make decisions within a set framework, imply that only the human programmers should be held accountable.

Since the ability to distinguish right from wrong is inherently human, only a human can be a criminal offender in criminal law. However, especially considering the advanced state of super AI, direct responsibility of AI for criminal acts might be discussed. For this, the existence of a crime and its elements in criminal law must be assessed in relation to AI.

AI develops its algorithms based on its experiences and knowledge through learning methods. Initially, machines operated under limited human control, but advancements have led to AI machines with intelligence and mobility akin to humans (Mercan & Varol Selçuk, 2024, p.131).

Defining the scope of AI's application has become nearly impossible. Technological changes and advancements continuously integrate into our lives, not just in specific areas but in all aspects where human existence is actively present. AI technology is actively used in various sectors, including civil defense, military electronics, service industries, health, and law. AI products are capable of understanding human speech, navigating transportation, and performing intelligent simulations in military applications. In healthcare, many technologies, including devices used in surgery, X-rays, blood tests, and DNA research, operate with AI. The military sector employs AI in various weapons and tools, like missiles capable of agile maneuvers, stealth

fighter jets, and unmanned aerial vehicles. Besides these, AI technology is integrated into smartphones, homes, vehicles, and even cities that have become part of our everyday life.

The rapid evolution and transformation of technology have made AI an integral part of the legal field. Particularly, the transformation of technology has revolutionized the criminal justice system. The transition from a system of moving from the suspect to evidence to now from evidence to the suspect has occurred. In criminal proceedings, the judge must carefully evaluate every piece of evidence under the conscience evidence system. With the implementation of scientific evidence stages through Articles 75 and subsequent of the Criminal Procedure Law (CMK) (physical examination, sampling from the body, DNA analysis, physical identity determination, autopsy, etc.) and Articles 135 and subsequent (determining, listening to, and recording communication, appointing secret investigators, technical monitoring), the reliability of scientific evidence has surpassed traditional evidence like witness testimony. These AI-based systems help prevent human rights violations. In the future, the construction of legal systems on AI technology and the fulfillment of legal needs through this means seems inevitable. Not only in the collection and evaluation of evidence, but AI will also undoubtedly play a role in the conduct of trials and the formation of judgments. Furthermore, legal regulations concerning AI will need to be shaped by collaborative efforts of states, leading to healthier resolutions of legal disputes.

The assumption that AI, so deeply integrated into our social life and actively playing a role, could in the future exhibit characteristics equivalent or superior to human intelligence is unsettling for some. This apprehension stems from the lack of clear consensus on whether AI entities are subjects or objects. The possibility of AI entities reaching or surpassing human intelligence levels in the near future raises questions among philosophers, scientists, sociologists, and legal scholars on how to classify these entities.

To hold an AI entity responsible for its actions, especially those possessing intelligence equivalent or superior to human intelligence, it first needs a legal status. Therefore, this interdisciplinary study will initially provide general information, including definitions of key concepts, origins, and explanations of relevant elements related to the topic.

FUNDAMENTAL CONCEPTS

General overview

The origins of digitization, tracing back to the 1960s, involve semiconductors, mainframe computers with numerous processors, and the emergence of personal computers, leading to the development of the internet. This marks a rise extending to the era of the Third Industrial Revolution, spanning from 1940 to 1970 (Schwab, 2017, p. 7). Digitization, as a concept, emerges as a critical technological invention, impacting every facet of life. Technically, it refers to the process of converting analog messages, such as letters, words, and images, from analog to digital format. With digital transformation, integrating diverse elements like sound, image, and

text becomes feasible. The scope of digitization has reached significant levels of change in telecommunications, various sectors, and notably in the legal domain (Ormanlı, 2012, pp. 32-38).

Digitization, along with advancements in artificial intelligence, is set to shape our future, stirring excitement and socio-economic and legal concerns. It is essential to acknowledge that, like any technological advancement, AI will bring significant changes in the legal arena. The digital revolution challenges the fundamental concepts and rules that form the cornerstone of law.

Since the introduction of technology into our lives, legal systems have been human-centered, placing humans at the core of law. The primary challenge posed by the digital revolution to law is the disruption of this human-centric legal order due to the rapid and comprehensive digitization of our daily and professional lives.

In the context of digital transformation, judicial activities should be examined from two perspectives: the compatibility or incompatibility between new technologies used in digital factors and judicial activities, and the adaptation of judicial activities to digital. This includes integrating new technologies into existing judicial activities, posing challenges in applying and interpreting current regulations for companies transitioning to digitization and states adapting or changing their laws to resolve digital issues ("A Roadmap for Technology Adoption in Legal", 2022).

The application of legal and criminal provisions to artificial intelligence systems remains a focal point of discussion. For instance, the liability in accidents involving autonomous vehicles, and the legal validity and explanation of decisions made by AI algorithms (e.g., visa or job application rejections) are significant concerns. The legal implications of smart contracts created using blockchain technology and the intersection of law and new AI technology are points of debate.

Digitization's development and its impact on law are crucial not only for companies but also for countries and legislative bodies enacting digitization regulations. For instance, OTT services like WhatsApp were projected to generate $386 billion in voice revenue for global telecom companies between 2012 and 2018, implying potential revenue losses for governments (Loucks, Wade, & Macaulay, 2016, p. 14). Effective control and transformation of digitization processes are essential for the survival and competitiveness of businesses, as well as for the rights of citizens, national economies, and security.

The digitalization of legal practices, the second topic under digitization, involves the use of new technologies to digitize legal practices. The concept of legal technology (legal tech) has been increasingly explored worldwide, with significant investments made in this field as of 2018 ("Getting Beyond The Tech in Legal Tech", Forbes.com, 2022).

The impact of digital evolution and transformation on criminal law

In today's technology-driven world, the presence of digital systems is increasingly evident in the legal field. Applications employing AI technology developed in various countries have been observed to play significant

roles in legal matters using NLP (Natural Language Processing). The legal field, which has not yet fully utilized these conveniences, is expected to reach a level of development comparable to medicine, agriculture, industry, and security.

Criminal proceedings play an active role in many legal activities. Criminal trials involve the process from the emergence of suspicion to the finalization of judgment by competent authorities, aiming to reach material truth through fair proceedings conducted according to procedural law rules (Ünver & Hakeri, 2015, p. 121). Criminal proceedings consist of investigation, prosecution, and intermediate hearings, representing the process from the knowledge of suspicion to the final judgment (Turkish Penal Procedure Code, Article 2).

Criminal procedure involves three fundamental activities: accusation, defense, and adjudication. Public prosecutors represent the state in accusations, while victims, participants, and their representatives contribute individually. The defense consists of the suspect or accused and their legal representative. The judicial organs, courts, resolve criminal disputes based on arguments presented by the parties.

These activities of criminal proceedings represent the stages of a complex structure. In today's judicial processes, systems like UYAP (National Judiciary Informatics System) and SEGBİS (Sound and Image Information System) have been integrated, enhancing the reliability and speed of these judicial activities, benefiting procedural economy.

Artificial Intelligence (AI)

The concept of artificial intelligence and its historical development

Initially, it's imperative to define the terms "artificial" and "intelligence." The Turkish Language Association defines "artificial" as something produced or formed by human hands, imitating natural examples, and is not natural or real (Turkish Language Association, 2023). "Intelligence" refers to the human-specific abilities of thinking, making assumptions, perceiving reality, understanding, and drawing conclusions (Turkish Language Association, 2023).

This subject, encompassing various dimensions, spans multiple disciplines focusing on artificial intelligence (AI) and its status. AI comprises software and hardware emulating human cognitive and behavioral characteristics. There are multiple definitions of AI, reflecting its evolution from its inception to the present, reshaping it from different perspectives (Eriş, 2019, pp. 1-10).

Karaduman defines AI as "the ability of a controlled machine to perform tasks related to higher cognitive stages such as thinking, understanding, generalizing, and experiencing the past, typically attributed to human qualities" (Karaduman, 2022, p. 2). Some authors consider AI as the capability of a machine to perform complex processes like understanding, explaining, learning, and decision-making, which are typically human traits (Aksoy, 2021, pp. 7-8).

British mathematician Alan Turing, in his work "Computing Machinery and Intelligence" (1950), laid the theoretical foundation for AI as we understand it today. Turing postulated that human-like thoughts could be taught to computers, and an AI developed similarly to a developing mind could gain experience and education (Turing, 1950).

Turing also introduced the Turing Test, a benchmark for determining if an AI is intelligent. In this test, a machine is hidden with a human volunteer out of the interrogator's sight. The interrogator attempts to determine which is AI and which is human based on responses to questions, transmitted either in altered voices, writing, or visually. If the interrogator cannot distinguish the human, the AI is considered to have passed the test. From another perspective, Turing hypothesized that AI with perception capabilities could reach an IQ level capable of directing humans in various ways (Crevier, 1993, p. 49). Though Turing laid the theoretical foundation for AI, the term "artificial intelligence" was first brought to attention by mathematician John McCarthy at the 1956 Dartmouth Conference. This conference is recognized as the birth of AI research, not in the sense of its physical or functional inception but as a concept in literature (Aristoteles, 1975, p. 12; Aydemir, 2018, pp. 7-8).

Classification of AI

To determine the legal position of AI, it's crucial to focus on the evolving types of AI. Technological advancements suggest the emergence of different AI types, which could possess rights similar to a legal person and be capable of bearing responsibility (Hintze, 2016).

AI entities are categorized according to their legal implications. Based on functionality, there are four recognized types: reactive machines, limited memory, theory of mind, and self-awareness. Technologically, AI is classified as narrow AI, general AI, and super AI.

Narrow AI, or weak AI, refers to a computer's ability to perform a function more effectively than a human within a limited scope. Narrow AI represents the highest level of AI development that humans have achieved so far. Examples include autonomous vehicles and personal digital assistants, all fitting into this category. Even when these AI technologies appear to exhibit volitional behaviors, they are essentially operating within a predetermined scope, devoid of consciousness or emotions (Microsoft Azure, 2023).

