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Challenges in Realizing Civil Liability in Robotic Technology

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ABSTRACT

The use of advanced technologies such as robots and artificial intelligence (AI) is rapidly expanding, and we are now witnessing the emergence of autonomous robots that act independently of the will of their creators or stakeholders. This shift includes transformations in the understanding of criminal liability and innovative approaches to punishment. This article, written using a descriptive-analytical method, aims to examine and analyze some of the current challenges associated with highly sophisticated AI-enabled autonomous robots, as well as potential challenges that may arise in the future, particularly if AI and robotics are developed and utilized on a large scale. Based on interpretive evidence, it is concluded that if robots commit harmful actions or omissions, legal liability for compensating the damage arises. In such cases, the human agent controlling the robot is obligated to provide compensation under the "respect" theory. This means that, as robots lack legal or natural personhood and cannot independently bear responsibility for damages, the burden falls on humans. This underscores the necessity of considering ethical and legal dimensions in the design and use of robots. Furthermore, it highlights the need for appropriate legal frameworks to support users and ensure robots are under control. For example, in cases where robots cause harm to individuals or property, determining who should be held accountable can be challenging. Therefore, the development of clear and comprehensive laws in this field is essential to protect the rights of all parties and ensure social justice.

Keywords: *Civil liability, harm, technology, robotics, jurisprudence.*

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1. Introduction

Civil liability refers to a person's legal obligation to compensate for harm or damage caused to another person as a result of an act attributable to them. The source of this obligation may be the will and agreement of the obligor, referred to as voluntary or contractual liability, or it may be the law, which is classified as involuntary obligation or civil liability in the strict sense. In cases where a harmful act (or omission) occurs against another, the law obligates the perpetrator to compensate for the resulting damage. Thus, civil liability denotes an obligation imposed by law on a person to compensate for harm caused by a harmful act, independent of their will (Amid Zanjani, 2003; Haji Deh Abadi & et al., 2014).

From a jurisprudential perspective, the scope of civil liability encompasses various aspects: the expansion or contraction of its scope, based on a maximal or minimal interpretation of the concept or instances of harm, may have practical applications. Instances include the determination of liability in cases where the perpetrator of harm is not at fault, where proving fault is impossible, or where omissions result in harm. Civil liability is a significant topic in civil law, particularly due to the conflict of rights in an industrial, mechanized, and advanced society (Hekmat-Nia, 2010; Hosseini-Nejad, 2010).

It is evident from examining the obligations of individuals in social life that their actions, economically and otherwise, affect others, sometimes directly and sometimes indirectly, resulting in both benefits and harm. Additionally, with industrial and technological advancement, the correlation between acts and resulting harm has become increasingly distorted; for instance, a seemingly insignificant act can cause significant harm. This raises critical legal questions: What constitutes a harmful act? Can omissions result in liability? What kind of causal relationship is required between an act and the resulting harm for civil liability to arise?

Determining the liable party when multiple individuals contribute to harm and calculating the share of each party's liability are further issues. Islamic jurisprudence addresses most of these questions, and foundational principles such as La Dharar (no harm), Itlaf (destruction), Tasbib (causation), Ihsan (benevolence), and Ghoroor (deception) are particularly relevant.

As highlighted, civil liability is more prominent in industrial societies. The rapid growth of modern technologies, particularly advancements in artificial intelligence (AI) and robotics, is among the most significant developments. Robots are increasingly employed in industrial, military, service, and collaborative domains and exhibit the ability to interact socially with humans. This interaction introduces a dynamic of mutual benefits and harms, where the industrial nature of robotic technology renders these harms more sensitive and the potential for rights violations more significant compared to other contexts.

2. The Necessity of Accepting Criminal Liability for AI-Enabled Robots

Smart robots are inherently capable of committing crimes. Whether directly or indirectly, they can serve as tools for criminal activities. This necessitates addressing their regulation, emphasizing the importance of legislation for AI-enabled robots in light of these potential risks. Isaac Asimov outlined three laws governing robotics:

1. A robot may not harm a human being or, through inaction, allow a human being to come to harm.
2. A robot must obey the orders given to it by humans, except where such orders conflict with the First Law.
3. A robot must protect its existence as long as such protection does not conflict with the First or Second Law.

These rules, referred to as technological principles guiding robotic performance, delineate the scope of robots' actions and responsibilities, which will be discussed further.

2.1. Free Will as the Basis of Criminal Liability

Free will is undoubtedly a cornerstone of criminal liability. It can be defined as the unique human capacity to exercise control over one's behavior, essential for moral responsibility. Criminal law scholars traditionally assert conditions for attributing responsibility to an individual:

1. The commission of a criminal act must stem from the conscious will of the perpetrator.
2. The criminal act, performed intentionally or due to recklessness, must demonstrate the perpetrator's malicious intent or negligence.
3. A causal relationship between the act and the crime committed must exist, as recognized by criminal justice.

In simple terms, criminal liability has two prerequisites: a material element (voluntary act) and a mental element (intent, awareness, or negligence) (Nobahar, 2017).

Given that AI operates autonomously, exhibits free will, and controls its actions, it is feasible to hold it accountable for crimes it commits. Accordingly, any entity, whether a natural person, legal person, or electronic agent, that acts with free will and without coercion, causing harm through a criminal act, must be held responsible. Consequently, robots, as entities capable of causing harm, may be criminalized and

introduced as new subjects of criminal law. However, attributing criminal liability to robots does not absolve other individuals involved, such as programmers, users, or manufacturing companies, who may bear liability based on their roles in the crime.

