The Infinite
An International Peer Reviewed / Refereed Journal of Multidisciplinary Research

An Online Peer Reviewed / Refereed Journal
Volume 2 | Issue 5 | May 2025
ISSN: 3048-9539 (Online)
Website: www.theinfinite.in

Evolving Standards of Duty of Care: A Critical Analysis of Negligence in the Age of AI and Automation

Dr. Ajay Kumar Singh

Associate Professor

Department of Law, K.S. Saket P.G. College, Ayodhya

ARTICLE DETAILS

Research Paper

Keywords :

Duty, Negligence, Tort, Liability.

ABSTRACT

Negligence, a cornerstone of tort law, is traditionally understood as the failure to exercise the standard of care that a reasonably prudent person would have exercised in a similar situation. It is fundamentally grounded in human conduct and interaction, assessed through the well-established elements of duty of care, breach of that duty, causation, and actual damage or harm. The legal framework is designed to hold individuals or entities accountable when their actions—or omissions—fall short of what society expects in terms of reasonable care.However, the digital revolution and the rise of Artificial Intelligence (AI) and autonomous systems have profoundly disrupted this classical understanding. AI-powered tools now perform tasks ranging from driving vehicles and diagnosing illnesses to making financial decisions and predicting consumer behavior. These systems operate with increasing autonomy, often making decisions without direct human intervention. As a result, new legal questions are emerging: Who is responsible when AI causes harm? Can a machine owe a duty of care? What standard of care should apply to an algorithm that continuously learns and evolves?These questions expose the limitations of the traditional negligence framework. The law assumes a conscious, decision-making agent behind every action—a premise that doesn't easily accommodate the complexities of AI. Further complications arise

due to the opacity of many AI systems, often referred to as the "black box" problem, which makes it difficult to trace decision-making processes or assign fault with clarity. Moreover, the diffusion of responsibility in the development and deployment of AI systems—spanning software developers, hardware manufacturers, users, and data providers—challenges the idea of a singular negligent party.This paper critically analyzes the challenges AI poses to the foundational doctrines of negligence, with a particular focus on the duty of care and breach in automated contexts. It highlights the gaps and ambiguities in current legal frameworks in handling such cases, especially in common law jurisdictions like India, the UK, and the US. It also examines comparative approaches, including emerging legal standards in the European Union, where efforts are being made to craft new regulatory frameworks addressing AI liability.

Through the lens of case studies, such as accidents involving autonomous vehicles, medical malpractice involving AI diagnostic tools, and algorithmic bias in employment or credit decisions, this research delves into the complexities of attributing legal responsibility in an AI-driven world. Finally, the paper proposes a set of legal and regulatory reforms, advocating for a hybrid liability model, adoption of "reasonable algorithm" standards, and mandatory algorithmic transparency to ensure accountability, compensation, and deterrence.In doing so, the paper contributes to the urgent discourse on how tort law, particularly the law of negligence, must evolve in response to technological advances, ensuring that justice and legal certainty are preserved in the face of emerging challenges.

1. Introduction

Negligence, as a foundational doctrine of tort law, encapsulates the idea that individuals and entities must act with a level of care that a reasonable person would exercise under similar circumstances. This legal standard has evolved through centuries of jurisprudence and is rooted in human experience, judgment, and foreseeability. Courts have traditionally examined negligence by scrutinizing the behavior of

individuals—doctors, drivers, manufacturers, employers—through the lens of established norms and societal expectations.However, the rise of Artificial Intelligence (AI) and autonomous systems has introduced an unprecedented transformation in the landscape of human interaction and liability. No longer confined to science fiction, AI technologies are now embedded in daily life—self-driving vehicles navigate public roads, AI-powered diagnostic tools assist in complex medical decisions, and algorithmic systems influence financial, educational, and employment outcomes. These systems are not merely tools guided by human command; many possess the capacity for machine learning, enabling them to adapt, evolve, and make decisions in real-time based on data inputs.