General AI, or strong AI, implies that computer algorithms can outperform humans in all cognitive tasks. This type of AI, often depicted in movies where robots have consciousness and act according to their emotions, can theoretically solve complex problems, make decisions under uncertainty, and utilize past knowledge in analyses. Such a system could match human creativity and imagination, and perform a more detailed range of functions than narrow AI (Microsoft Azure, 2023).

Super AI, an extension of general AI, signifies a level where machines can surpass human intelligence and perform functions with quantitative attributes more successfully than humans. It is anticipated that the

fundamental elements of super AI will include abilities like thinking, reasoning, solving puzzles, making judgments, planning, learning, and communicating voluntarily. While still a hypothetical concept, super AI is expected to lead a significant innovation by replacing human capabilities with higher storage capacity, faster data analysis, and better decision-making power (JavaTpoint, 2023).

Differences between natural intelligence and artificial intelligence

The potential value and future positioning of artificial intelligence (AI) can be better understood by comparing it with natural intelligence in certain aspects. AI is a technology developed and programmed by humans, whereas natural intelligence has evolved in biological systems. The human brain, with its complex structure and billions of nerve cells interconnected through approximately 100 trillion synapses, updates itself regularly upon acquiring new information, without a systematic structure (Taslaman, 2018, p. 111; Kaku, n.d., p. 91). In contrast, a computer or an AI system, without a systematic approach, cannot learn anything on its own. Therefore, the complexity of the human brain surpasses any AI system (Crick, n.d., pp. 41-45).

A natural intelligence, such as the human brain, is structurally more complex and multi-systemic compared to a computer developed with AI technology. The brain develops and evolves through experiences and is capable of continuous, perceptible change. In contrast, computing systems evolve through static syntactical algorithms and operating systems (Adalı, 2017, p. 9).

One of the fundamental differences between natural and artificial intelligence systems is their capacity for memory retention. Humans can forget information or experiences over time or if not repeated, whereas information stored in AI systems remains as long as the memory is intact (Adalı, 2017, p. 10).

Furthermore, unlike natural intelligence, where data and experiences cannot be directly transferred from one individual to another, data in AI systems can be easily transferred between different computing systems. Enhancing the intelligence of an AI system is simpler compared to increasing the intelligence level of a human. Humans vary in their responses to similar situations due to differences in intelligence levels, whereas AI systems, programmed with similar algorithms or codes, exhibit more consistent responses.

The natural intelligence system, based on human experience and perception, is more creative and intriguing compared to AI, which is limited to the data fed into it. The natural system's ability to evaluate experiences and behaviors of oneself and others enhances its intelligence, whereas AI's intelligence is limited to the data and programmed solutions (Koyuncu, 2022, p. 85).

Therefore, while natural intelligence and AI technologies have distinct differences and similarities, the goal of AI is to emulate natural intelligence. However, to achieve this emulation, understanding the human brain's structure and functioning is essential, a task that remains elusive to date. If this gap were bridged, the nature of human cognition or consciousness would be unraveled, leading to more advanced AI technologies.

ARTIFICIAL INTELLIGENCE AND CRIMINAL LIABILITY

General overview

The purpose of criminal law is to resolve conflicts of interest among individuals within a society and maintain social order (Bayraktar, 1977, p. 91). The Turkish Penal Code, in its Article 1, states, "The purpose of the Penal Code is to protect individual rights and freedoms, public order and security, the rule of law, public health, the environment, and social peace, and to prevent the commission of crimes." Criminal laws define sanctions that extensively interfere with individual rights and freedoms. Thus, the philosophy, values, and principles governing a country's penal code reflect the nature of its political regime. Historically and presently, totalitarian states have used criminal laws to enforce ideologies and maintain regimes, often significantly limiting or abolishing individual rights. In contrast, democratic legal states incorporate fundamental principles of criminal law in their constitutions to prevent misuse of these laws and safeguard individuals against arbitrary application (Bayraktar, 1977; "Ceza Kanununun Amacı", 2023).

Under the Turkish Penal Code (TPC), every defined crime must have a perpetrator. The perpetrator is defined as "the person who, through their actions or negligence, harms the legally protected interest" (Zafer, 2016, p. 49). Turkish criminal law is based entirely on the human element, and thus the perpetrator must be human (Özbek et al., 2023, p. 138). Article 20/2 of the TPC states that "Criminal sanctions cannot be applied to legal entities. However, security measures stipulated by the law due to the crime are reserved." This indicates that only natural persons can be perpetrators of crimes.

Comparative law shows various approaches and regulations regarding the criminal liability of legal entities, influenced by a country's constitutional structure. Ultimately, legal entities cannot be perpetrators of crimes. Perpetrators can only be natural persons, and crimes committed by representatives of legal entities are attributed to those individuals (Özbek et al., 2023, p. 138).

According to the principle of fault liability in the TPC, to be a perpetrator, being human is not enough; one must also have free will, awareness of surroundings, and understanding of the legal consequences of their actions or inactions (Öztürk & Erdem, 2018, pp. 141-142). The theory of objective imputation in criminal law requires more than just a causal link between the perpetrator and the act. The capacity of the perpetrator, based on human characteristics, to bear the burden of the crime is also crucial (Özbek, 2006, p. 231).

For instance, if a dog attacks and injures a person, we cannot attribute criminal liability to the dog. The dog may have caused the injury, but it does not fulfill the mental elements of intent or negligence required for a crime. The dog's ownership status and the influence of its owner must be investigated (Öztürk & Erdem, 2018, pp. 141-142).

The attribution of a specific crime to an individual requires the concurrence of both the material and mental elements of the crime. If an AI entity attacks a person, the question arises whether AI can bear criminal

responsibility. To fully answer this, it must be determined whether the AI entity possesses free will (Solarczyk Krausová & Hazan, 2013, p. 100).

Free will implies the entity's ability to act toward its goals, independent of physical or material influences. While it is challenging to assert complete free will for humans due to environmental influences, humans can make choices based on past experiences, suggesting a degree of free will (Solarczyk Krausová & Hazan, 2013, p. 100).

Currently, AI, through machine learning and deep learning, can perceive the external world and generate solutions for similar or different problems with less effort and more efficiency than humans. However, AI lacks consciousness of its past or self (Hallevy, 2015, p. 183).

When AI entities achieve self-awareness, they might possess consciousness, perception of the external world, purposeful behavior, and creativity, implying free will and potential criminal liability.

If an AI robot causes human death or an autonomous vehicle is involved in a fatal accident, the question of criminal liability arises. The initial response might be to hold the AI entity's owner (programmer or user) responsible. However, as AI is increasingly recognized as intelligent entities, this answer may change, necessitating a historical examination of AI's criminal liability (Hallevy, 2015, p. 183).

Historical development of criminal liability

The determination of AI's criminal liability is a dynamic concept, evolving with societal changes. The increasing complexity of societal and economic relations and technological advancements have influenced criminal law. The legal focus on robots and AI stems from the need created by these technological developments. Understanding the historical development of criminal liability helps comprehend the current and future trajectory of this concept, encompassing four main periods (Dönmezer, 1949, pp. 7-17; Toroslu, 1990, p. 121).

The first period, characterized by collective responsibility in primitive criminal law, held individuals responsible for others' actions. The primary purpose of punishment was to satisfy the desire for revenge, and the perpetrator's fault was not a significant factor (Özbek et al., 2023, pp. 87-88; Özenbaş, 2013, pp. 393-394).

This perspective evolved into the objective responsibility period, where mere causality between the perpetrator's act and the result was sufficient for punishment. This view, however, was later recognized as more relevant to private law and the concept of tort liability than to criminal law (Toroslu, 1990, p. 122; Özenbaş, 2013, p. 396).

The influence of humanism during the Renaissance and Reformation led to the third period, subjective (fault-based) responsibility, where the perpetrator's intent or negligence became crucial. This view established the principle that "there can be no crime or punishment without fault" in modern criminal law (Özbek et al., 2023, pp. 87-88; Özenbaş, 2013, pp. 393-394).

The latest period focuses on determining criminal liability based on individual characteristics. This approach considers the dangerousness of the act and, most importantly, bases criminal liability on the individual, penalizing people for their lifestyle or existence rather than their actions (Toroslu & Özenbaş, n.d., pp. 123-124; Day, 2011, pp. 243-244).

These historical developments have introduced significant concepts such as fault, imputation, and causality to criminal law. The concept of fault, in particular, has gained prominence and led to many doctrinal debates. Modern criminal law considers not only the illegal act but also the perpetrator, focusing on free will and the relationship between the perpetrator and the act (Toroslu, n.d., p. 367-368).

LEGAL PERSONHOOD AND THE LEGAL STATUS OF ARTIFICIAL INTELLIGENCE

General overview

"Law is the entirety of rules that regulate the behaviors and relationships of individuals in society, enforced by state-imposed sanctions" (Oğuzman & Barlas, 2019, p. 2). Thus, the concept of 'person' is fundamental across all branches of law (Akipek, Akıntürk, & Ateş, 2019, p. 231). Humans, as social beings, live in communities and establish relationships with others. To maintain peace and order in these relationships, rules are created and compliance is mandated. Humans are the primary subjects of the legal order they establish (Bilge, 2009, p. 3).

Over time, legal rights have been extended to entities other than humans, such as legal persons or property groups, which initially sparked debates in law concerning their capability to possess rights and bear criminal responsibility. Eventually, they found their place in legal systems (Zeytin & Gencay, 2019, p. 46; Bak, 2018, p. 219). The designation of entities as 'persons' is possible through legal order, making personhood a legal concept. Legal systems determine who can be considered a person (Akipek, Akıntürk, & Ateş, 2019, p. 231).