2.2. AI-Enabled Robots as Tools for Crime

Under the principle of vicarious liability, anyone tasked with supervising another's actions and failing to fulfill this duty may be held accountable if a crime is committed. Moreover, if a robot is used as a tool to commit a crime, it cannot be held criminally responsible, as it is merely an instrument. In such cases, the perpetrator using the robot remains liable.

However, when robots independently commit crimes, they may be held liable if they possess the technical capacity and intelligence to meet the conditions of criminal responsibility. This excludes simpler systems incapable of such actions, such as devices programmed solely to alert homeowners in case of a fire.

The focus of this study is on AI systems that meet the requirements for committing crimes. Legal principles evolve alongside scientific and technological advancements, and these changes are evident in liability arising from objects. With the emergence of autonomous entities such as robots and self-driving vehicles, which can independently make decisions, new legal challenges arise that require addressing their legal status, ownership, contracts, and liability in the digital age.

Future complexities associated with AI highlight the urgent need to explore the legal aspects of liability and responsibility, shedding light on current ambiguities and guiding solutions for future challenges.

3. Types of Harmful Acts in Robotic Technology

3.1. Absolute Positive Harmful Acts

A harmful act in robotic technology can occur in the form of a positive act, such as a robot destroying another person's property. Destruction is a positive act carried out by the robot, and society likewise regards it as the agent of that act. As noted, since robots operate in various domains and are capable of interacting with humans, this presence and interaction may sometimes cause a robot to perform an act that harms a person or their property. From this standpoint—where rights may be infringed upon—a robot can fall under the scope of liability.

For instance, the Fatty robot at the 2016 China Technology Exhibition lost control and injured a person while also breaking a glass pane. Or consider the 2008 case of an American woman suffering from endometriosis who underwent robot-assisted surgery; ten days post-operation, physicians discovered a tear in the patient's colon and rectum. Surgeons and the manufacturers of the Da Vinci surgical robot examined all possible causes for this tear, yet they did not find any specific error in the surgery. However, according to new investigations, the Da Vinci robot was the cause. Another example is the death of a 49-year-old woman in the United States due to a collision with a self-driving Uber vehicle. These and similar incidents—easily found through a brief search of news reports—illustrate instances of harm inflicted by a robot in the form of a direct, positive act.

3.2. Harmful Acts Resulting from Abuse of Rights

By abuse of rights, we mean exercising a recognized right in a manner that harms another person under the guise of using one's legitimate right. Sometimes a harmful act stems from this abuse of rights, meaning the perpetrator inflicts harm in the course of exercising their right. In such scenarios, we must examine whether this harmful conduct—given that no one may inflict harm on another person while exercising their own rights—leads to liability, or if, because the act is ostensibly legitimate, the perpetrator is exempt from civil liability. To answer this question, one must first determine the criterion for distinguishing between the valid exercise of a right and its abuse. Accordingly, we will continue this discussion in two parts:

First: The exercise of a right that necessarily causes harm to another. In this situation, the right cannot be exercised without harming someone else. Its holder can only benefit from that right by committing a harmful act. One example is the right of retention in Article 377 of the Civil Code. Under this provision, the holder of this right—such as a seller in a contract of sale—can only exercise it by preventing the buyer from using their property. Another example is the right of retribution (*qisas*), the enforcement of which inevitably deprives the convicted individual of a body part or of life. In all such cases, where exercising a right inevitably requires causing harm to

another person, any resulting harm is not compensable provided it does not exceed customary limits.

Second: The exercise of a right that does not necessarily cause harm to another. In most cases, exercising a right does not harm someone else, and the right-holder can exercise their right without causing damage to others. However, if the right-holder exploits their right in such a way that harms someone else, does this conduct subject the right-holder to liability?

In Iranian law, the abuse of rights has always been prohibited. The legal history of Islam and the foundation of the *La Dharar* (no harm) principle indicate that, within this religious and legal system, a right-holder has never been free to harm others. Observance of the *La Dharar* principle has prevented the right-holder or owner from acting in their property without regard for others' rights. The Civil Code explicitly bans the misuse of property rights in relations between neighbors. Pursuant to Article 132 of the Civil Code, if an individual exceeds conventional limits or the standard of a reasonable person, or if they deliberately seek to harm their neighbor, they are barred from making such use of their own property.

From the rationale of this provision, one can infer a general principle: a person must not commit a fault (*taqseer*) while exercising their right, otherwise they will be liable. Most explicit is Article 40 of the Constitution, which states: "No one may use the exercise of their rights as a means to harm others or to infringe upon the public interest."

Consequently, no one may abuse their right, and if they do, they are liable. There is general agreement among experts on this point. However, the key question, and one that is disputed, concerns the extent and criterion for determining when a right-holder has abused their right. Article 40 of the Constitution does not provide a specific legal criterion, but the final part of Article 132 of the Civil Code deems harmful uses that are customary for meeting a need or preventing harm permissible. While some interpret this provision to mean that property rights are not absolute and see it as a limitation on the principle of property-right absoluteness, it must be noted that the principle of absolute ownership concerns the owner's freedom from being forcibly prevented by others or compelled by force to act with respect to their property. It does not imply that an owner can engage in any harmful conduct to others.