This evolution calls into question the very foundation upon which negligence law is built. The legal concept of a "reasonable person" assumes cognitive intention, foreseeability of harm, and accountability—elements that become blurred when the actor is not human but a non-sentient algorithm. For example, when an autonomous vehicle causes an accident, can the AI system itself be considered negligent? Or should liability rest with the manufacturer, the software developer, the user, or perhaps a combination of parties?Furthermore, AI systems operate with opacity and complexity—their decision-making processes are often difficult to interpret or predict, even for their creators. This "black box" nature complicates the task of identifying whether a breach of duty occurred, how causation should be assessed, and whether harm was foreseeable in the traditional legal sense. It also raises the issue of distributed responsibility, since AI systems are typically developed, trained, and maintained by multiple actors across different jurisdictions and sectors.

This technological shift necessitates a reimagining of the concept of duty of care. Courts and lawmakers must now grapple with whether a duty can be imputed to machines, or whether legal responsibility should instead rest on those who design, deploy, and profit from such technologies. The standard of care may need to evolve from the "reasonable person" to the "reasonable algorithm"—a standard that reflects industry norms, technical limitations, and regulatory guidelines applicable to intelligent systems.In sum, while negligence law remains a vital tool for ensuring accountability and compensation, it must be adapted to the realities of a technologically complex society. As AI systems become more autonomous and influential, the legal system must evolve to maintain the balance between innovation, public safety, and justice.

2. The Traditional Framework of Negligence

Under common law, to successfully establish a claim for negligence, the claimant must satisfy four key elements: duty of care, breach of duty, causation, and damage. These principles are the bedrock of tort law, designed to hold individuals or entities accountable for failing to exercise reasonable care, thereby preventing harm to others. However, the advent of AI-powered decision-making systems challenges these principles, as decisions are increasingly made by machines rather than humans. Let's explore how these core elements of negligence are impacted by AI systems:

2.1. Duty of Care:

In the landmark case of Donoghue v. Stevenson (1932), the duty of care was established as an obligation to avoid acts or omissions that could foreseeably cause harm to others. The principle of foreseeability is central to the duty of care, as it allows the law to hold individuals responsible for harms they could have anticipated. This principle works well when the actor is human, as humans are presumed to have the capacity for foresight, reasoning, and intent. However, the question arises: Can a machine or algorithm owe a duty of care? In many cases, AI systems, such as self-driving cars or medical diagnostic algorithms, operate autonomously and without human oversight. If a self-driving car causes an accident, who is responsible? Is it the vehicle's AI system, the manufacturer, the software developer, or the user? Furthermore, AI systems can make decisions based on vast datasets, which may contain hidden biases or errors that are not immediately apparent. Therefore, determining whether a duty of care exists in the context of AI systems requires a new approach, possibly expanding the scope of responsibility to include those who design and deploy such systems.

2.2. Breach of Duty:

The breach of duty is evaluated by comparing the defendant's conduct to that of a "reasonable person"—a hypothetical standard that reflects what society expects in terms of reasonable care. In human contexts, this is an intuitive comparison: Would a reasonable person in a similar situation have acted differently? The problem, however, arises when the actor is an AI system. AI systems, unlike humans, do not have subjective awareness or common sense. Their actions are driven by algorithms that rely on data and patterns. A self-driving car may make decisions that seem entirely reasonable within its programming and the data it has been given, but these decisions could be deemed negligent if they result in harm. The question becomes: What standard of care should be applied to AI? Should it be assessed by comparing it to a "reasonable algorithm" or the best practices within the industry? Additionally, AI systems may evolve

over time through machine learning, potentially altering their behavior in unpredictable ways, which further complicates the idea of breach.

2.3. Causation:

In negligence law, causation is a critical element. To establish causation, a claimant must demonstrate that the defendant's breach of duty directly caused the harm. Causation is typically assessed in two parts: factual causation (the "but for" test) and legal causation (often defined by proximity or remoteness). In cases involving AI, factual causation can be difficult to establish. If an AI system's decision leads to harm, tracing the exact cause can be complicated. Did the harm occur because of a flaw in the AI's programming, the data it was trained on, or the human decisions involved in deploying the AI system? Additionally, legal causation—determining whether the AI's actions were foreseeable and within the scope of duty—becomes even more complex. AI systems operate in environments with multiple variables, and their learning algorithms can evolve in unpredictable ways. As a result, remoteness becomes a challenge: Can a developer be held legally responsible for an unforeseeable outcome resulting from an autonomous AI system's decision?