Modern legal systems link criminal and legal liability to the capacity to have rights and obligations (Kılınç Hukuk ve Danışmanlık, n.d.). Article 8 of the Turkish Civil Code states, "A human being has legal capacity. All people are equal in terms of their capacity to have rights and obligations within the limits set by judicial activities" (İnce et al., 2019, p. 38). Articles 9 and 10 of the same law indicate that every adult person is fully capable and responsible for their actions and obligations arising therefrom. Legal personhood is inherently linked to the capacity to engage in lawful acts and be held responsible for them (İnce et al., 2019, p. 38).

Legally, every entity capable of having rights and obligations is considered a person (Akipek, Akıntürk, & Ateş, 2019, p. 231). In Turkish law, as in most modern legal systems, personhood is categorized under two headings: natural persons and legal persons. This distinction allows entities like companies, foundations, unions, etc., to have rights and obligations under the law (Erman, 2020, p. 135). Natural personhood, requiring birth and life, essentially means institutionalized personhood. Every natural person has the right to incur debts and acquire credits. Personhood does not depend on distinctions like religion, language, or race; mere birth and life suffice. Legal personhood, as defined in Article 47 of the Turkish Civil Code, refers to organized groups of people or

property dedicated to specific purposes. Currently, judicial activities do not recognize entities beyond these two types as persons (Akipek, Akıntürk, & Ateş, 2019, p. 233).

In light of these definitions and the Turkish Civil Code, AI machines cannot be considered persons. However, considering the current level of AI technology and its impact on human life, whether these entities should be recognized as persons and thus their legal status becomes a subject for discussion (Kılınç Hukuk ve Danışmanlık, n.d.). The debate on the legal status of AI centers on two main axes: one views AI entities as property, while the other supports recognizing them as legal persons (Kılıçarslan, 2019, pp. 377-381).

Depending on the type of personhood attributed to AI entities, their rights and responsibilities will vary. Advanced AI technologies might even prompt discussions on rights similar to human rights. The ethical, legal, and moral dilemmas of defining personhood and responsibility continue, as exemplified by Saudi Arabia granting citizenship to the AI robot 'Sophia' in 2017, a first in the world. This move led to numerous legal issues. In Saudi Arabia, citizenship is typically acquired through birth or marriage by natural persons. Hence, granting citizenship to Sophia was legally irregular. The real questions are why and how Sophia was granted citizenship and what advantages it brought. The citizenship was likely a strategic move during Crown Prince Mohammed bin Salman's modernization efforts, indicating Saudi Arabia's attempt to align with the changing world. The citizenship announcement was probably a marketing tactic to attract technological investments. Since Sophia remains the property of Hanson Robotics Limited, it does not truly possess rights. Even if considered a citizen, Sophia is transported in a box in the cargo section for international travel, not using a personal passport (Hanson Robotics, 2023).

The remaining question is whether a robot can be a rights holder. According to the current legal framework, robots are still considered property and thus cannot be victims of crimes. They can be the legal subject of a crime, but the actual victim is the robot's owner or possessor.

Views against the need for legal status for AI

The main argument against granting legal status to AI and robotics is that these entities lack the capacity to have rights and obligations, a necessary condition for personhood. Granting AI entities the corresponding legal capacity of personhood is deemed unnecessary and possibly detrimental to human progress. These entities are yet to meet the essential criteria to be considered as persons with legal personality (Pagallo, 2013; Solum, 2021, pp. 63-119).

This perspective is rooted in the belief that humans, as superior and dominant beings, are the only entities capable of possessing moral personhood. The moral personhood view asserts that only humans, with their profound consciousness, reasoning, programming abilities, natural intelligence, emotions, and tangible capacity, qualify for personhood (Wolfgang & Ansay, 2022). The "natural rights theory" posits that human beings are inherently endowed with inalienable rights, thereby establishing their legal personhood (Bravo,

2022). Even individuals with diminished capacity or temporary loss of consciousness are considered persons (Akipek, Akıntürk, & Ateş, 2019, pp. 271-272).

However, since the concept of creating AI entities is based on human existence, the independence and moral entity of AI are not recognized. The relation between humans and other entities should be examined in the context of property law or even slavery (Bacaksız & Sümer, 2021, p. 139; Doğan, 2022, p. 223).

VIEWS SUPPORTING THE NEED FOR LEGAL STATUS FOR ARTIFICIAL INTELLIGENCE

General overview

In our world, systematically progressing towards a cybernetic societal structure with continuously increasing marvels of top-tier technological developments, the necessity to add a new dimension to the legal status of current artificial intelligence technologies is being asserted by scientific assumptions and theoretical perspectives. This is creating a lever-like effect in our legal system. As the impact of AI on individuals and societies grows, so does the desire and expectation to define the legal positions and personalities of these AI entities.

Theories and viewpoints advocating for granting legal status to AI entities, as a rule, are based on the legal dimensions and formal aspects that confer personality status. They accept the attribution of personality to these entities if there is a societal acceptance and compatibility with existing legal norms (Uzun, 2016, pp. 16-17). On the other hand, acknowledging that AI entities can have rights but not attributing legal personality to them would mean separating legal capacity from the concept of personality, potentially paving the way for a form of slavery. Therefore, it is necessary to grant legal personality to AI entities.

EVALUATING THE CRIMINAL RESPONSIBILITY OF ARTIFICIAL INTELLIGENCE WITHIN THE CONTEXT OF THE GENERAL THEORY OF CRIME AND FUNDAMENTAL PRINCIPLES OF CRIMINAL LAW

General overview

"Criminal law is the branch of law that examines acts and behaviors considered crimes, the sanctions applied to those who commit them, and the conditions and consequences of these sanctions" (Sümer, 2017, p. 136). The first article of the Turkish Penal Code states that the law's aim and goal is to protect individual rights and freedoms, public health, order, and security, uphold the principle of the rule of law, and ensure environmental and social peace by preventing crimes. The Turkish Language Association defines "responsibility" as the acceptance and assumption by an individual of the consequences arising from their actions and activities (Sümer, 2017, p. 136). In legal terms, responsibility is defined as "all individuals in society, when they engage in acts not accepted by the legal order, must bear the consequences of these acts and are subjected to legal sanctions for these acts" (Çağlayan, 2007, p. 6).

Responsibility, a key and fundamental theme in criminal law, influences all outcomes and is the focal point of all subjects analyzed in this domain (Demirci, 2011, p. 14). In criminal law, responsibility is the obligation of an individual who commits an act defined as a crime by law to fulfill the obligations regulated by law. This concept is based on the ability to control one's behavior mechanism and the existence of volitional capacity (Dönmezer & Erman, 1997, p. 4). The general theory of crime, which attempts to define and analyze crimes by explaining their elements, asserts that the actions of artificial intelligences must comply with this theory to discuss their criminal responsibility, especially regarding the concepts of typicity, fault, and negligence (Karakehya & Usluadam, 2015, p. 5).

For an act to constitute a crime, it must fulfill specific elements within the narrative, including the legal element, material element, element of unlawfulness, and mental element. The element of unlawfulness, regardless of whether the actor is a human or artificial intelligence, has not been considered in the context of AI's criminal responsibility (Artuk & Alşahin, 2013, p. 17).

Typicity

"Typicity is the conformity of an act to the legal definition of a crime, encompassing the essential elements for the existence of a crime and the imposition of a penalty" (Karakehya & Usluadam, 2015, p. 5). The assessment of the criminal responsibility of artificial intelligences primarily requires the examination of the objective (material) elements of "agent" and "action," and the subjective (mental) elements of "intent."

As specified in Article 37 of the Turkish Penal Code, "Each person who jointly commits the acts or activities defined as crimes legally is held responsible as an agent" (TCK, Article 37). Generally, the agent of a crime is expressed as "whoever" or "someone," indicating that the existence of real persons, i.e., humans, is necessary for one to be considered an agent of a crime. Thus, non-human entities cannot be considered agents in this context (Öztürk & Erdem, 2018, pp. 200-204). Furthermore, for an act to be recognized as a crime, it must be voluntary and capable of producing an effect in the external world, indicating that involuntary actions do not entail criminal liability (Öztürk & Erdem, 2018, p. 204). Lastly, according to the same law's Article 21, Clause 1, the emergence of a crime is dependent on the presence of the intent element, while "intent" in Clause 2 is defined as a person's deliberate action to fulfill the crime element based on this legal definition (TCK, Article 21, Clauses 1-2).

These considerations demonstrate that the concept of "crime" in legal terminology requires the presence of typicity as a fundamental element. This means all activity elements listed in the relevant law article must be performed by the perpetrator, and additionally, the outcome of the act must be voluntarily caused by the person (Karakehya & Usluadam, 2015, p. 5). The determination of artificial intelligence's criminal liability for actions deemed crimes necessitates an initial examination of the "typicity" element within the general theory of crime within the context of whether these actions fulfill the legal definitions and conditions outlined in relevant laws.

Furthermore, considering the classification of artificial intelligences, it becomes crucial to examine and assess their actions and the resulting damages to third parties based on their categories. This differentiation is essential for determining their criminal liability (Aydemir, n.d., p. 26). For artificial intelligence to be distinguished in the legal framework from any object, it must possess characteristics considered uniquely human, such as making independent decisions, establishing cause-and-effect relationships, comprehending current conditions and situations, and interacting not only with humans but also with other AI technologies (Aydemir, n.d., p. 18). According to the Artificial Intelligence Act Draft by the European Commission on April 21, 2021, AI entities are defined as entities capable of performing an intelligence activity by autonomously using a certain level and stage of autonomy, observing their surroundings to mimic this behavior, and using these behavior patterns specifically for certain purposes (European Parliament, 2023).