It appears that one can derive, from Article 132 of the Civil Code, the underlying rationale for rights: the cited article restricts an owner's permissible use to conventional, beneficial uses—that is, for meeting needs or gaining a profit and preventing harm. Society, by considering the rationale behind each right, the benefit the right-holder obtains, and the potential harm to others, distinguishes between what is considered acceptable and unacceptable use. After all, in rational custom, every right exists for a particular purpose, and the right-holder must remain within the scope of that purpose. Whenever the right-holder acts beyond that fundamental rationale, causing significant or intolerable harm to another, the act is customarily deemed an abuse of rights that imposes liability. However, this rationale may not always be easily verifiable, since the underlying purpose of every right has not been fully delineated.

Although many criteria—such as intent to harm, exceeding the social purpose of the right, or lacking a legitimate interest in exercising the right—have been suggested to identify abuse, it seems that the most comprehensive guideline is the customary (*'urfi*) assessment of abuse when the right is exercised. This is because each of the previously mentioned criteria may be valid in some cases but not in others, while the customary standard would apply to all instances of abuse of rights and be consistent with reality.

With these clarifications, abuse of the right to own a robot in the context of employment can be considered an example of a positive harmful act in robotic technology. Sometimes, in accordance with the aforementioned standard for abuse of rights, a robot owner exercises their right of ownership over the robot. For example, they deploy several robots in a factory and then dismiss all the workers, thereby causing them various forms of harm discussed in the previous chapter. However, the owner of the robot cannot proceed in such a way, since that would be an abuse of ownership power, harming others. In such cases, the owner's right should be restricted because the right of the community takes precedence over that of the individual. One way to limit the owner's right is to employ the method of *tanqih manat* (refining the rationale) and appeal to the consensus of rational people (*bana-ye 'oqala*).

Refining the rationale means definitively identifying the legislative basis of a rule from the words of a religious or legal authority. It is a method that allows a jurist to

extract the lawmaker's intent from a text (*nass*) and then apply it to a new situation lacking a specific textual ruling, provided the same basis clearly applies. If the lawgiver stated the rule for one case and also the reason, but then also described some qualities that evidently do not impact that ruling, the jurist, by discarding those inconsequential qualities, can arrive at the true rationale and extend that rationale to other similar cases not explicitly covered.

In light of Article 40 of the Constitution—which is invoked to establish that one should not abuse the right of ownership—one may, by refining the rationale, conclude that a robot owner cannot exploit the absolute aspect of their property right to harm others. While the owner is free to use their property, here, replacing human workers with robots inflicts harm by causing unemployment. According to the basic rationale of this article, the owner's right becomes restricted, preventing them from such a use. Furthermore, by disregarding the "neighborly" context in Article 132 of the Civil Code, one may similarly determine that the owner's unlimited freedom to use robotic technology must be curtailed when it results in others losing their jobs.

On the other hand, there is no doubt that the consensus and customary assumptions of rational people prohibit abusing a right, regardless of its specific instance. Robotic technology experts also acknowledge this. In a lecture at a scientific progress conference, Professor Moshe Vardi stated that humans need to work, and having a job is an essential aspect of human life. He added that to prevent robots from dominating human life in the future and to ensure proper use of these machines, relevant studies and necessary investments must begin now. Otherwise, in about 25 years we could face a massive social upheaval with dire consequences, possibly leading to the death of millions, akin to historical revolutions.

Likewise, Erik Brynjolfsson, an MIT economist, and Andrew McAfee—both pioneers of automation—maintain that replacing labor with machines is not a minor issue. Whenever labor faces automation, short- or long-term technological unemployment is an inevitable outcome. Even the most beneficial innovations produce adverse consequences that must be managed.

A potential objection here is that one of the conditions for the authority (*hojjiyyat*) of a consensus-based rational practice is that it be confirmed or endorsed by the lawgiver and not rejected by them. However, robotic technology—our topic—did not exist at the lawgiver's time, making it impossible to prove that the lawgiver explicitly approved or did not oppose the consensus of rational people in this area. In other words, rational consensus, by itself, lacks *hojjiyyat* (authority) unless supported by definitive evidence of its validity. Put differently, to serve as proof, the consensus must reveal reality, hence requiring the lawgiver's endorsement.

Some disagree, arguing that no human being will inherently oppose these foundational rational norms embedded in society and essential for social development. Should there be any hypothetical objection, that objection is inherently an acknowledgment of the very principle. This is akin to a person telling themselves to act contrary to what they know with certainty, which would simultaneously fulfill the first duty they set for themselves. You also observed in the discussion on "designation" (*wad'*) that the validity of designation and verbal indication is grounded in human nature and social order, and thus rational people have embraced it. Prohibiting such a practice does not make sense unless, by forbidding it, one essentially affirms it. Therefore, the consensus of rational people is intrinsically authoritative—like knowledge itself—and does not function as a middle term (*hadd-e wasat*) in an argument.

