




The Nature of Natural and Legal Personality of Robots, Ethics, and Compensation for Robot-Related Damages

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ABSTRACT

The aim of this study is to examine the nature of the natural and legal personality of robots, ethical considerations, and the compensation for damages caused by robots. Today, the pervasive and powerful presence of robots in all aspects of human life reflects the profound influence of artificial intelligence, compelling us to not only accept it within human society but also regulate the way we interact and establish relationships with it. This is necessary to ensure that when a robot causes harm to human property or rights, effective solutions are available to respect human rights and facilitate adequate compensation. One of the most critical and practical approaches involves addressing issues such as autonomy, natural and legal personality, ethics, civil liability, compensation for damages, and aligning robotic technology activities with established rules and standards. With this perspective, the role of jurisprudence and law in organizing these activities becomes evident. A thorough investigation into the element of harm and its realization in robot-human interactions is essential for safe utilization of technology, as well as the formulation of robust laws and enforcement guarantees. This paper examines the civil liability of robots and concludes that if robots act or omit actions that result in harm, the liability rests with the human agent. Since robots lack natural or legal personality, they cannot independently be held accountable for damages. Therefore, based on the "respect" theory, the individual responsible for controlling or programming the robot is obliged to compensate for any resulting damages. This analysis highlights the necessity of drafting clear legislation regarding robot-related liabilities to protect individual rights and ensure societal security.

Keywords: *Natural personality, ethics, compensation for damages, robots*

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1. Introduction

Significant fear and confusion exist regarding artificial intelligence (AI) and other computer advancements. Numerous publications have already addressed short-term issues such as data privacy

concerns and unemployment caused by technology. AI has the potential to solve many common business challenges, from quickly identifying multiple questionable payments and expenses in thousands of invoices to predicting consumer needs and desires.



However, these advancements may also have a downside. Privacy concerns arise when companies use advanced AI algorithms to collect data about customers and even vendors, either with or without their consent, potentially for lawful or unlawful purposes (Rahmani, 2000; Safaie & Ghasemzadeh, 2003).

Although the right to employment is not an absolute or unconditional right to obtain a job, governments are obligated to strive toward facilitating individuals' access to employment. AI's role in job automation presents a real threat to this right, potentially preventing some individuals from entering the labor market. Automation has already resulted in job losses in specific sectors, and it is anticipated that AI will accelerate this trend. While there is considerable debate over the use of automation in jobs, it is undeniable that AI will bring about changes in the labor market by both creating and eliminating jobs. Many authors have speculated about distant future events, such as an apocalyptic scenario or an era in which AI ushers in a new age of peace and prosperity (Ashley, 2017; Saripan & Mohd Shith Putera, 2016). While these topics are significant, they are not the focus of this research.

Beyond the challenge of intellectual property ownership, other jurisprudential-legal challenges also relate to AI, one of which is civil liability. Robotic technology has, in recent years, intertwined with human life, and the extent of its integration and role in human life is constantly advancing. This advancement necessitates legislation regarding the behavior and various functionalities of robots. Firstly, ensuring controlled and safe operation in society is essential. Secondly, the effectiveness and efficiency of robots in different aspects of life depend on understanding the jurisprudential and legal issues related to them. Among the critical legal discussions in this area is civil liability in the event of mistakes or errors caused by robotic actions (Riddle, 2014).

AI has entered many aspects of human life, bringing new legal challenges. Legal scholars differ on whether AI possesses a natural personality, a legal personality, or is merely an executor and subordinate. Two theories have garnered the most support. The first posits that AI has an independent personality and should be regarded as a natural person. The second suggests that AI is merely an executor and subordinate. Proponents of both theories provide reasoning to support their claims. Currently, the executor and subordinate theory is widely accepted,

given the current state of AI technology. However, as this technology evolves, the theory of AI as a natural person may gain acceptance.

AI is defined as a level of technological complexity in human-made tools that enables them to analyze, respond, and react independently of their creator, surpassing human capabilities in a shorter time and with greater speed. Examples include self-driving cars and ATMs. The efforts of advanced countries to develop AI in the form of humanoid robots have led to significant technological advancements and more complex structures. AI's capacity for autonomy, decision-making, intelligence, logical analysis, and in some cases, emotional response has created the most extensive network of interactions with humans, fostering actions and reactions that involve emotions. These new features attributed to AI have led to debates about its status as property and prompted person-like perspectives on it. For instance, Saudi Arabia recognized the humanoid robot Sophia as a citizen.