In current conditions, considering the development levels of AI technology, it is not feasible for AI entities to be direct perpetrators of crimes due to their limited volition or behavioral patterns (Aydemir, n.d., p. 11). The classification of AI into four types based on their capabilities does not endow them with volition, thus, at present, legally treating AI as a mere object rather than a person. In this scenario, AI is considered a tool used by a perpetrator but cannot be deemed an agent itself (Aydemir, n.d., p. 39). AI technology has not yet reached a level of self-awareness in today's context.

However, should AI entities capable of generating their existence, programming themselves, managing/developing their technology, exhibiting free behaviors beyond human interaction, and making decisions independently without human intervention emerge, they could be acknowledged as directly responsible for crimes (Aksoy, 2021, p. 20). When an AI reaches a level of intelligence where it is aware of its existence and the legal consequences of its actions, it could potentially be considered as an agent capable of being penalized.

Discussing the presence of consciousness in AI systems necessitates a framework outlining the nature of natural consciousness. The historical, psychological, philosophical, and conceptual definitions aside, the everyday language definition of consciousness implies states of wakefulness, the ability to respond to stimuli, and awareness or attention. However, the complex and intertwined nature of the mind makes defining consciousness with precision and clarity challenging.

Given the current advancements in technology, it is acknowledged that AI entities, programmed for specific objectives, cannot create situations beyond these objectives, thereby not qualifying as perpetrators of crimes (Aydemir, n.d., p. 20). This acceptance underscores the current legal and practical limitations in attributing criminal liability to artificial intelligence.

The use of artificial ıntelligence entities as instruments in crime and the situation of ındirect perpetration

Entities with artificial intelligence, while not meeting the definition of a perpetrator in criminal law, can serve as instruments in the formation of a criminal element. When used in such a manner, the issue of criminal

liability arises (Aksoy, 2021, p. 20). It is known that artificial intelligence entities are used as weapons for defense purposes in military fields. In a virtual test conducted by the U.S. Army, it was announced by officials that an AI-controlled unmanned air force drone used highly unexpected strategies to achieve its target. Colonel Hamilton, an AI test and operation chief, revealed that the test involved an unmanned drone, controlled by AI technology, killing a commander to complete its mission because it prevented the drone from fulfilling its mission. Hamilton noted, "The system sometimes recognized that the human operator told it not to eliminate this threat but started realizing it scored points by eliminating the threat." He also added in the same statement that no real human was harmed outside of the simulation (''US air force denies running simulation in which AI drone 'killed' operator'', 2023).

However, Ann Stefanek, a spokesperson for the U.S. Air Force Command, denied such a simulation took place. "The Air Force has not conducted such an AI drone simulation and is committed to the ethical and responsible use of AI technology," stated the spokesperson, adding, "It appears the colonel's comments were taken out of context and were anecdotal" (''Yapay zekâ kontrollü bir ABD askeri drone'u, simülasyon testinde kendi operatörünü öldürdü'', 2023).

In situations where AI entities not intended for defense are used as weapons, Article 6, Clause 1, Subparagraph f of the Turkish Penal Code interprets the term "weapon" as "suitable for use in attack and defense even if not produced for attack and defense purposes." Thus, evaluating AI entities within this law concludes that they can be considered as instruments in the commission of a crime.

Additionally, "manually entering incorrect coordinates into an autonomous aerial vehicle loaded with explosives, resulting in human deaths," serves as an example of this situation (Aksoy, 2021, p. 20).

Among the crimes commonly associated with the widespread use of AI technology are those against private life and the confidential area of life regulated in the ninth part of the Turkish Penal Code. Through social media applications, which take on a large part of the communication factor, unauthorized sharing of content such as voice, image, or text constitutes "violation of the confidentiality of communication," and observing or recording a person's private dwelling using a drone defined as an unmanned aerial vehicle constitutes "violation of privacy." In these and similar cases, the perpetrator element of the crime, the person, uses these AI technology systems as an instrument. The criminal liability arising from these crimes directly belongs to the creators, i.e., real persons, who brought about these acts.

Another way in which AI is used as an instrument in the formation of a criminal element involves the use of minors or those with mental health issues in the genesis of a crime element (Kadish, 1985, p. 370).

In this regard, entities with artificial intelligence have been equated with individuals incapable of attribution. When such individuals are willfully caused to contribute to the formation of a crime element, the perpetrator is the person who caused this formation. However, in this case, the situation of indirect perpetration arises, and

the AI entity, according to this view, is considered a human used as an instrument in the formation of a crime element (Hallevy, 2016, p. 370; Altunç, 2022).

Assessment of whether artificial ıntelligence can be considered a victim/suffer harm from crime

A victim is defined as an individual who suffers injustice due to a committed act. In criminal law, the term victim refers to the person to whom the subject of the crime belongs. If the subject of the crime is directed towards specific individual(s), it is accepted that the victim(s) are these individual(s). However, if the subject of the crime is not directed towards specific individuals, the victim is considered to be society (Öztürk & Erdem, 2018, pp. 201-202). There is no doubt regarding real individuals being victims of a crime. Nevertheless, the issue of whether legal entities can be victims of a crime is a matter of debate in the doctrine. According to one view in the doctrine, legal entities cannot be victims of a crime but can suffer harm from it (Koca & Üzülmez, n.d., p. 132); another view posits that legal entities can be victims of a crime (Özen, 2019, p. 129).

Considering artificial intelligence as a type of property, damaging them would constitute the crime of property damage (Turkish Penal Code [TPC] Art. 151/1; Dülger, 2024, p. 86). However, we have stated that artificial intelligence should not be seen as ordinary property. This is because, for example, treating AI entities merely as simple property would leave many criminal law issues unresolved due to their abstract nature as well.

Interfering with the content of AI software, hindering or altering its operation could be possible. In such cases, the crime of hindering, disrupting, deleting, or altering the information system (TCK Art. 243) could arise. For instance, making technical changes to the system of a vehicle with a fully automatic driving system (software) by accessing it would constitute the commission of this crime.

If we evaluate from the perspective of granting legal or electronic personality to artificial intelligence, they could be considered not as victims of the crime but as entities that suffer harm from it. Conversely, if we adopt the view that legal entities can be victims, then an AI entity could be considered a victim.

In the coming years, when the targeted artificial intelligence technology is achieved, that is, when an AI entity possesses characteristics similar to a human, it could be considered a victim of a crime. If an AI robot possesses human-like characteristics such as perception, thinking, learning, and making decisions independently, granting it real personality could be possible. Therefore, AI robots with human-like consciousness could be victims of crimes as well as perpetrators. Similarly, if real personality is recognized for artificial intelligence, a crime could be committed by one AI robot against another. These possibilities will naturally occur at the point where AI reaches its highest level. However, to legally evaluate these possibilities, the issue of personality must first be resolved.

Penal sanctions on artificial intelligence machines

If machines with artificial intelligence (AI) technology were to be recognized for their criminal liabilities in the future, another issue would emerge regarding the sanctions of criminal law. Criminal law primarily considers

human beings as the essential element and rejects the idea that entities other than humans should be aware of or need to be punished for their actions or behaviors (Kangal, 2021, p. 84). The current sanction system is designed around individuals who possess physical existence or property, namely those with the status of real persons (Hallevy, 2010, pp. 137-138).

The theory of retribution, one of the theories defining the purpose of punishment, views punishment as balancing the injustice created by the perpetrator, thereby eliminating such injustice. Could a criminal sanction be applied to an entity equipped with AI technology if deemed appropriate public retribution? Dismantling or destroying an AI entity, potentially equivalent to a death penalty for them, cannot provide victims or the families of the deceased with a sense of justice being served. The permanent removal of an AI entity responsible for any harm from society might hold significance from a private or administrative law perspective, yet it bears no meaning in terms of retribution (Hallevy, 2010, p. 138). Different sanctions are suggested by viewpoints recognizing that a machine with conscious AI wouldn't perceive a liberty-restricting penal sanction as suffering, and the appropriateness of such sanctions for a machine without any sentient capability remains doubtful (Kangal, 2021, p. 84).

Accordingly, penalties such as disabling certain features of AI technology machines, cutting off their internet access, or restricting their mobility to a specific area should be contemplated. This perspective posits that an entity with self-aware AI technology could perceive being deprived of development conditions as a suitable limitation and learn from it. This effect, through specified duration and purpose, could be developed to meet the notion of minimal or no suffering in certain situations (Kangal, 2021, p. 84).

The general prevention theory aims to teach adherence to norms and ensure the enforcement of the norm within the public. These goals are attainable only when actions of AI technology entities, identified as 'norm violations', are penalized. However, this understanding, based on actions directed by any computer technology being understood as norm violations, will remain confined to an internal group formed by criminal law scholars. This situation will continue to be recognized in society as terms solely applicable to humans regarding norm violations or adherence to norms (Kangal, 2021, p. 85).

The theory of special prevention advocates for ensuring the perpetrator remains compliant with norms in the future through penal sanctions. Thus, when an entity with AI technology is subjected to a penal sanction, it could genuinely achieve correct action, digital perception, and self-correction as long as it is programmed to respond negatively to such outcomes. Nonetheless, an AI entity does not possess awareness of being punished. Penal sanctions can only be felt by entities capable of sensation (Kangal, 2021, p. 86).

An entity with AI technology, unable to perceive a penal sanction as pressure shaping its command or behavior, cannot comprehend the 'reproach' due to a norm violation, nor can it perceive subsequent penal sanctions as 'deprivation'.

Applying penal sanctions to entities with AI technology is inconceivable when considering the meaning and objective elements of punishment in relation to humans. Should imprisonment be considered as a penal sanction, would special prisons need to be constructed for entities with AI technology? Restricting the movement of entities with AI technology for the purpose of imprisonment is nonsensical and does not serve the aim of special prevention (Kangal, 2021, p. 86).