According to Allamah's viewpoint, one may infer that the customary practice of rational people is based on recognizing the virtue or vice (*husn wa qubh*) of an action. Thus, when rational people unanimously adopt a norm, it is because they regard it as virtuous. In Allamah's view, the existence of such a consensus confirms the lawgiver's approval, requiring no further demonstration of divine ratification; rather, the consensus of rational people has an intrinsic authority, much like certainty does. However, if Allamah believed that the rational consensus was by its nature authoritative and could not be rejected, how do we reconcile that with his position in the discussion on reliance upon trustworthy reports, where he contends that the lawgiver's silence or non-rejection is necessary for establishing their validity, even though reliance on trustworthy reports is considered a rational practice?

Having shown that rational consensus (*bana-ye 'oqala*) is not intrinsically authoritative, one must still provide definitive evidence of its acceptance. If there is a credible

textual source endorsing or approving a rational consensus, no question arises regarding its validity. However, in most cases—particularly in novel issues—it is impossible to find such textual evidence. In exploring foundational jurisprudential resources, one finds three main views concerning why the consensus of rational people may be valid:

1. **First View: Demonstration of Non-Rejection by the Lawgiver.** Most jurists argue that consensus of rational people is valid only if definitively confirmed and approved by the lawgiver. Accordingly, it is treated as a type of *shar'i* (religious) evidence, not purely rational evidence. They rely on the principle of the lawgiver's tacit or explicit endorsement: that is, if the Infallible (Ma'sum) remains silent and does not reject a rational consensus, such silence reveals acceptance. As Ayatollah Hakim notes, "The reason rational consensus requires the Infallible's endorsement is because it does not categorically reflect reality; hence, the lawgiver might have followed a different path, disapproving it. However, once the Infallible endorses it (or refrains from rejection), we gain certainty as to its validity."

Proving this agreement involves two stages: (a) showing that the relevant consensus existed during the Prophet's or an Imam's lifetime, and (b) establishing the lawgiver's subsequent approval of that consensus. Various methods are employed for each, such as evidence from historical records, the universality of certain widespread practices, or the principle that if the lawgiver had objected, it would have been documented and reached us.

2. **Second View: Non-Verification of Rejection Is Sufficient.** According to this view, it is unnecessary to confirm the lawgiver's non-rejection. Merely failing to establish a lawgiver's rejection is enough. Both views accept that the consensus of rational people has no intrinsic authority and depends on the lawgiver's approval; they differ in how that approval is revealed. Proponents of this second view go further than the first, assuming an inherent alignment between the lawgiver and the basic rational norms shaped by human social nature. They claim that it is not required to prove contemporaneity with the Infallible; rather, the lawgiver's default stance is concurrence with such rational norms.

Al-Muhaqqiq al-Isfahani writes: "For the methodological consensus of rational people to be authoritative, it suffices that no rejection by the lawgiver has been established. We do not need to verify, or prove non-objection by the lawgiver. After all, in terms of rational capacity, the lawgiver is among the rational people—indeed, their leader—and cannot ignore their interests and realities. Unless definite proof indicates the lawgiver's objection, one can assume the lawgiver's alignment with their view."

Imam Khomeini also supports this stance, saying: "The Prophet and the Imams were aware of future developments and realized what kinds of practices would prevail in society, particularly during the major occultation. If they disapproved of future rational practices, they had to forbid them in every era; yet they never did, thus confirming that rational consensus holds in all eras."

3. **Third View: Referring the Consensus in Question to a Rational Judgment.** According to this perspective, the consensus of rational people reveals a rational judgment. The consensus is merely a method to discover a rational verdict, which can then be tied to a religious ruling under the principle of the correlation between reason and religious law. Unlike the first two views, which find the legitimacy of consensus in the *Sunnah*, this view sees it arising from reason itself.

Martyr Sadr criticizes the second view, claiming that not all rational consensuses originate from inherent or logical necessity; some are shaped by other factors, such as emotional or external pressures. Similarly, this critique applies to the third view: not every rational consensus reflects the command of reason, since it can stem from shared interests, feelings, or forced conformity rather than any logical compulsion.

In conclusion, the need for the lawgiver's endorsement of rational consensus is widely accepted. However, it is not necessary for each and every new rational consensus to receive separate, explicit approval. Rather, a general endorsement of rational practices is sufficient. Put differently, while the Infallible is no longer present to weigh in on novel forms of consensus, the acceptance of rational consensus in broad terms still stands. Islam is an

eternal religion, and its lawgiver, being knowledgeable of societal developments until the Day of Judgment, must clarify opposition to any consensus that is in conflict with reality. We cannot suppose that the lawgiver has simply neglected to endorse or oppose emerging rational practices. Therefore, we assume that the lawgiver grants general endorsement of the rational nature embedded in humanity, barring explicit evidence of disapproval. Hence, one cannot differentiate between ancient and modern forms of consensus: in every era, science and other factors change, thereby transforming how these practices manifest. This logic applies equally to robotic technology.

3.3. Examination of Omission and Its Role in Generating Civil Liability

There is no doubt that civil liability arises when a person performs a positive harmful act. However, if someone fails to perform a required act, and this omission causes harm, can we say that not doing the act should be regarded as an act in itself?