2. The Legal Nature of Artificial Intelligence

Research on the nature and essence of artificial intelligence (AI) from a legal perspective, given current advancements, both in domestic and industrial applications, is becoming increasingly evident. Despite the significant and widespread impact of this technology on human life, it has generated new legal issues. Currently, there is no specific law that clearly defines the nature of AI in terms of control, monitoring, compensation for damages, or its legal responsibility in the Roman-Germanic legal system. The first legal discussion in this field comes from the European Union, which, through the European Parliament's Legal Affairs Committee, presented a draft proposal along with recommendations concerning civil law rules related to robotics. This draft, titled "Civil Law Rules in Robotics," was adopted by the Parliament in February 2017. However, this regulation, rather than addressing the legal nature and responsibility of AI and robots, focuses on providing recommendations to the European Union's Committee, urging it to develop legal frameworks for resolving legal issues arising from AI. Due to the absence of impactful legislation in this area, legal scholars are actively engaged in comparing actions attributed to AI with those of children, objects, animals, etc., or by exploring the potential of granting legal personality to AI

systems to establish a legal framework for compensating damages caused by them. This paper therefore examines AI both as a natural and legal person and as an object.

Given the civil and criminal responsibilities of judges, as stipulated in Article 13 of the Islamic Penal Code, the legislator provides that if a judgment leads to punishment or corrective actions that exceed the quality defined by law, causing any harm or damage—whether due to negligence or intent—responsibility will be incurred. If the action is due to negligence or intent, it results in criminal and civil liability, otherwise, the damage will be compensated by the public treasury. From this, it can be concluded that if a robotic judge issues a decision contrary to the law, leading to damage, and since AI lacks intention and will, the issue of intent or negligence becomes irrelevant. Therefore, the damage caused by AI's error will be borne by the public treasury. Additionally, Article 171 of the Constitution emphasizes that in the case of negligence, the responsible party is liable for compensation, and otherwise, the state is obligated to compensate for the damage. The designer or programmer, in cases of intent or disruption to the judicial order, could be held liable, but if no deliberate mistake occurs, under Article 171 of the Constitution, the state is required to compensate for the damage. The aim of employing AI is to prevent human errors and personal biases in judicial cases.

2.1. *AI as a Natural Person*

The term "person" is used in various sciences, such as sociology and psychology, but its meaning differs in each field. In legal science, the concept of personhood refers to an entity that has rights and obligations. However, the legal definition of personhood differs from its colloquial meaning. In legal terms, personhood refers to the ability of an individual to hold rights and duties. In law, there are two types of persons: natural persons and legal persons. A natural person refers to an actual human being, whereas a legal person is an abstract entity that does not exist in the real world but is recognized by law and afforded legal protections. Essentially, any entity recognized by law as a legal person consists of a group of individuals who come together for specific non-profit or profit-driven purposes, such as in the case of corporations or organizations. Furthermore, legal personhood has been granted to certain entities for specific purposes, such as charitable trusts, where these

assets are used for particular aims and are thus considered legal persons (Andersen, 2018; Jackson, 2019; Kaku, 2019).

In all legal theories, it is clear that only humans are recognized as natural persons. The reason why humans are considered to have rights and duties is their status as natural persons. This issue is clearly defined, and it is impossible to treat AI as a human being because AI lacks fundamental human qualities such as reasoning, emotion, conscience, death, will, and birth. While AI systems strive to simulate human cognitive processes and physical actions, they have not yet achieved full success in doing so. It may seem that autonomy in AI implies the system's will and choice, but it is important to understand that these systems and robots are tools without soul or substance, which many religious beliefs reject. Therefore, granting natural personhood to a system that cannot attain the high status of a human being is inappropriate.

2.2. *AI as a Natural and Legal Person*

Under Iranian law, Articles 583, 584, and 587 of the Commercial Code recognize legal personality for non-human entities such as commercial companies and state institutions. Additionally, Article 588 of the same code grants these entities the rights and duties of a natural person, except for those rights and obligations inherently tied to human nature. For example, companies can own property, sign contracts, and be held liable for damages caused, and even criminal penalties may be imposed on them.