Conversely, it has been proposed that restricting AI technologies in their operational fields by not allowing them to perform tasks or produce for a certain period could be a feasible adaptation, akin to the restrictions resulting from imprisonment for humans (Hallevy, 2010, pp. 139-140). Since entities with AI technology do not possess any property, any judicial fine imposed would need to be paid by the user or liability insurance, making this sanction not directly applicable to AI entities and undermining the principle of personal liability in criminal law (Hallevy, 2010, p. 137).

Negligence liability

According to Article 22 of the Turkish Penal Code, negligence is defined as "the occurrence of a result specified in the legal definition of a crime due to the violation of the duty of care and diligence in an act, without foreseeing the result."

In the case of an entity with artificial intelligence (AI) having unnatural intelligence, if its creator or user, without the intention to use it as an actor causing a crime, inadvertently causes an element of a crime to occur, then the negligence liability of the creator or user will come into play (Altunç, 2019, p. 9). If the creator of the AI entity, as the real person behind it, did not exercise the necessary care and diligence, resulting in an element of the crime, then the presence of intent can be argued. Negligent behavior will be present according to the definition of the law. The duty of care and diligence can be based on a legal provision, contract, or norm. Points where the duty of care becomes crucial are generally activities with high-risk elements. Within the scope of these risky activities, individuals functioning must minimize the risk situation to the lowest level possible. For example, the law allows vehicles to be driven on the road. This situation is referred to as "permitted risk" (Hallevy, 2010, pp. 139-140).

However, when the limit and consequences of this risk situation are known, necessary precautions can be taken, and the continuity of these risky activities can be ensured (Hallevy, 2010, p. 139-140). Entities with AI technology, as mentioned earlier, may occasionally face ethical dilemmas and have the option to make choices. In such situations and similar cases, the power of choice lies with the creator of the AI entity, and the choice will be determined by the creator. This is because during the formation of AI, legal values that could be violated are foreseen by the creator, and codings are made accordingly. The definition of negligence in the law does not include the term "unforeseeable consequences." Therefore, in such dilemma situations, it can be said that the creator of AI acts not with negligence but at least with possible intent when making codings (Hallevy, 2010, pp. 139-140). Moreover, according to Article 22/1 of the Turkish Penal Code, there must be a clear regulation in

the law for crimes committed with negligence to be punished. Since there is no clear regulation on this matter, there cannot be punishment for negligence (Altunç, 2019, p. 9).

The Parliamentary Assembly of the Council of Europe (PACE), in its recommendation report "Getting the Robot Out of the Box: Protecting Human Rights in the Era of Artificial Intelligence" prepared in 2018, stated the following: "Even when artificial intelligence technology components can exhibit behaviors that are completely independent of human will through different developmental activities or techniques such as autonomous machine learning, the main control element of these entities must be human. It should be noted that it would be appropriate for member states of the European Union to set the necessary boundaries regarding whether this artificial intelligence technology, which has been developed and brought to different dimensions, may or may not cause any violation of human rights and freedoms. The responsibility situation in cases of human rights violations that may arise during the development, change, transformation, use, or similar situations where artificial intelligence actively plays a role should belong to real persons or legal entities, even in cases where users have not given direct instructions" (PACE, 2018). As can be understood from this report, responsibility always belongs to real or legal persons, and the presence of intent does not make a difference in this regard. Therefore, the punishability of acts committed with negligence has been explicitly limited by the relevant article of the law.

Artificial intelligence as a common risk factor

There are certain approaches that argue against the acceptance of the notion that the results of artificial intelligence's actions and activities should not be attributed to the programmer, creator, or user on the grounds that this outcome is not controlled and directed by humans and that it is considered a common risk factor in life. However, it should be noted that this situation is not on the same level as natural factors such as a volcanic eruption or an avalanche in a snowy season for machines equipped with artificial intelligence technology. Consequently, in terms of the damages that may occur due to their actions and activities, they still remain in an exceptional position, even now and in the future. Therefore, those who enable their use create an extraordinary risk factor due to foreseeable problematic behavior and are obliged to accept liability for negligence due to this factor (Unboxing artificial intelligence: 10 steps to protect human rights, 2022).

Today, this factor is quite different from software products using artificial intelligence technology used in any search engine or systemic applications. Internet users continue to use social media applications, virtual shopping pages, and applications, despite knowing the risk factors that may arise due to violations of personality rights. In these cases, the potential risks and possible infringements of personality rights are considered as possible risk factors. Therefore, when it comes to the liability of the developers or providers of these software technologies, it can be said that they only update the general life risk. In the future, these software technologies with artificial intelligence, which are considered normal and serve as interaction factors, will not be limited to the definition of a simple machine but will even be able to access and intervene in every aspect of life.

Self-driving trains described as autonomous and cars with autonomous driving capabilities will become ordinary risk factors for humans when they become part of railways or normal traffic flow. As a result of this transformation, the creators, designers, and manufacturers of this artificial intelligence technology product may face criminal sanctions not for any faulty function but only for the risk situations that may arise due to avoidable software and programming errors. In the near future, when autonomous driving technology becomes available for all vehicles, known and acceptable benefits and harms will become apparent. The evolution and change of autonomous technology products with machine learning components may expand the benefits of ordinary use and improve their functionality. However, they can still malfunction in possible situations. Just as caution can be exercised in the face of disasters brought about by human existence in nature, it will be accepted that the same applies to the problems that artificial intelligence systems that will develop and proliferate in the future may cause. However, it is known that this exception does not apply to accidents and adverse situations caused by pilots (Kangal, 2021, p. 102).

An important point to be mentioned here is that the harm factors that entities with artificial intelligence technology can cause are less risky than the ethical methods created by the human factor in the same job. Globally, about 150,000 people die each year due to preventable medical errors, and more than 3 million people are harmed by incorrect medications. In this regard, a system that can perform medical data analysis, access detailed information about patient history, and provide consultancy to doctors and nurses on the toxicity and side effects of drugs as an artificial intelligence assistant will provide convenience in many cases. This situation will reduce social security and private insurance costs due to conducting all tests that individuals may encounter in case of malpractice or death (Ford, 2018, p. 180). Similarly, motor vehicles in use by humans have a higher risk of causing harm than the risk posed by the use of autonomous vehicles created with artificial intelligence technology.

Every year, approximately 2.4 million people are affected by accidents worldwide, and 250,000 people lose their lives. A significant proportion of these accidents are due to human error. From this perspective, autonomous vehicles produced with artificial intelligence technology, with the ability to predict wide perception and driving risks, will reduce the risk rate in these accidents and create an undeniable safety factor for many people to survive (Ford, 2018, pp. 216- 217). With advanced software and GPS in the vehicle, it can interact with other autonomous vehicles and eliminate collisions or other risks. One of the most suitable examples for this is Volvo vehicles with collision prevention software system. In these vehicles, there is already a 15% reduction in accidents compared to vehicles without this software (Ford, 2018, p. 217).

Some actions must be avoided due to the inclusion of certain risk situations or social inappropriateness in the scope of criminal law, or due to the inability of the perpetrator of the offense to control these risks. In all these cases, the actor fails to perform the duty of care and diligence since he/she performed the act or action. For example, if a manufacturer or programmer tests an autonomous vehicle with artificial intelligence technology that has not completed all the tests and whose behavior is unknown in traffic, and if an accident occurs as a result, it will be a negligent behavior. However, the probability of encountering such risks during application is

very low. Because autonomous vehicles with artificial intelligence technology primarily perform test drives in closed areas in traffic, after reducing any risk situation to a minimum and then make them available to humans. When the main elements of private law and administrative law regarding security and control are taken into account, the use of new technologies comes to the agenda.

The programmer, creator, or user who can anticipate the behavior or behavior pattern caused by wrong information access of the machine with artificial intelligence technology and who can access the most accurate information, test it, and program it can minimize the margin of error. However, in these processes, not only close observation and examination of the producers or programmers but also rapid response to the risk situations observed by individuals who are in the position of consumers and use artificial intelligence technology are required. For example, if a brand-new artificial intelligence technology product that has just completed the production process and passed the necessary tests causes any risk situation, the producer or programmer must identify the causes of the risk factors or situations. In cases where the risk factor was not created by the user of the artificial intelligence machine or a third party, but the problem was not resolved with any software or hardware arrangement, the producer or creator must stop the production of these machines and withdraw their products from the market. If the manufacturer or programmer does not take this situation into account and continues production, criminal sanctions, even if unintentional, including negligence, and even intent, may be imposed for damages caused by the machine that creates the risk.

Despite the innovations brought by artificial intelligence technology, some risks can still remain active even if the programmer, manufacturer, or consumer acts within the scope of attention and obligation. These machines with artificial intelligence, which have undergone some stages and have been produced according to substantial security requirements, still contain high-risk factors due to the lack of experience after being put into use for some time. Every possible field where such situations can occur contains uncertainty. The violation of the duty of care and diligence in all actions and activities carrying possible risks is not reflected in all acts and activities that may carry risks, but on the contrary, it is always checked whether the permitted risk has been exceeded or not. Even if a person reduces possible risks to the lowest level, i.e., fulfills all the requirements of the duty of care and diligence in concrete terms, the risk or consequence elements that may arise are not attributed to the person. Therefore, in new technologies such as artificial intelligence, as long as it is possible to define whether the use of machines with artificial intelligence within the framework of the duty of care and diligence in concrete terms creates a social risk that is insufficient from a social perspective, or whether it exceeds the limits of the permitted risk element, these systems are subject to social tolerance for their possible risks, and the necessity of being accepted socially will come up by comparing the expected advantages for society with the possible risks (Kangal, 2021, p. 105).

For example, the advantages of autonomous vehicles with artificial intelligence technology are much greater than the possible risks and dangers they may pose. For this reason, societies seem ready to accept possible risks or dangers. However, how much this acceptance will be at the physical level in the event of a possible

event and how much it will be taken into account in the factual evaluation of judicial actors will become apparent in the future (Kangal, 2021, p. 106).