It appears that in cases where the omission occurs during the performance of a positive act, and society deems the omission a definitive duty of the actor, not doing it is customarily considered a positive act. For example, if a surgeon anesthetizes a patient but then abandons the patient and refuses to proceed with the surgery, or if a driver causes an accident by failing to brake, thereby causing damage. In these instances, civil liability is established. This is because the person was in the process of doing something and could have prevented the harmful outcome by braking or continuing the medical procedure. Put differently, the harm is not attributed to the omission itself but rather to the positive act; even though the person could have prevented the effect of that act by taking another action and failed to do so. In other words, an omission within a positive act is beyond the scope of the present discussion because liability in such cases stems from the positive act, not from mere inaction.

On the other hand, if the harm results from an initial and absolute omission, does simply failing to perform an act qualify as a harmful act? For instance, if a hospital refuses to admit a patient, leading to the patient's death or the worsening of their condition, should the omission be considered a harmful act? One must observe that if the performance of that act—or refraining from omission—constitutes a definite legal or customary duty, then failing to perform it is a breach of that legal or customary duty. Such a failure is customarily regarded as a violation that obligates the violator to compensate for the harm. In addition, from a legal standpoint, the necessary means for performing the act must also be available to the person, so that not doing it is customarily considered a harmful act—for example, a hospital's refusal to admit a patient when, by law, the hospital is not permitted to do so.

4. Types of Omissions in Robotic Technology

4.1. Omission Stemming from the Obligation to Care for Objects and Animals

Caring for objects and animals that belong to a person or are used by them is that person's duty. The rationale behind this duty is to prevent harm to other individuals or their property by such objects or animals. Since care requires actual, external actions—indeed, multiple positive actions—failing to undertake those actions may cause harm and expose the individual to liability. Thus, omission in caring for objects and animals can constitute a basis for civil liability. In Iranian law, the duty of care is reflected under the principle of *tasbib* (causation), which may arise from either an act or an omission.

Omission in caring for an object or animal arises when one bears a duty grounded in profession, contract, or law. For example, the police have a duty to protect citizens, including an arrested suspect or another citizen threatened by a criminal who requests police assistance. Sometimes, the obligation is contractual; if the person entrusted with that duty neglects it and causes damage, they are contractually liable if the injured party is the other contracting party. However, if a third party is harmed, the liability arises under the principle of *tasbib*. For instance, a security guard hired to protect someone's property is contractually liable if they fail in that obligation and cause harm to the contracting party. Conversely, if someone is hired as a lifeguard at a swimming pool, tasked with rescuing potential drowning victims, and refuses to carry out this duty, that person is liable under *tasbib* with respect to an injured third party. A legally mandated duty of care can be found in Article 522 of the Islamic Penal Code (Islamic Penal Code, art. 522), which states: "Anyone who possesses an animal and is aware of the likelihood of it attacking, must take

precautions to safeguard others. If that animal causes harm due to the possessor's negligence, the possessor is liable." Article 334 of the Civil Code (Civil Code, art. 334) likewise provides: "Neither the owner nor the possessor of an animal is liable for damage caused by that animal unless they have failed to exercise due care in safeguarding it. However, if the animal's action results from someone else's conduct, that person is liable for the ensuing damage." (Ali et al., 2017)

Under Iranian law, liability arising from an animal is fault-based, and the injured party generally bears the burden of proving negligence by the animal's guardian. Such negligence includes knowing that the animal might attack and failing to prevent it. Determining negligence also depends on the type of animal, whether the owner knew it could be dangerous, and whether they failed to safeguard it. Unlike the laws of some countries, which focus on direct harm caused by the animal, Iranian law—relying on the broad principle of *tasbib*—holds the guardian liable for both direct and indirect damages if they were negligent. Thus, letting animals roam where people pass is deemed fault, and if the animal's presence makes a vehicular accident inevitable, the guardian (as the indirect cause) is responsible (Ghasemzadeh, 2008; Haji Deh Abadi & et al., 2014).

Article 334 of the Civil Code (Civil Code, art. 334) explicitly names both the owner and the possessor as parties liable if they are negligent in safeguarding the animal. Thus, mere ownership is insufficient for liability; in addition, the owner or possessor must have had a duty of care. Consequently, once this duty of care transfers to another party—for example, when animals are entrusted to a shepherd—the responsibility likewise transfers.

Since liability for harm caused by animals in Iranian law is based on *tasbib*—and negligence is the central criterion—responsibility falls upon the guardian. When ownership is separated from actual guardianship, the owner no longer has that duty and is therefore not liable. Regarding omission in caring for animals, jurists maintain that safeguarding a wild or unruly animal is obligatory; if one fails to do so, they are liable for all resulting harms. Jurists base these opinions on certain narrations concerning "grounds for liability."

"For instance, Imam Sadiq was asked about a camel from Khorasan that had gone into rut and, having become aggressive, escaped the house and killed a man. The victim's brother slaughtered that camel with a sword. The Imam said the owner of the camel owes the blood money (diyah) but may recover from the person who slaughtered the camel the monetary value of the camel." Likewise, similar narrations stipulate that if a restless camel kills someone, the owner is responsible for the blood money, while the individual who slaughtered the camel is responsible for the camel's monetary value (Rajabi, 2019).