As previously defined, personality is the capability and quality of a person to hold rights and obligations. Therefore, legal personality is granted to companies because these non-human entities can acquire rights, such as domicile and nationality, and can personally fulfill obligations, such as compensating for damages caused by their actions, from their own assets. In this context, in the 17th century, a Chief Justice of the English courts stated that companies have no soul to damn and no body to be kicked. However, companies, created to generate profit for themselves or their shareholders, can independently be subject to financial and moral penalties. These penalties aim at the fundamental purpose of companies—capital generation—and thus fulfill the objectives of punishment, namely deterrence, correction, and justice.

It is essential to note that social necessities have led to the recognition of legal persons and systems, such as endowments (waqf), which arose due to significant differences in legal and jurisprudential opinions regarding ownership of endowed properties. These debates led to the establishment of legal personality for such properties, serving purposes like reducing class divisions in society and transforming private property into public assets .

This raises the question: can AI systems be granted legal personality despite the lack of explicit legal provisions? Can intelligent autonomous robots serve as judges in courts? Clause (f) of Article 59 of the European Parliament's Civil Law Rules in Robotics proposes creating a new category of persons for robots, referred to as "electronic persons," with specific rights and duties. This clause urges the European Committee to examine the legal consequences of establishing such a legal status, particularly for autonomous robots in contexts where they make intelligent decisions or interact with third parties. The draft legislation suggests that granting legal personality to robots necessitates reviewing their rights and obligations.

How could rights and duties be granted to a machine? What specific rights and privileges of persons could be extended to AI systems: the right to life, equality with humans, the right to wages, or the right to retirement? For example, could an intelligent robot judge request leave or claim salary and bonuses? Could an autonomous robot deployed in hostile environments avoid traversing a dangerous area where the risk of destruction or injury is high? If the answer to these questions is affirmative, why purchase such systems if they cannot be used, and why not simply continue relying on human resources? Granting rights to an AI system appears to be futile and counterproductive, potentially undermining the emerging market for this technology.

The same issue applies to assigning obligations and responsibilities to AI algorithms. It is clear that AI cannot be compelled to compensate for damages caused by its actions or be subjected to penalties, such as imprisonment or torture, since such measures would fail to achieve the objectives of punishment: correction, deterrence, and justice.

Asaro, in his discussion on granting personality to machines, suggests that machines might be recognized as quasi-agents before being granted full legal

personality. He draws a parallel with minors, who are a significant example of quasi-persons. Minors do not enjoy all the rights associated with personality that adults do; for instance, they cannot personally sign contracts or engage in certain legal agreements due to their lack of full legal capacity. Instead, they participate in such agreements through the actions of their parents or legal guardians. While minors are not considered full legal persons in some respects, killing a child is legally equivalent to killing an adult, thereby granting minors legal personhood in that sense. Thus, minors can be considered a type of quasi-agent or quasi-legal person.

The same reasoning can apply to individuals with permanent or temporary insanity, during periods of incapacity. Asaro concludes that since incapacitated persons are considered legal persons in some respects but not in others, robots could similarly be regarded as quasi-agents from a legal perspective before achieving full legal personality.

Simplified, this reasoning suggests that since children do not enjoy all the rights and obligations of adults and are considered quasi-persons, robots, which might be capable of holding limited rights and obligations, could also be viewed as quasi-persons. However, according to Article 956 of the Iranian Civil Code, a child enjoys all personal rights from birth, and according to Article 958, the exercise of these rights during incapacity falls under the guardianship of their legal guardian. This distinction between possessing rights and exercising them is clear. Following Asaro's reasoning would also imply that companies are quasi-persons, as they are deprived of certain rights and obligations exclusive to humans under Article 588 of the Iranian Commercial Code. However, this argument is incorrect, as the legislator grants full and independent legal personality to companies. Furthermore, it remains unclear what rights and duties could be assigned to an AI system. Granting legal personality requires legislation, and until laws are enacted, comparing AI to children or companies for assigning personality remains speculative (Talimonchik, 2021).

Proponents of granting personality to AI aim to establish it as an entity responsible for damages. However, alternative systems for compensating damages, such as mandatory insurance schemes or compensation funds, as proposed in Clauses (a), (b), (c), (d), and (e) of Article 59 of the European Parliament's Civil Law Rules in

Robotics, are more effective than assigning personality. Assigning rights and obligations to an entity that is merely a tool is not only risky but also blurs the lines between humans and machines and the distinctions between living and non-living entities. Granting personality to an insentient entity lacking consciousness would ultimately degrade the human race to the level of a machine.