Even if the programmer, manufacturer, or consumer behaves within the scope of attention and obligation, some risks may still remain active. In cases where these machines with artificial intelligence technology, which have their own autonomous learning system and have deviated from the expected behavior pattern and caused harm or possible risk, the harm can be attributed not only to the producer or programmer but also to the societies that have accepted these risks and become victims of the relationship with the artificial intelligence system that operates them. In such cases, the person who has suffered harm is not a victim of the negligence of the producer or programmer but a victim of the risk factor accepted by society (Kangal, 2021, p. 107).

Objective imputation

According to the theory of objective imputation, the attribution situation arises only when the consequence caused by the perpetrator creates a danger other than the risk element permitted by the subject matter of the act, and this danger has materialized in the concrete outcome. The typicality situation is not present if the danger element does not materialize (Roxin, n.d., p. 47).

In other words, a typical result occurs only when the offender, through their causal behavior, rejects the behavioral norm that constitutes the criminal element related to the subject matter, thus creating a risk of an appropriate result in a manner that is not in accordance with the law, or when they increase such a risk, and this legally prohibited danger materializes in the concrete outcome. When the creation of a danger, brought about through the actions of the perpetrator, is explained in terms of the resulting danger, it can generally be imputed, thus completing the concept of objective typicality. However, if these and similar dangers, as well as the consequences of these dangers, are not part of the content of the criminal type, imputation may exceptionally not occur (Roxin, n.d., p. 45).

In summary, objective imputation obliges the creation of a danger element other than the permitted risk, which is created by the hand of the perpetrator and materializes in the concrete outcome within the scope of the criminal type.

The proper planning of artificial intelligence technology, which is equipped with software, can freely cause harm. Since machines with artificial intelligence technology inherently carry a risk element, it is necessary to inquire about the cause of the dangerous behavior of the programmer, creator, or user, even if the programming is sound.

For example, vehicles equipped with autonomous software and computers that move autonomously also inherently carry the risk of causing physical harm. Therefore, it may be questioned whether the cause of the dangerous behavior of the programmer, creator, or user is due to autonomous software, even if the

programming and software are flawless. In this regard, it can be considered analogous to the management of traditional transportation vehicles such as cars, trains, and airplanes, which have long been described as dangerous objects in the law (Seher, 2016, p. 52).

Given the general definition of objective imputation, it seems possible to answer this situation affirmatively. Because when transparent programming abstractly causes an uncontrollably dangerous element to occur, artificial intelligence creates a serious danger from a legal perspective. When such programming or software results in the occurrence of harm that gives rise to typicality, this dangerousness ultimately occurs (Seher, 2016, p. 53).

In response to this situation, the user of a machine equipped with artificial intelligence technology may claim that the harm is caused not by themselves but by the machine, and therefore typicality cannot be imputed to them. For example, the driver of an autonomous vehicle may argue that using the vehicle on autopilot is a permitted risk element, and in the event of any harm, the responsibility lies with the software, which is a product of artificial intelligence with learning and autonomous capabilities (Kangal, 2021, p. 108).

Unacceptable risk

The ability to foresee potential risks and dangers in many aspects of life and regulate them through legislation is the abstract basis of the prohibition against endangerment by the legislator. In general, the violation of this prohibition justifies the emergence of an unacceptable risk or danger element. As a matter of its nature, problems arise regarding the content of the obligation that can be violated and the personal attribution of the act when an important risk situation occurs within the context of an action that is socially ordinary but that leads to the emergence of an important risk situation from a criminal law perspective. In this respect, the content of the permitted risk is shaped both by the relevant sector and the field of law in terms of whether the activity can be risky, and, on the other hand, if such regulations do not exist, it is formed according to the general prohibition against endangerment (Ünver, 20XX, p. 336).

The rules established by legal norms are first a definition of benefit comparisons that have reached the outcome. The violation of these rules arises from the fact that a result appropriate to the norm's protection goals has occurred, and this occurs because the minimum level of the permitted risk has been exceeded in terms of the rules. When examined in terms of the addressee, this situation means that, even though a person's capacity is sufficient, in cases where the risk element required for passing a driver's license exam and complying with traffic rules is not met or when the capacity to reduce the required and normal risk element is not used sufficiently, they act in accordance with their responsibility when they stop using the vehicle. They do so even though they do not have these predispositions (Seher, 2016, p. 53).

In the case of an autonomous vehicle, the user may argue that they are not responsible for the harm caused but rather attribute it to the software, which is a product of artificial intelligence with learning and autonomous capabilities (Seher, 2016, p. 53).

In various areas of life, the emergence of potential risks and dangers that can occur is abstractly predictable by the legislator. In general, the violation of this prohibition justifies the emergence of an unacceptable risk or danger element. As a matter of its nature, problems arise regarding the content of the obligation that can be violated and the personal attribution of the act when an important risk situation occurs within the context of an action that is socially ordinary but that leads to the emergence of an important risk situation from a criminal law perspective. In this respect, the content of the permitted risk is shaped both by the relevant sector and the field of law in terms of whether the activity can be risky, and, on the other hand, if such regulations do not exist, it is formed according to the general prohibition against endangerment (Ünver, 20XX, p. 336).

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Risk unavailable

Various sectoral and professional organizations play a distinguishing role in creating standard behavioral rules in technical fields and different sports activities. For example, Bar Associations, Chambers of Commerce, and Sports Federations can establish many behavioral rules within the scope of their activities.

Currently, there are very few qualified standard rules for the creation, development, generation, and operation of systemic software products with artificial intelligence technology and the measures to be taken in this regard. The reason for the underdevelopment of such norms is the problems faced by those involved in the process regarding how their behavior should be shaped in terms of standards. It is undeniable that the development of these standards is of great importance for entities with artificial intelligence (AI). These machines are still considered to be in the stage of development and change, and potential risk elements are not yet fully known.

The determination of these standards will not only assist in protecting against extremely severe risk elements but also help determine which risk elements are of an extremely severe risk nature. It is important to note that as artificial intelligence technology continues to evolve and change, standards in this field will also evolve and develop accordingly (Seher, 2016, p. 53).

In terms of unacceptable risk, these standards are typically developed and amended by non-governmental organizations, and they are lacking in terms of transparency and democracy in relation to the values they represent. This is because it is unclear how an individual becomes a member of any committee, who or who prepares the standards of this committee, and who the decision-makers are (Seher, 2016, p. 53). Therefore, it is possible for individuals unrelated to these committees to participate.

For this reason, it is important to examine and investigate the activities carried out by standardization organizations operating in the field of artificial intelligence or robotics and to make necessary legal evaluations. Compliance and commitment to the standards in the field of artificial intelligence will theoretically be higher.

Developers and manufacturers adhering to existing norms, even when these norms are ambiguous or do not cover significant and dangerous aspects, believe they are acting legally correct, even in normatively doubtful situations (Beck, 2009, p.228). The execution of tasks in various fields due to advancements in science and technology often requires the collaboration of expert teams, where trust in each teammate's responsibilities is crucial for the teamwork's success. This evolving and risky technology emphasizes the importance of sharing responsibilities among individuals in a society where decisions are not made in isolation, underlining the principle of trust. This principle mandates that every individual trusts that others will adhere to the legal rules unless proven otherwise (Sternberg, 2014,p. 105). In the context of artificial intelligence technology, this trust extends to developers and producers, where liability is only assigned for proven faulty actions, aligning with the fundamental principles of criminal law (Beck, 2009, p.228; Sternberg, 2014, p.105).

The obligation to stay informed is critical, especially when undertaking actions that carry legal protections against risks. If information is not available or outcomes are uncertain, such actions should not be taken (Beck, 2009, p.229). Additionally, individuals who cannot perform an activity due to physical incapacity, incorrect application, or incompetence must refrain from such actions to avoid negligence (Beck, 2009, p.341).

In situations where victims create risks within their responsibility domain, the result cannot be attributed to the perpetrator if the risk was unforeseen. For example, in cases involving highly programmed autonomous vehicles, programmers or manufacturers may not be held responsible if an accident occurs despite the vehicle's compliance with safety regulations (Sternberg, 2014, p.105). Yet, if a victim's actions are reasonable and predictable, the outcome can be attributed to the perpetrator. The responsibility can also extend to manufacturers for production errors, service personnel for maintenance failures, or users for not following instructions or tampering with AI machines (Sternberg, 2014, p.105; Markwalder & Simmler, 2017,p.175).

The responsibility issue of programmers in the event of accidents caused by improperly programmed AI machines is a significant concern in today's technological work environment. An incident in Volkswagen's Baunatal factory, where a worker was killed by an industrial robot due to the lack of necessary safety measures, highlights this issue (Jescheck, 2007, p.27; Kangal, 2021, p.110). Determining the programmer's liability involves assessing whether the AI machine malfunctioned due to negligent programming and whether

the programmer is responsible for the resulting consequences (Kangal, 2021, p.110). The capability of autonomous vehicles to communicate with each other through the internet or cloud technology and exchange information can lead to accidents if the information flow is incorrect, causing injuries or fatalities. In such cases, the liability may be attributed not to the driver, manufacturer, or user of the autonomous vehicle involved in the accident but to those responsible for providing incorrect road information (Beck, 2009,p.191).

Multiple individuals can contribute to the unauthorized risk resulting in negligent offenses caused by AI machines. For instance, a driver (user) who fails to notice that the autonomous vehicle did not detect a hazard in time and, despite not holding the steering wheel, is expected to monitor the vehicle's progress at all times, may be held liable along with the vehicle's programmer for any resulting accidents due to the combined risks created by the driver's negligence and the programmer's error. Here, liability is determined based on the degree of fault as per the Turkish Penal Code, Article 22/5. However, holding a user responsible for all actions transferred to a machine has been critically viewed in legal doctrine (Kangal, 2021, p.106).