All three narrations have sound (*sahih*) chains of transmission and are also relevant to the question of monitoring and supervising a robot's performance. Even though the narrations specifically mention a "Bakti" (a particular camel), one can apply the same rationale to analogous instances. No jurist has limited the ruling exclusively to that type of camel. Grand Ayatollah Sabzevari, presenting these examples more generally, states a broad principle: "Safeguarding anything whose lack of oversight could harm others, and whose care is under the owner's control—like a wild animal, an unruly camel, and so forth—is obligatory. If a person fails to exercise due care and harm occurs, that person is liable." Accordingly, if someone who uses a robot neglects oversight and management of the robot's activities, they may be held liable under these same narrations. This follows from the fact that relying on a robot's decision-making in human tasks remains a significant challenge for this technology. For example, an autonomous Uber car collided with and killed a 49-year-old woman in the United States. While these vehicles typically have a human monitor behind the wheel, they mostly drive themselves. In this specific incident, Arizona police stated that the car was operating without human control at the time of the crash. The driver, able to take control, failed to do so and was therefore negligent, resulting in liability (Bakhshi & Veisi, 2019).

Consider the highly advanced, humanoid PIBOT robot, designed with human-like limbs and capable of sitting in the pilot's seat to handle all phases of flight—taxiing, takeoff, cruising, and landing—using standard aircraft controls. Researchers at KAIST used an advanced flight simulator to verify the mechanical accuracy of PIBOT's limbs and ensure that its artificial intelligence operating system makes sound decisions. PIBOT can execute all necessary commands for flying, monitor real-time technical variables, and make intelligent decisions in critical situations. However, the lack of trust in robotic decision-making in human missions remains a serious

challenge. Consequently, someone must continuously supervise the robot. Failing to do so could amount to omission in caring for equipment. Should the robot fail to make a correct decision in an emergency—resulting in harm to passengers—liability is undoubtedly established.

4.2. *Omission Stemming from the Obligation to Care for Individuals*

In some instances, a person may be responsible for caring for someone else. As discussed, the basis of this duty can be a profession, a contract, or a legal obligation. Whenever someone is obligated to care for another person and neglects that duty, causing harm, that individual is unequivocally liable. A classic example in jurisprudential texts is the responsibility of a swimming instructor who fails to supervise a swimmer. The harm to the swimmer may result either from poor instruction or from the instructor's failure to supervise. If the harm arises from inadequate training, the instructor is liable, whether the swimmer is an adult or a minor. If, however, the harm results from insufficient supervision, several possibilities arise: the instructor may indeed be responsible for the swimmer's safety if circumstances imply that supervision was required; if, however, the swimmer was personally responsible for their own safety, the instructor bears no liability. For example, when an instructor takes students to a poolside during lessons and fails to supervise, any resulting harm to a child is the instructor's responsibility. By contrast, there is no such liability if the swimmers are adults.

Jurists note that if a person entrusts their child to a swimming instructor, and due to the instructor's negligence the child drowns, the instructor is liable. The rationale is that safeguarding an individual who cannot protect themselves is obligatory, and negligence in that regard entails liability. Some jurists limit this ruling to minors and do not impose it on adults, yet it seems untenable to differentiate between minors and adults if both require care.

A "nurse robot" exemplifies omission in caring for individuals. Although nursing is among the last professions to be replaced by robots, robotic aids can assist in monitoring, supervising, and supporting older adults, those with cognitive disorders, or those who have lost memory. Direct human contact is a fundamental aspect of caregiving and nursing; thus, replacing human staff with robots may remove human characteristics from caregiving tasks. On the other hand, robots can carry out automated care tasks, lighten assistants' responsibilities, enhance human caregiving, and support recovery processes. This would enable medical personnel to devote more time to diagnosis and better treatment options. Despite robots' capacity to improve mobility and the social inclusion of older or disabled persons, humans remain indispensable sources of care and social interaction and cannot be entirely replaced.

Still, a nurse robot may become subject to liability in cases of omission. For instance, the "Stevie" nurse robot provides automated control for tasks that do not require a nurse's direct intervention. Stevie can remind patients about their medication schedule or alert the appropriate individual if a patient requires medical attention—say, if a patient falls, Stevie contacts the nurse and, if necessary, calls an ambulance. Should Stevie fail to perform this function when required—resulting in greater harm to the patient due to delayed medication reminders, failure to contact a nurse in emergencies, and so on—liability would arise.

5. Causation

The final element in establishing civil liability is proving the causal relationship. Merely showing that the plaintiff has suffered damage and that the defendant (or those for whose acts the defendant is liable) has committed negligence or performed a harmful act does not by itself justify a claim for damages. Rather, it must be demonstrated that a causal relationship exists between the harmful act and the injury—meaning the injury arose from that act (see Barikloo, 2017). Some legal scholars assert that ascertaining the causal link between a harmful act and the injury is a delicate, predominantly philosophical issue rather than a purely legal one. The importance and nature of causation vary depending on the parties involved and the type of claimed liability. Therefore, a causal relationship between the harmful act and the injury is necessary for civil liability to arise.

Put simply, the injury must directly result from the harmful act, such that, if the harmful act had not occurred, the injury would likewise not have happened. The necessity of this link is self-evident, as conventional wisdom (*'urf*) and the practice of rational people (*bana-ye 'oqala*) only hold a person liable for damage arising from their own act. If there is no customary (or

recognized) causal connection between the injurious act and the resulting damage, the actor is not generally considered responsible for compensating that harm.