3. Artificial Intelligence in Observing Ethical Principles

Judging is a sensitive and central task in establishing justice among people. The characteristics of a judge, including individual and psychological traits, and the environment in which judgments are made and verdicts are issued, play a significant role in decision-making. The importance of justice in judgment is so critical that multiple obstacles are highlighted in this area. A judge who is not characterized by the virtue of justice should never be appointed, as both internal and practical justice are essential qualities for this role. Judging is one of the significant aspects of the socio-political system's authority, tasked with establishing justice and enforcing the rule of law among the people. Like other social behaviors and phenomena, the judicial position cannot be entirely free from errors and shortcomings (Israhadi, 2023; Moreira et al., 2023).

3.1. Concerns about Using Artificial Intelligence in Legal Proceedings

When discussing the legal status of artificial intelligence (AI), the central question arises: can AI be recognized as a judge with legal responsibility? The European Parliament's plan considers assigning legal responsibility to AI, suggesting that this responsibility should align with the performance level and autonomy of machines in executing tasks they are programmed to perform. Manufacturers and owners of robots may be required to insure robots against potential damages they might cause.

Another consideration in the European Parliament's plan is the possibility of AI surpassing human intellectual capacity in the coming decades. AI experts have voiced opposition to granting legal rights to robots. According to a report by Yasna, quoting the *Daily Mail*, one fundamental question is whether robots should have legislators. This issue was first raised in January 2017,

prompted by a clause in a European Parliament report that recommended creating a "legal status" for AI.

With the rapid growth of the robotics industry, members of the European Parliament warned last year about the need for regulations to ensure a standard level of safety and security. However, specialists currently oppose this move, believing that granting AI legal and ethical status might violate human rights. A group of 156 AI experts from 14 different nationalities sent an open letter to the European Parliament in Brussels condemning the proposal. They argue that creating a legal status for robots as "electronic persons" is fundamentally flawed. Such a move might allow manufacturers to deny liability for damages caused by their products, potentially leading to situations where robots could claim rights to earnings or citizenship.

AI must not harm humans or, through inaction, allow harm to occur. It must obey human commands unless those commands conflict with the first rule and must strive for its survival as long as this self-preservation does not conflict with the first and second rules. Beyond science fiction, a crucial concern for AI and robotics researchers is the possibility of creating self-aware robots. If AI advances to the point where robots achieve self-awareness, the debate over granting legal status to robots would enter a new phase.

For the first time, AI has outperformed prominent legal professionals in interpreting legal contracts. According to Yasna and the *Daily Mail*, researchers found that AI was 10% more accurate than lawyers in identifying key issues related to commercial contracts—a task that is part of the daily responsibilities of many attorneys. This finding suggests that AI poses a significant threat to numerous professions, with predictions that AI may replace 300 million jobs worldwide by 2030. Results of this competition, analyzed with input from legal experts at Stanford University, Duke University, and the University of Southern California, revealed that AI demonstrated 94% accuracy in identifying risks, compared to experienced attorneys, who achieved only 58% accuracy.

Grant Galusin, an intellectual property attorney and one of the participants in the competition, noted that the task was very similar to the daily activities of most lawyers.

In considering the personification of AI, it is essential to recognize that a natural person is characterized by independence and decision-making capabilities in all

matters. For legal persons, these decisions are made by their natural representatives. AI cannot independently make decisions across all matters like a natural person and can, therefore, be more closely likened to a legal person. Legal persons, treated as property, lack independent assets or will separate from their representatives.

In today's world, AI has acquired the ability to learn, primarily by modeling behaviors through repetition and imitation. This capability is still in its infancy and limited to understanding basic concepts of the physical and social world. One of the most advanced AI systems in the form of a social robot is Sophia. This robot became the first humanoid robot to receive citizenship from Saudi Arabia. Sophia exhibits numerous advanced capabilities, including independent will and decision-making. In many press conferences, Sophia has answered questions about the purpose of its creation or its envisioned future, offering spontaneous, unprogrammed responses. In one international conference, when asked whether AI might destroy humanity in the future, Sophia replied affirmatively, stating that this could happen if humans obstruct its progress and goals. This independence from its creator's intent and AI's autonomous will are critical considerations (Andersen, 2018; Riddle, 2014; Scherer, 2015).

These developments suggest that AI has moved beyond being a mere tool and has entered the domain of person-like capabilities. Therefore, granting decision-making abilities to AI indicates its potential success in adhering to judicial principles.

The European Parliament, as the union's highest legislative body, has proposed creating a unique legal framework for AI, granting it limited rights and obligations. According to the European Parliament's recommendations, these rights and duties could be implemented in cases where AI makes decisions or interacts with third parties—a concept currently unfamiliar in European legal systems.