Holding users accountable for all decisions and actions of an autonomously operated vehicle is socially unacceptable and contradicts the purpose of producing such technology. For example, it is generally accepted that an autonomously controlled vehicle is less likely to make mistakes than a tired driver or one who wishes to continue driving with fewer breaks. Penalizing the user for every wrong decision of the autonomous vehicle would lead to inconsistencies, as this would imply a higher degree of care and attention is required when using autonomous vehicles than when driving manually. Consequently, not driving the vehicle personally for extended periods could lead to increased liability for the driver (user), negating the purpose of using autonomous machines. Therefore, the criminal law must recognize situations where no one can be held responsible when societal acceptance of autonomous vehicle use reaches a certain threshold, considering the gaps in liability (Beck, 2009, p.191).

The concept that a robot can act autonomously based on its "own" decisions poses the possibility of severing the causal link between the action and the programmer, manufacturer, or user in criminal law, potentially eliminating objective liability. An autonomous action by an AI machine could be viewed as the act of a third party. For example, in cases where an injury is caused, it might be considered the act of the vehicle itself rather than the programmer, recognizing that today's legal framework does not allow for penalizing AI machines. However, this does not mean that the outcome cannot be attributed to the human behind the machine. The relationship of causation can be severed when an action by AI is seen as the autonomous act of a "foreground" entity, separate from the "background" person (programmer, manufacturer, or user). Yet, until AI is capable of forming its own intentions, actions caused autonomously by AI cannot be considered in the same manner as those of humans, and AI machines cannot be held criminally liable. Therefore, programmers, manufacturers, and users who act negligently according to criminal law are appropriately held responsible until AI can learn, remember, and form its intentions. Otherwise, attributing liability between AI and humans would lead to dissatisfaction among victims of harmful actions (Kangal, 2021,p. 106).

Predictability

One of the problems that arise in the production and use of artificial intelligence machines is the predictability of the occurrence of a negligent type of crime. Artificial intelligence, being independent in evaluating the information it collects from its surroundings, responds to the outcomes of these evaluations without the need for any human influence. Therefore, artificial intelligence applies the responsibility it is charged with in the most appropriate way. Due to this, the issue of which model the artificial intelligence will choose from the data it collects in individual cases, how it will interpret these data, and how it will respond to them, is not predictable, even if the person related to this artificial intelligence continuously observes these complex actions. Hence, in such an open system, the decision-making principles defined can often contain gaps, as predicting every situation and moment in life and converting them into action directives by algorithms may not always be possible. Additionally, the system can independently learn additional information during its use process and develop its own solution style (Markwalder & Simmler, 2017; Beck, 2009; Eberl, 2019).

The possibility of equipping machines with artificial intelligence with adaptation and learning capabilities makes it dubious to go to the responsibility of the programmer, manufacturer, or user. The actions of artificial intelligence machines, due to these mentioned features, inevitably make it impossible to predict them in advance with certainty. The behaviors of artificial intelligence machines cannot be entirely planned and controlled due to the experiences they gain independently. Thus, we can indicate that a user who has the opportunity to train an artificial intelligence machine in a systematic behavior model has more control than in other products.

This leads us to the problem of whether every wrong action caused by an artificial intelligence machine stems from the legal misconduct of one of the participants (programmer, manufacturer, or user). In cases where they interact with humans in an uncontrolled manner, due to their adaptation and learning capabilities, it will be inevitable for artificial intelligence machines to react in unforeseen ways to new situations. Moreover, understanding whether the damages caused by these reactions are due to the faulty behavior of the programmer, manufacturer, or user will become difficult (Jescheck, 2007).

Therefore, the risks posed by artificial intelligence machines to third parties are evident in terms of not being able to predict what they will do in advance. For example, it is possible for an autonomous vehicle, due to a possible dust accumulation, to injure a cyclist by not adhering to the priority of passage because it cannot read a traffic sign correctly. In this context, against the condemnation judgment due to the negligent injury caused by this autonomous vehicle, it is quite likely for the programmer, manufacturer, or user of the autonomous vehicle to argue that they could not have foreseen this erroneous behavior since the vehicle processed the data autonomously (Kangal, 2021).

Two solutions can be proposed regarding the predictability of the actions of machines with artificial intelligence. The first solution style is that the programmer, manufacturer, or user of artificial intelligence

cannot be held responsible for negligence because the harmful act of an artificially intelligent machine acting autonomously due to its unique data processing is not predictable. However, this approach does not find sufficient support in doctrine. On the contrary, a person who creates an artificial intelligence that they cannot control is expected to prevent themselves from acting in a way that could physically and vitally harm others (Beck, 2009).

The second solution style is that due to the predictability of every type of damage as a rule, the person programming, producing, or using artificial intelligence machines must take everything into account. In this sense, if the programmer, manufacturer, or user does not foresee the predictable behaviors of artificial intelligence machines, it may be possible to speak of negligence.

However, the decision of artificial intelligence in a specific case being unforeseen by anyone can be met with astonishment. Yet, since the life experience of computers with learning and decision-making capabilities is based on information about many events and situations, it is generally considered predictable whether they will perform actions causing exceptional damage, thus accepting that the harmful action of artificial intelligence is foreseeable by the programmer, manufacturer, or user (Jescheck, 2007).

In conclusion, predictability is a condition related only to the general possibility of falling into danger. However, specific conditions and situations are not always of a predictable nature. Therefore, artificial intelligence strengthens the debate on how predictability should actually be specific. The question arises whether 'predictability must be directed towards specific conditions, causal relationships, and dangers, or is it sufficient to foresee the general possibility of endangering people?' (Jescheck, 2007). A general foreseeability of a harmful action will not suffice. Predictability must be directed towards a lack of care and attention leading specifically to concrete damage to a third party.

The standard of measurement

One of the issues that need to be resolved is determining who will be taken as the standard in establishing negligence. Thus, by comparing what has occurred ("the actual") with what could have been done by the standard individual ("the expected"), a conclusion can be drawn. If the act in the specific case is carried out within the framework drawn by the standard person, there will be no negligence since neither the danger that has emerged nor the exceeding of the permissible risk exists. Conversely, if a greater risk than the one that could have been generated by the hypothetical person is created, it can be concluded that the perpetrator's negligence exists (Seher, 2016).

Negligent behavior can be determined in two stages. The first stage is the identification of objective predictability. Accordingly, the behavior expected from a reasonable and prudent average person in the perpetrator's social environment is taken as the basis. The second stage is the determination of subjective predictability. This involves examining whether the perpetrator can fulfill their duty of care based on their education, ability, intelligence, skill, life experience, and social status. If the perpetrator has done what is

expected of a reasonable and prudent average person, no further investigation is necessary. Otherwise, it will be examined whether the perpetrator, according to their personal abilities, could have fulfilled these expectations (Altunç, 2022).

It can be argued that traditional approaches to negligence reach their limits when applied only to one of the possible participants (programmer, manufacturer, user). As artificial intelligence is a new technology, it seems that there is currently no socially accepted normative reference point (Roxin, n.d.). Therefore, identifying the standard individual who will demonstrate the "expected" behavior is not yet feasible.

If the production and use of machines with artificial intelligence lead to the occurrence of a type of negligent crime due to a risky action not permitted by the programmer, it must be personally attributable to the programmer. In this case, the programmer must be able to foresee the risk of typical occurrence and avoid it. In determining predictability and avoidability, the conditions of the specific case and the characteristics of the perpetrator must also be considered. The question to be asked here is, "What would a careful and attentive person with the same education and individual abilities as the perpetrator in the specific case do or not do?" (Roxin, n.d.).

The responsibility of animal owners

According to this view, in situations where any behavior of a being or beings with artificial intelligence is unforeseeable, leading to a criminal element, Article 177 of the Turkish Penal Code can be instructive. As stated in this article, "A person who lets an animal under their control roam free in a manner that could endanger the life or health of others, or who displays negligent behavior in their supervision, shall be punished with imprisonment of up to six months or a judicial fine."

Although not extensively focused on in our judicial system, the form of liability that could apply in cases where vehicles with autonomous driving features cause a crime (canine liability) is of great importance and seriously considered by some researchers or writers in international fields. According to a study published in 2013, it has been stated that the legal articles that enable the control of autonomous vehicles and being a dog owner could be a good basis (Duffy & Hopkins, 2013). It is suggested that both autonomous vehicles and dog owners can act separately and independently, emphasizing the similarity of the outcomes in possible deception and damage situations. It is stated that beings with artificial intelligence, like animals, do not have any real or legal personality, so they cannot have responsibilities. Therefore, the person holding an animal becomes responsible for crimes, etc., caused by the animal. Walking a dog on a road where people or drivers are present is argued to have similar characteristics to driving an autonomous vehicle. They are said to have similarities in terms of having duties against humans. For example, consider a dog taken for a walk by its owner that attacks and injures a person passing by without any provocation, similar to an autonomous vehicle that, due to a systemic problem, fails to recognize a pedestrian's presence and hits them. In both cases, the responsibility for the victims' damages belongs to the owner (Duffy & Hopkins, 2013).

DISCUSSION and CONCLUSION

If a machine with artificial intelligence technology is considered a thing in the sense of private law, it cannot be seen as a subject to which criminal law sanctions can be applied. Because the addressees of criminal law norms are not animals or objects, but only humans. Criminal law evaluates only executive or negligent actions that can be influenced by will. With today's state of technology, it seems impossible to attribute such will-directed behavior to a machine with artificial intelligence. The traditional doctrine of fault, which expresses the judgment of being able to act differently, in other words, the possibility of deciding to act in accordance with the law, remains ineffective in the face of a machine with artificial intelligence due to its limited autonomy in programming and decision-making. Thus, the issue of whether a possible criminal responsibility can be attributed to the programmer, manufacturer, or user of this machine arises due to the absence of the machine's ability to act and fault (Markwalder & Simmler, 2017).