Before delving further, one must examine the standard of causation among existing viewpoints—although this was partly addressed in the previous chapter on *tasbib* (causation). It is crucial to note that the standard of causation aims solely to elucidate one of the elements of civil liability; thus, in examining this standard, one should not simultaneously look for the fulfillment of all conditions or the absence of all bars to civil liability. For example, the author of *Jame' al-Madarik* defines *tasbib* as "an act or omission that customarily serves as the means of destruction," yet he questions whether such conduct necessarily results in liability. He suggests that digging a well in one's own property is different from digging a well in a public thoroughfare and believes that we should ultimately be guided by the relevant narrations on *tasbib*. As is evident, he does not separate all the elements required for liability when discussing how *tasbib* is established.

Some jurists, in determining the standard for *tasbib*, sought a philosophical foundation (Allameh; Allameh & Qawa'id al-Ahkam fi Ma'rifat al-Halal). Others—such as Shaykh Tusi, Ibn Barraj, Muhaqqiq Na'ini, Martyr Sadr, and Muhaqqiq Bajnoordi—focus on the nature of what intervenes between the cause and the damage. Still others contend that customary attribution (*esnad-e 'urfi*) of the harm to the actor suffices, while another group finds searching for a universal standard futile and prefers to rely exclusively on *tasbib* narrations to identify instances of liability.

5.1. *Examining Customary Attribution and Its Relationship to Causation*

Previously, we noted the view of the author of *'Anawin* on determining the standard for *tasbib*: he maintained that liability stems solely from *itlaf* (direct destruction), measured by whether "it is customarily deemed destruction." It was also mentioned that proving a harmful act requires establishing this causal connection. In the same vein, we can say that by "customary attribution" of a harmful act to its agent, we mean that society, in its assessment, regards the harmful act as originating from that agent. Although a harmful act generally seems attributable to its perpetrator, in some circumstances the act is not recognized as belonging to that individual.

For instance, Article 1215 of the Civil Code states: "Whenever someone hands over property to a non-discerning minor or to an insane person, that minor or insane person is not liable for any damage or loss to such property." In this article, the non-discerning minor or the insane person is relieved of liability for the property entrusted to them because customarily the damage or loss is attributed to the individual who handed them the property, even though logically the damage could be traced to the act of the minor or insane person.

Similarly, if someone incites a non-discerning minor or an insane person to commit a harmful act, that act is customarily attributed to the inciter, even though physically carried out by the minor or the insane person. Or consider a collision in which two people or two objects collide—society deems both parties necessary for an accident, yet it normally attributes the incident to the careless party. On that basis, Article 335 of the Civil Code stipulates: "In the event of a collision between two ships, two trains, two automobiles, or the like, the party at fault—whether through intent or negligence—shall be liable. If both parties are at fault, both shall be liable."

From these examples, one can see that the relationship between "attribution" and "causation" follows a general-and-particular-absolute pattern. In other words, wherever a causal link exists, attribution also exists. However, in some cases there may be attribution without a genuine causal link. In the concurrence of causes—such as cause and direct actor (i.e., *mubasher*)—if the cause is stronger, even though the act may be attributed to both the cause and the direct actor, causation is established only with the stronger cause, not with the direct actor. Conversely, if the direct actor is stronger or if both play an equal role, the accident may be attributed to both, but causation is established only with the direct actor (Bakhshi & Veisi, 2019; Barikloo, 2006).

In the concurrence of multiple causes sequentially (*asbab-e toulī*), although the harmful act might be attributed to all of them, causation belongs exclusively to the cause whose effect precedes the others, while the cause whose effect is subsequent does not have a causal link.

Sometimes the causal link aligns closely with material attribution. For example, someone digs a hole, and a motorcycle falls in. In addition to the accident being

attributed to the digger, a causal link exists between the digger's act and the accident.

In other instances, the material attribution is such that it does not give rise to a causal link in the eyes of society. For example, if a vehicle traveling at excessive speed suddenly encounters a pedestrian who illegally emerges from an obscured location and then collides with that vehicle, leading to the pedestrian's death, there is a material connection with the driver's conduct. Yet society would not identify a causal link between the driver's speed and the accident.

Another example is where someone is carrying a container of oil and falls into a hole someone else dug, spilling the oil onto the street and making it slippery, causing a passerby to slip and get injured. Although the accident is materially attributable to the oil carrier, one cannot establish causation between the carrier's act and the accident. Rather, the causal link connects the digger's act (the one who made the hole) to the incident (Rajabi, 2019).

From the above, it follows that a customary connection or attribution between the act and the harm is what establishes liability, and this constitutes an essential element of the general rule of civil liability. It also becomes apparent that no concise, universal definition of causation exists, nor is there a precise criterion for identifying its instances. Societal judgment (*'urf*) often provides a path to ascertain causation.

For example, Article 493 of the Islamic Penal Code states: "A lapse of time between the offender's conduct and the resulting harm does not prevent the offense from occurring, such as death caused by transmitting a fatal disease, which may lead to *qisas* or *diyyah* (blood money), depending on the case." In other words, even though some time may have passed between the perpetrator's act and the resulting harm, society still recognizes a causal link between them.

5.2. *Determining the Liable Cause*

As noted, proving causation is challenging due to the absence of a specific legal standard. When there is only one possible cause, the issue may be straightforward. However, when multiple causes contribute to the harm, the matter grows complex. Several causes may exist simultaneously (i.e., *asbab-e 'arzi*) or sequentially (i.e., *asbab-e toulī*). In simultaneous causes, multiple concurrent factors lead to damage—for example, several vehicles colliding or two people jointly destroying property. In sequential causes, the factors operate in succession—for instance, digging a well and placing a stone inside it are two sequential causes.