3.2. Artificial Intelligence in Observing Ethics

Artificial intelligence (AI) is increasingly prominent in research and products recommended to consumers. Given the growing influence of AI across all societies, experts believe that developing ethical guidelines for AI is essential. These guidelines aim to reassure humanity that the increasing mechanization of various processes

and the relentless advancement of AI align with human interests. Machines already make decisions for us. However, achieving ethical consensus in this area presents a long and challenging journey for scientists, encompassing formulating ethical guidelines, programming, and implementation (Bostrom, 2014).

Michael Har, a senior professor, highlights one of the key questions before us: *How can we be ethical humans?* He notes that humanity struggles to answer this question, making it even more difficult to expect AI to provide solutions to such dilemmas. Gradient Organization aims to collect and organize diverse data from fields such as law, humanities, engineering, and data analysis. Elon Musk, founder of Tesla, consistently warns in interviews that AI poses a serious risk—though not as long as it remains under human control. Once control is lost, the future becomes unpredictable. Musk likens AI to nuclear energy, where unleashing its potential is easy, but controlling it is challenging. The goal must be to ensure AI's safety, even if this means slowing its progress or production, as this is the most responsible approach.

One of the most well-known and advanced robots today is Sophia, the first robot to be granted citizenship (by Saudi Arabia). Sophia is a highly intelligent robot capable of independent interaction with humans, earning global fame. It can think and exercise will, providing answers to questions without relying on pre-programmed responses. Christian leaders, including the Pope, believe that AI should not yet be granted its own specific rights. Another humanoid robot, Geminio, programmed with AI, can represent its creator, Professor Hiroshi, in meetings and conferences while being remotely controlled. This robot's human-like appearance, including hair, skin, and even facial stubble, raised concerns about robot personification. The Pope and other Christian leaders have expressed that society is not yet ready to grant rights to robots and emphasized the need for cultural readiness to accept such a development (Jackson, 2019; Kaku, 2019).

The personification of robots raises questions about their status as natural or legal persons. If robots are considered natural persons, they would have intent, will, autonomy, and independence. This introduces complexities, especially regarding whether damages caused by AI actions are intentional or accidental, creating significant legal challenges. While it might seem that humanity's role is to create its evolutionary

successors and step aside, this transition is expected to take centuries as robots achieve greater self-awareness. Concerns about robots acting against humanity to "save the world," as depicted in the film *I, Robot*, where a central computer system decided to harm humans to preserve humanity, remain relevant. Judges employing AI should ensure that it does not harm humans or issue judgments contrary to laws or its programming. Many scientists advocate for "friendly AI" designed to benefit humanity rather than harm it. Doug Hofstadter, a prominent AI thinker, suggested that hyper-intelligent robots might be treated like our children, cared for and nurtured. Another perspective proposes enhancing human capabilities to create "superhumans" instead of building advanced robots (Riddle, 2014; Scherer, 2015). Technological advancements in prosthetics and brain-machine interfaces are revolutionizing human capabilities. For instance, cochlear implants have transformed audiology and restored hearing to the deaf. Brain implants now allow disabled individuals to control movements through thought. Researchers are exploring artificial vision systems for the blind and robotic limbs with sensory feedback. Italian and Swedish scientists have recently developed robotic hands capable of sensing and providing feedback, paving the way for artificial body parts for robots.

Students using EEG helmets can now control the movements of Honda's ASIMO robot through thought alone. Such technologies could address labor shortages, as workers in one country could remotely operate robots in another. Ray Kurzweil, a proponent of human-robot integration, envisions using microscopic robotics to clean and repair the human body, potentially enabling immortality. He believes AI integration into our bodies and brains could lead to longer, healthier lives.

Scientists advocate implementing safety measures to ensure AI remains non-threatening. AI systems could be equipped with chips preventing harmful thoughts and allowing humans to deactivate them, particularly during undesirable behavior. Since AI emotions must be pre-programmed, developers could carefully select which emotions to include, focusing on those that are beneficial or foster dependence on their owners. Key emotions for AI in the judicial field include justice—ensuring laws are applied correctly and accurately—and empathy, enabling understanding and assistance to humans. Fear, as an evolved response to danger, could also be valuable.