2.4. Damage:

Finally, damage in negligence cases requires the claimant to prove that actual harm occurred as a result of the defendant's actions. In cases involving AI, the type of damage caused may vary significantly from traditional negligence cases. For instance, an AI decision might result in physical harm (e.g., a car accident involving a self-driving vehicle), financial loss (e.g., algorithmic errors leading to stock market crashes), or non-physical harm (e.g., reputational damage due to biased algorithmic decisions). Additionally, AI systems might cause indirect damage that is not immediately apparent, such as exacerbating inequality or perpetuating discrimination through biased decision-making. These novel forms of damage challenge the existing frameworks for compensation and justice, requiring the law to develop new standards for quantifying and redressing harm caused by AI.

In sum, while the traditional doctrines of negligence—duty of care, breach, causation, and damage—have provided a solid foundation for accountability in human conduct, they are facing significant challenges in the context of AI systems. AI's autonomy, learning capabilities, and unpredictability raise fundamental questions about how these principles should be applied. Traditional concepts of foreseeability, reasonable conduct, and human agency are increasingly at odds with the reality of autonomous, data-driven decision-making. As AI systems become more integrated into society, rethinking the legal standards for negligence

will be essential to ensure that justice is served, and that victims of harm caused by AI are adequately compensated. Future legal frameworks must evolve to address the unique characteristics of AI while maintaining the core principles of negligence law.

3. Automation and the Duty of Care

AI systems increasingly perform functions once controlled by humans. The law must determine how negligence applies in these new contexts:

(a) Autonomous Vehicles

- Self-driving cars, controlled by AI, raise liability questions in case of accidents.
- If a crash occurs, is the manufacturer liable for faulty design, or is it the software developer for algorithmic errors?
- Example: Uber's self-driving car accident (2018) where the car killed a pedestrian despite a human supervisor being present.

(b) Medical AI Systems

- AI diagnostic tools are now assisting in identifying diseases like cancer.
- If a wrong diagnosis leads to harm, is the hospital liable for relying on AI, or the developer for flawed algorithms?
- Raises issues of informed consent and standard of care.

(c) Algorithmic Bias and Discrimination

- AI used in recruitment, credit scoring, or law enforcement can discriminate based on biased data.
- The harm caused by such decisions may not be easily attributable to a single human agent.

4. Legal Challenges and Emerging Jurisprudence

AI introduces complexities such as:

- **Opacity ("black box")**: AI decision-making is often non-transparent, complicating legal assessments of breach and causation.
- **Shared Responsibility**: Multiple parties (developers, users, manufacturers) are involved in the design and use of AI systems.
- **Lack of Mens Rea**: Traditional tort principles rely on human intention or negligence. AI lacks consciousness.

Courts have begun recognizing these challenges:

- U.S. courts in product liability claims related to AI often apply strict liability principles.
- In the EU, new proposals attempt to assign presumptive fault to producers in AI-related harms.

5. Comparative Legal Analysis

(a) United States

- Courts use tort law and product liability frameworks.
- The Restatement (Third) of Torts applies, but lacks specific AI provisions.

(b) European Union

- Proposed **AI Liability Directive** and **Product Liability Directive** (2021) shift the burden of proof to producers in certain AI contexts.
- EU also envisions mandatory insurance for high-risk AI systems.

(c) India

- India lacks dedicated AI liability laws.
- Tort claims involving AI would fall under general negligence, consumer protection, or product liability principles.
- Given India's digital push, the legal gap is notable and requires urgent attention.

6. Rethinking the Reasonable Person Standard

The "reasonable person" is a legal fiction used to assess breach of duty. When AI replaces human decision-making, courts must consider:

- Should the "reasonable algorithm" standard replace the human standard?
- How should courts measure foreseeability or prudence in AI actions?
- Could AI be judged by industry standards or by regulatory benchmarks?

Legal scholars suggest evolving the standard to incorporate technical expectations, transparency, and accountability norms in AI systems.

7. The Way Forward: Recommendations for Legal Reform

- **Legal Definitions of AI Liability**: Clear definitions and duties for AI developers, users, and manufacturers.