The critical question is whether, when there are multiple causes, they are all liable or only some (or just one). How does one identify which cause is accountable? The responses to these questions differ. Some see no distinction between simultaneous and sequential causes and hold all causes liable in any scenario. Others rule that in simultaneous causes, all are liable, whereas with sequential causes only one cause bears responsibility.

As an example, consider cause and direct actor under Article 332 of the Civil Code: "Whenever one person creates the cause of destruction of property and another directly destroys that property, the direct actor is liable, not the cause—unless the cause is stronger such that customarily the destruction is attributed to it." Here, only one cause bears responsibility. However, under Article 335 of the same code, concerning collisions of ships, trains, or automobiles, if both parties are at fault, both are liable.

In 2013, the Islamic Penal Code introduced changes regarding sequential causes. Under the former law, if one person acted as the direct actor and another as the cause—one type of sequential cause—liability rested with the direct actor unless the cause was stronger. In multiple sequential causes, only the one whose effect preceded the other was liable, and the others were not. Under the new law, Article 526 of the Islamic Penal Code makes two modifications: (a) it allows the cause and the direct actor to share liability, and (b) it apportions liability according to the degree of each party's causal contribution.

Given the new Islamic Penal Code, Article 332 of the Civil Code must be interpreted to apply only to scenarios in which the damage is attributable exclusively to the direct actor or exclusively to the cause. Otherwise, if one's role is minor or negligible, that individual bears no liability. Accordingly, Article 531 of the Islamic Penal Code excludes from liability any vehicle in a collision whose movement was so minimal that it played no role in the incident.

Regarding multiple sequential causes, Article 535 of the Islamic Penal Code departs from the view that the earlier cause alone is liable if all the causes intended the criminal act. Instead, it deems all causes liable. Although

the final phrase of this article seems to focus on criminal matters, the key point is that there are circumstances where the statute recognizes a causal link connecting the harm to all causes.

This perspective aligns with the notion that "earlier in effect" (*aqdam fel-ta'thir*) is merely a presumption for identifying the stronger cause; in some situations, a later cause may be held liable if its connection to the harm has become stronger in society's view. The same logic clarifies the final part of Article 536 of the Islamic Penal Code. It does not matter why the second cause was deemed liable; what matters is that in some instances, custom recognizes that the second cause is more significant, establishing a stronger link with the harm or offense.

Jurists have also addressed identifying the liable cause. For example, 'Allamah Hilli wrote: "If one person digs a shallow well, and another deepens it (after which someone falls and …), it is possible that the first person is liable. One might also argue that both the digger and the person who deepened it are liable." Fakhr al-Muhaqqiqin and the author of *Kanz al-Fawa'id* believe that liability extends to both because the single cause arises from the acts of both parties. Muhaqqiq Ardabili, the author of *Jawahir*, and Imam Khomeini propose three possibilities: (1) only the first person (the digger) is liable; (2) only the second person (the deepener) is liable; or (3) both share liability.

Fadel Hindi explains that the rationale for shared liability is that the injury results from a single cause to which both contributed, because the reason for the loss is falling into a deeper well (one dug it, another deepened it). The author of *Jawahir*, however, rejects Fadel Hindi's argument as a "customary simplification" that does not suffice to establish liability. He then adds that if both parties participated in initially digging the well, regarding them as a single cause would be apt.

Some scholars maintain that the scenario the jurists are analyzing should not be viewed as one involving multiple causes. In multiple causes, each factor independently meets the definition of a cause, regardless of the existence of the other. For example, if a well is dug and a knife is placed inside it, without the well, a person would not fall onto the knife, and without the knife, the person, even if they fell, would not be harmed. By contrast, in the instance of deepening the well, the second act merely completes the first cause; absent the original well, there is no concept of deepening. Society does not regard this as two separate causes. Rather, it sees the harm as caused by falling into a well, and no one typically asks who removed the first shovelful of dirt; society considers both actions jointly responsible for creating the single cause of the harm.

6. Conclusion

One of the key and significant issues in this field is the civil liability of robots when errors or mistakes occur in their performance. Since robots cannot independently assume legal responsibility, identifying the human agent liable for such errors is of immense importance. This study, employing a descriptive-analytical approach, examines the foundations of civil liability and the conditions necessary for establishing it in robot operations.

In recent years, robotic technology has become deeply embedded in human life, and its role across various fields is rapidly expanding. These advances require formulating laws and regulations to govern the behavior and functions of robots. On one hand, it is imperative to ensure that robots operate safely and remain under human control. On the other hand, it is crucial to recognize that the effectiveness and efficiency of robots depend on thorough knowledge of the jurisprudential and legal issues associated with their operation.

Ultimately, these discussions guide us in anticipating a future in which robots play a major role, helping prevent potential problems. As robotic technology continues to proliferate in everyday life, it will become an unavoidable necessity to enact legal provisions addressing civil and criminal liability for robot performance. Such measures not only secure public safety and welfare but also promote the responsible and sustainable development of robotic technology.

Authors' Contributions

Authors contributed equally to this article.

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