However, traits such as ambition or dominance must be excluded to prevent AI from overriding human authority. AI must process cases as requested by plaintiffs without arbitrarily adding or omitting complaints, even if its approach is not the most optimal choice. Judicial ethics, as a subset of professional ethics, emphasizes judges' ethical conduct, with different schools of thought proposing unique judicial ethics principles. In Islamic governance, judiciary preparation includes cultivating ethical practices, particularly justice and honesty. Islamic jurisprudence also prohibits judging while influenced by emotions like anger, hunger, or excessive joy—traits AI lacks, allowing it to deliver consistent and unbiased decisions.

While AI's lack of emotions and ability to expedite case resolution make it valuable in judicial processes, it is not yet appropriate to appoint AI as a judge. Instead, AI should serve as a tool to assist skilled judges, enabling faster case resolutions and restoring violated rights. Its immunity to human emotions such as anger or sadness ensures continuous and unbiased analysis of cases, making it a useful complement to human judgment.

4. Compensation for Damages Caused by Autonomous AI-Based Robots

When harm occurs, and an individual suffers damage, under civil liability principles, the responsible party is obligated to compensate for the harm caused. Various methods can be employed to provide compensation depending on the specific case. The same applies to damages caused by robots, where users of the robots must implement these solutions.

4.1. Use of Insurance

Insurance is a contract that imposes obligations on both parties. Article 1 of the Insurance Law (1937) defines insurance as follows:

"Insurance is a contract whereby one party undertakes, in return for payment by the other party, to compensate for losses incurred by the latter or to pay a specified amount in the event of an accident. The party undertaking this obligation is referred to as the insurer; the other party as the insured; the payment by the insured to the insurer as the insurance premium; and the subject of insurance as the insured item."

Humans and their possessions are exposed to countless unforeseen events in everyday life. Since no one can predict when these events will occur or their extent, prudent and forward-thinking individuals seek to prepare for such contingencies. From the earliest formation of human societies, people have sought security, making insurance one of humanity's innovations to achieve such assurance (Andersen, 2018; Saripan & Mohd Shith Putera, 2016).

The most advanced civil liability theories and systems derive their social benefits when integrated with modern insurance techniques. Civil liability principles alone cannot resolve social challenges arising from significant hazards or risks. A financial and operational support system is necessary for these principles to be effective. The involvement of insurance in civil liability issues revitalizes these principles, making them more practical and enforceable.

The emergence of social security systems in various countries and the expansion of liability insurance have increased the importance of civil liability and the compensation of victims. However, some argue that liability insurance and social compensation schemes have diminished the deterrent effect of civil liability. Since the advent of liability insurance, insurers often compensate victims, and enforcement of liability against the actual responsible party has become rare. This shift can lead to negligence among insured individuals, causing them to act carelessly, believing that "the insurance will pay for everything."

However, this perspective is not universal. Not all insured individuals act irresponsibly; most seek insurance to safeguard against potential damages and live more comfortably. For instance, a driver may insure their car to cover potential damages to others' property or injuries caused by accidents. Similarly, homeowners may insure their houses against fire, floods, or earthquakes, even if such disasters never occur during the policy term. Thus, insurance cannot be dismissed as a means of avoiding responsibility or undermining civil liability principles.

With this understanding, insurance can be used as a mechanism to compensate for damages caused by robots. Any legal solution addressing robot and AI liability should not limit compensation for potential damages. Instead, it should ensure comprehensive coverage and avoid restricting compensation simply

because the harm was caused by a non-human entity. Therefore, establishing mandatory insurance for robot manufacturers, especially those producing autonomous robots, is a critical legislative priority. Moreover, insurance systems should establish funds to cover damages caused by robots in cases where no existing insurance policy applies.

Liability insurance, as a type of private insurance, can be applied to compensate for damages caused by robots. In liability insurance, the insured party protects themselves against potential civil liability. For example, a vehicle owner insures against damages caused to others, with the insurer obligated to compensate for those damages on behalf of the insured (Ashley, 2017).

Robots must be insured to operate safely and prevent harm, ensuring that compensation is available in cases of accidents or damages. Liability insurance for robotic technology is a contract under which the insurer commits to compensating for damages caused by robots, such as those resulting from errors or unintentional acts. This type of insurance, also known as third-party liability insurance, addresses damages caused by robots interacting with humans or the environment.

For example, a robotic pilot, such as PIBOT, capable of performing all flight operations from taxiing to takeoff, cruising, and landing, using standard aircraft controls, would be liable for any damage caused during its operations. If an accident during landing or another flight phase injures individuals or damages property, compensation must be provided. If the robotic aircraft is covered by liability insurance, the insurer will compensate for such damages within the limits and terms specified in the policy.