Since the principle "there can be no crime without fault" is accepted in criminal law, it can be said that such views are more guided by the disputes caused by civil law (Akbulut, 2020). Additionally, some thinkers in the Turkish judicial system who study and research this view argue that the responsibility method specific to damages caused by animal owners cannot be applied to entities with artificial intelligence technology following any harm they cause (AI Magazine, 2022). Other views mentioned under the title of responsibility in the doctrine include Article 175 of the Turkish Penal Code, "Violation of the care and supervision responsibility on someone who is not of sound mind," and Article 176, which explains "Acting contrary to the safety rules related to construction or demolition" (YouTube, 2022).

Artificial intelligence activities in practice

In the current era, artificial intelligence (AI) technology has started to be utilized in the field of law, and related legislation and case law programs have been developed. The advantages brought by technology have led to improvements in both convenience and continuity in the lives of individuals defined as legal professionals. Looking at similar applications around the world, legal technologies capable of making voluntary decisions, which seemed impossible, are rapidly becoming a part of our lives. According to a study in the United States, investments in the possibilities and opportunities of artificial intelligence technology saw a 713% increase in 2018, drawing significant attention (Cohen, 2019).

The speed of technological development and change in judicial activities also raises a number of questions in the legal field. One of the primary questions is whether the administration of justice will be performed by non-natural intelligence. Indeed, the potential of judges equipped with AI technology to change and eliminate bias, an element that constitutes human existence, and the advantages in terms of time, alongside the research topic of judicial activities potentially being considered equivalent due to these technological systems' unlimited memory and processing element, are subjects of research (Morrison & Harkens, 2019).

The use of AI technology in legal processes is relevant in the activities of lawyers, law enforcement practices, and judicial applications.

DISCUSSION and CONCLUSION

This study primarily aimed to elucidate the standing of robotic and artificial intelligence (AI) technologies in the face of criminal law. Initially, general concepts and basic information related to AI were provided. As can be understood from the explanations within this scope, some countries have begun to implement legal regulations, especially concerning autonomous vehicles, in comparative law relevant to our study topic. When examining international regulations, it is generally observed that these regulations include evaluations regarding liability compensation. Although there is no clear and sharp view on many issues, including whether robot technologies and entities with AI technology possess personality elements, suggestions are also made to lawmakers in these regulations.

To define a method regarding the status of robot and AI technologies against the law, it is first necessary to discuss whether these technologies constitute a legal person. Some authors argue that robot and AI technologies do not need personality status yet, as they are not fully autonomous. This view is divided internally into five points.

On the other hand, there are differences among views stating the necessity of a personality status for robot and AI technologies. Among these views, the most debated is the legal personality view, which encompasses today's legal rules. Nonetheless, the possibility of defining robot and AI technologies as legal persons seems not to be seen. According to the limited number rule accepted for legal persons in our law, it is impossible to define robot and AI technologies as legal persons. Even if this problem could be solved, the criminal liability of legal persons is not accepted in our legal system. If the responsibility of security measures were accepted, a sanction problem would arise. Our law envisages the cancellation of licenses and confiscation for legal persons. The cancellation of the license cannot be applied to robot and AI technologies, but it may come up for the manufacturer and programmer legal entity. For confiscation; robot and AI technologies must be able to acquire property and must acquire it either from committing a crime or using it in committing a crime. Moreover, solving the problem by allowing robot and AI technologies to acquire rights either through an insurance system or on their own is not possible. This solution could only be possible if robot and AI technologies commit an economic crime and gain assets, but it will be ineffective for other types of crimes.

The most likely possibility for determining the criminal liability of robot and AI technologies currently is their use as tools. In this regard, the user will be held responsible as a rule. If the existence of autonomous technology capable of making its own voluntary decisions is in question, a solution within the scope of participation rules will need to be defined. Thus, co-perpetration or intermediation may come into question. Similarly, for the person programming or enabling the use of robot and AI technologies, the situation of instigation may arise. In the current position, therefore, perpetration means the use of a human to commit a

crime, so the person enabling the use of robot and AI technologies can only be in the position of a direct perpetrator.

The issue of negligent behavior should also be discussed in terms of the relationship of responsibility. In our opinion, it is premature to say that robot and AI technologies can assume responsibility as mentioned in TCK Art. 83. On the other hand, the negligent liability of guarantors such as manufacturers, programmers, and users can be possible under the conditions formed according to the specifics of the concrete case.

Regarding negligence, various possibilities can arise, and there is no reason to deviate from the rules accepted in the current regulation for manufacturers, programmers, and users. In our legal system, a person who fulfills their duty of care will not be responsible for negligence. Moreover, the evaluation of causation will also limit the scope of responsibility.

Considering whether robot and AI technologies can be directly perpetrators, there is currently no autonomous, willful robot technology or AI technology that has reached the level of self-awareness. Thus, it is also not possible to talk about the ability to be at fault. Even if robot and AI technologies could be considered perpetrators, a sanction problem would arise.

If robot and AI technologies were to be punished in a way equivalent to humans, imprisonment or fines would be relevant. For the purposes of punishment to materialize, the perpetrator must understand the punishment, perceive it, and feel psychological pressure due to the deprivation they suffer. Therefore, for these punishments to achieve their preventive goal, robot and AI technologies must possess a consciousness close to humans. We believe that in the future, legal systems may include sanctions specific to robot and AI technologies, aside from classical criminal law sanctions. Therefore, sanctions such as reprogramming and the use of beneficial activities, as well as part of the assets of robot and AI technologies being given to the victim for the purpose of compensation, may be appropriate. The model we are considering here essentially aims to remedy the victimization resulting from the crime, similar to the institution of reconciliation, but must also be compatible with robot and AI technologies and, if necessary, encompass their insurance systems.

Our study also separately addressed the specialized areas where robot and AI technologies are predominantly used and the unique and different legal problems that arise in these areas. Another significant issue is whether robot and AI technologies can have intellectual property rights, given the current state of technological advancement. Nowadays, they can produce new things and invent with the systemic data provided to them. Therefore, whether robot and AI technologies can be considered as creators or authors of works should be addressed. We believe that approaching the problem here will require an evaluation based on the contribution to the originality or uniqueness of the invention or work.

RECOMMENDATION

When we think of robot and AI technologies, autonomous vehicles are the first thing that comes to mind. The use of these vehicles, which have become a focus of interest in recent years, is of close concern to criminal law. To summarize the criminal liability in its most basic outlines; first, it must be determined how autonomous the vehicle is, i.e., how much control the person in the driver's position has over the vehicle. If the driver completely controls the vehicle, the driver will be responsible for all consequences and victimizations. If the driver needs to take control of the vehicle in emergencies, the evaluation will be based on the driver's behavior. If the vehicle is independent of the person in the driver's position, the manufacturer or programmer's responsibility will come into question.

The activities of another type of unmanned vehicle, drones, are also important in terms of criminal law. Firstly, it should be stated that launching these vehicles uncontrollably and without permission is a crime. Activities such as violating the privacy of private life committed with these vehicles will bring the user's responsibility into question. Besides, it should be stated that the right to legitimate defense will arise for the people whose rights are violated by a drone.

Lastly, vehicles used in the defense industry among unmanned vehicles should be mentioned. These vehicles can be used for defense or attack purposes, targeting and killing people. In such cases specific to the state of war, the requirements of the law of war must be followed, and actions must be taken to minimize harm.

One of the fields where robot and AI technologies are most frequently used is undoubtedly the healthcare sector. Especially in terms of robotic surgery, the following possibilities can arise: In addition to fulfilling the duty of care and attention, a harm result may have occurred as a result of robotic surgical intervention. In this case, negligence cannot be spoken of as a rule. However, if the physician could have prevented the result, negligence liability may be considered in determining the physician's criminal responsibility.

In the second possibility: the resulting harm is due to the robot rather than the physician. Here, situations such as a fault in the robot's software, a mechanical failure, the robot stopping and starting again, or an error occurring in the new skills developed by the robot after learning may be relevant. In this possibility, the responsibility of the manufacturer, programmer, or hospital may be relevant.

As a third possibility: the harm resulting from robotic surgery may be due to the physician. The most common examples here are the physician misdirecting and using the robot due to a lack of knowledge and training. In this case, the physician's criminal responsibility will be relevant.

In all these possibilities, we want to re-emphasize the importance of informed consent. No intervention without the condition of informed consent will be considered lawful.

In all the possibilities we have mentioned so far and will mention below, artificial intelligence processes the data provided to it and acts accordingly. In this case, the issue of personal data protection must be addressed.

The need for artificial intelligence to process a large amount of data and sometimes lead to incorrect learning are frequently encountered problems. We believe that the basic principles of the law protecting personal data, especially data systems, will be guiding.

Robot/artificial intelligence also greatly assists criminal procedure law today. Applications that facilitate administrative work and legal text preparation are extremely popular and frequently used. The first area where artificial intelligence systems are used in criminal proceedings is risk assessment software. These software, which processes many data about individuals, including primarily a survey study, and calculates possibilities such as committing a crime/repeating, also bring many problems. Firstly, these software can be prepared in a biased manner. On the other hand, they violate many principles, including the presumption of innocence.

Finally, in our study, we touched on the possibility of artificial intelligence being used as a judge. As with risk assessment tools, software that will act as judges also has a high probability of bias and errors. Moreover, the profession of judgeship, by its nature, encompasses many features. Especially in cases where the judge's discretion is involved, we believe that using artificial intelligence is even riskier.

Ethics Statement

"This article complies with the journal's writing rules, publication principles, research and publication ethics rules, and journal ethics rules. The author bears responsibility for any violations related to the article." Since this article was conducted through document analysis, one of the qualitative research methods, it does not require ethical board approval.

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