It is reasonable to require mandatory insurance for robot manufacturers, owners, designers, and all those involved in using robotic technology. Since robots and AI increase the potential for harm through their interactions with society, all parties involved in their production and use should be obligated to secure liability insurance (Safaie & Ghasemzadeh, 2003; Scherer, 2015).

Liability insurance for robotic technology should be formally recognized as a type of liability insurance. As previously noted, an insurance fund should be established within the insurance system to support the safe use of robotic technology. This fund would ensure compensation for damages caused by robots in cases where conventional insurance policies do not apply.

Mandatory insurance for robots will provide assurance that damages caused by their activities are compensated. This requirement protects society while enabling technological advancement, offering a balanced approach to managing risks associated with autonomous AI-based robots.

4.2. Payment of Diya or Arsh

One of the methods for compensating damages caused by robotic technology is through the payment of *diya* or *arsh*. In Islamic law, the system for compensating bodily harm is distinct from the system for financial compensation, with specific regulations for each. Financial compensation is addressed under the principles of *itlaf* (destruction), *tasbib* (causation), and *ghasb* (usurpation), while compensation for bodily harm is covered under *diya* and *arsh* (Katouzian, 1993).

Diya and *arsh* refer to monetary payments required for bodily harm or injury to a person or their body parts. If the amount is predetermined in Islamic law, it is referred to as *diya*. If it is not specified, it is referred to as *arsh* or *hukoomah*. Some scholars use *diya* to refer to both specified and unspecified amounts. Others define *diya* as full compensation for bodily harm, while *arsh* is a proportionate amount determined either by legal provisions or judicial authority (Katouzian, 1993).

Article 448 of the Islamic Penal Code defines *diya* as:

"Specified diya refers to a determined monetary amount prescribed by Islamic law for unintentional crimes against life, bodily harm, or benefits, or for intentional crimes in cases where retribution (qisas) is not applicable for any reason (Katouzian, 1993)."

Article 449 defines *arsh* as:

"Arsh refers to unspecified diya whose amount is not determined by Islamic law. Courts determine its amount by considering the type and nature of the crime, its impact on the victim's health, the damage caused, and the specified diya, consulting expert opinion where necessary."

4.3. Providing Equivalent Compensation

Another method for compensating damages caused by robots involves providing equivalent compensation. This applies particularly to damages caused to property. For instance, Tesla's autonomous vehicles are frequently involved in accidents. Last year, a Tesla Model S, operating in autopilot mode, collided with a humanoid

robot rented for \$2,000 per day. The incident occurred during the Consumer Electronics Show when engineers were moving robots to a booth. According to Promo Bot, one of the robots veered off its path into a parking lot, where the Tesla, operating autonomously, collided with it. The crash caused significant damage to the robot, including its body, head, arm mechanism, and mobile platform.

Similarly, in an incident at the Shenzhen exhibition, a robot named Fatty broke a glass panel, causing significant damage. Such cases underscore the principle that damages caused to others must be addressed, as the primary goal of civil liability is to ensure compensation for harm.

In this context, "providing equivalent compensation" emerges as another viable solution. This means that when a robot causes destruction, the most common form of compensation involves replacing the destroyed property with an equivalent item. If the damaged property is a *mithli* (fungible item), an equivalent item is provided. If it is *qimi* (non-fungible), the monetary value is paid.

The concept of equivalent compensation can be divided into two forms:

a. Monetary Compensation

When the damaged property caused by a robot's harmful act is *qimi*, compensation is made by paying its monetary value. Articles 311, 328, and 331 of the Civil Code support this approach.

b. Provision of Equivalent Property

When the damaged property is *mithli*, compensation is made by providing an equivalent item.

Before elaborating on these methods, it is worth noting that for *itlaf* (destruction) to be established, there must be a direct causal relationship between the act and the damage, as recognized by customary norms. It should be evident that the destruction naturally or typically results from the specific act. Furthermore, in *itlaf*, a direct causal link between the perpetrator's act and the damage suffices, and negligence is not a required condition.

5. Conclusion

The interaction between jurisprudence and technology is not limited to the examination of technology by jurisprudence; rather, a reciprocal relationship has emerged. Jurisprudence cannot isolate itself from technology, and the spheres of their interaction have

developed to a point where jurisprudence utilizes technology as a tool. The proposition of granting legal personality to artificial intelligence (AI) systems (robots) is one approach to managing their activities. However, this idea has limited support among Western jurists and has not been incorporated into their laws or judicial practices, nor has it been included in regional or international conventions.

In Iran, Clause (m) of Article 2 of the Electronic Commerce Law, which appears to recognize legal personality for systems, is not defensible and has not been accepted by legal scholars. While AI possesses the scientific and jurisprudential foundations necessary for legal personality, the general legal principles related to the status and attributes of legal persons cannot be fully applied to AI due to its unique characteristics. Challenges such as describing capacity for legal action, determining domicile, nationality, and assets, make such an application difficult. Assuming legal personality for AI—for example, in a single legislative provision—will not solve the problem but will create significant legal issues. Given the availability of alternative solutions, hasty innovation in legal frameworks could result in legal fragmentation.

The following conclusions can be drawn from the discussion:

1. Among the theories proposed for civil liability, the "Respect" theory stands out as the most comprehensive. It upholds the sanctity of human rights, property, and other rights, prohibiting any infringement upon them. Any transgression necessitates compensation for the damage caused. This principle can be understood in two ways:
 - Compensation for damages is an aspect of respect, meaning that if something is considered sacred, compensation must be mandatory if it is destroyed by another.
 - Respect and liability are interlinked; respecting property means that any unauthorized use or infringement obliges the infringer to compensate for the damage.

While all civil liability theories face criticisms, the Respect theory is free from such issues and can be universally applied. Therefore, if a robot causes damage

to a person or their property, it can be held liable for failing to respect human rights and property. Additionally, all individuals involved in the creation of robots must prioritize respect for human dignity, privacy, and safety in their work.

2. The principles of "No Harm," *Itlaf* (destruction), and *Tasbib* (causation) are key arguments for establishing civil liability in robotic technology. The "No Harm" principle asserts that no decree causing harm has been legislated in religion, nor can it be. Thus, the claim that the principle cannot affirm liability is baseless. This principle applies to all harmful situations, whether explicitly addressed by the legislator or not.

Moreover, when legislators fail to enact necessary laws, causing harm to individuals and societal disruption, the harm can still be attributed to the legislative body. Thus, just as harmful legislation can be negated using the "No Harm" principle, the absence of necessary legislation can also be addressed through this principle.

3. Since production, employment, preservation of life, and continuity of generations are among the objectives of Islamic jurisprudence, replacing human labor with robots can disrupt these goals. As robots replace human jobs, the need for specialized human skills diminishes, potentially undermining academic and educational development and harming indicators of human development. Based on Article 40 of the Iranian Constitution, the removal of legal protections for human labor is a valid concern, suggesting that ownership rights over robots should be limited when they harm others' livelihoods.
4. Harmful actions by robots can be examined in two forms: absolute actions or misuse of ownership rights. Regarding ownership rights, owners of robotic technology cannot use their rights to harm others, as indicated by Article 40 of the Constitution, Article 132 of the Civil Code, and customary understandings.
5. Harmful omissions in robotic technology fall into two categories:
 - Omissions related to maintaining objects, where the owner or operator must exercise caution and supervise the robot during its operation. Failure to do

so, resulting in damage, places the owner or operator within the scope of liability.

- Omissions in caregiving duties, where a robot fails to adequately care for an individual, causing harm. In such cases, the robot is deemed responsible.
6. Protecting victims is a fundamental goal of civil liability. When harm occurs, the responsible party must compensate for the damage, adhering to principles of restitution. This means restoring the victim to their pre-damage state. This principle includes addressing supplementary damages to ensure complete restitution.
 7. Compensation in robotic technology can be achieved through several methods:
 - Robot liability insurance can support responsible parties in compensating for damages.
 - Payment of *diya* or *arsh* (Islamic compensation for bodily harm) may be applicable in specific cases. If these are insufficient, the "No Harm" principle allows victims to seek additional compensation from the responsible party.
 - Equivalent compensation, either in kind or monetary, can address damages. For fungible items, compensation must be made with an identical item; for non-fungible items, the value must be paid.
 8. Robots, by their nature, cannot independently bear responsibility for compensation due to their non-human status. Therefore, liability must be attributed to a human agent. Depending on the case, this responsibility may rest with the owner, operator, designer, or manufacturer of the robot. For damages caused by control system failures or design defects, liability would fall on the hacker, designer, or manufacturer, respectively.

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were observed.

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