- **Mandatory Insurance**: Inspired by motor vehicle laws, to compensate victims of AI errors.
- **Algorithmic Audits**: Mandated audits to assess transparency and bias in AI systems.
- **Statutory Standards of Care**: Legislating standards for various AI applications (e.g., medical, automotive).

8. Conclusion

As Artificial Intelligence (AI) and automation continue to revolutionize nearly every facet of society, from transportation to healthcare and financial services, the law of negligence—historically grounded in human conduct—finds itself at a crossroads. The traditional legal framework, which revolves around human decision-making and responsibility, is now confronted with the complexities of autonomous systems that can function independently, learn from vast datasets, and make decisions without direct human intervention. These innovations necessitate a critical reinterpretation of the core principles of negligence law: duty of care, breach of duty, causation, and damage.

The concept of a duty of care has long been fundamental to the law of negligence. It establishes that a person must act in a way that avoids foreseeable harm to others. The foreseeability of harm has traditionally been assessed from a human perspective, considering what a "reasonable person" would anticipate. But when decisions are made by AI or machine learning systems, the concept of foreseeability becomes much more complex. AI systems, especially those that are autonomous and evolve through machine learning, operate without human oversight in many cases, learning from data and continuously adjusting their actions based on patterns that may not be immediately comprehensible. Who, then, owes the duty of care? Is it the developer of the AI, the entity deploying the system, or the machine itself? As AI becomes more integrated into critical sectors like healthcare, transport, and finance, the traditional understanding of who bears responsibility for harm becomes less clear. Moreover, as autonomous systems are given greater autonomy, the need for a redefined duty of care becomes even more pressing.

In human-centric negligence law, the breach of duty is measured by comparing the defendant’s actions to that of a "reasonable person" acting in the same circumstances. This standard assumes a level of human judgment and cognitive capability that is inherently absent in AI systems. A machine or algorithm, by contrast, operates on predefined rules or learned patterns from vast datasets. The question of whether a breach has occurred is complicated because machines do not act from intentional decision-making or reasoning—they simply follow programmed instructions or learned behaviors based on algorithms. For instance, in the case of a self-driving car that causes an accident, the breach of duty might not be the result

of poor judgment or negligence by a human driver, but a flaw in the AI's decision-making process or an unforeseen failure in its programming or data input. How, then, should the legal system assess whether the breach occurred? Should a machine's actions be compared to a "reasonable algorithm," based on industry standards and best practices, or is there a need for a new, more flexible standard that can account for the evolving nature of AI?

The principle of causation in negligence law requires that the breach of duty directly causes the harm suffered by the claimant. Traditionally, causation has been assessed through two lenses: factual causation (i.e., "but for" the defendant's action, the harm would not have occurred) and legal causation (which looks at whether the harm was foreseeable and within the scope of duty). In the context of AI, determining factual causation becomes increasingly difficult. If an AI-driven system malfunctions or causes harm—such as a self-driving car involved in a collision or an algorithmic decision that results in unfair discrimination—the "but for" test is complicated. Was it the fault of the AI's design, the data it was trained on, or the system it interacted with? Given that AI often operates in an opaque, "black-box" fashion, tracing the exact cause of harm can be a challenge. In addition, legal causation becomes problematic because AI systems often operate in complex, dynamic environments where the outcome may be shaped by multiple factors that were not foreseeable at the time the AI was deployed.

Finally, the element of damage requires actual harm to have occurred, and it must be directly linked to the breach of duty. In traditional negligence cases, the harm is usually physical injury, financial loss, or reputational damage. However, with AI systems, the forms of harm can be far more diverse. AI-driven decisions might cause financial ruin, personal injury, or psychological harm, but the damage could also be indirect, such as the erosion of privacy through AI-powered surveillance or biased decision-making in hiring algorithms. Furthermore, the harm could be difficult to quantify, as AI systems often impact large numbers of people, creating a multifaceted ripple effect. For example, an algorithm used to predict loan eligibility may unfairly discriminate against certain racial or socio-economic groups, causing systemic damage that is not immediately obvious but becomes apparent only over time. The legal system must evolve to properly assess and compensate these new and complex forms of harm, ensuring that victims are adequately redressed.

If the principles of negligence law are not updated, society risks leaving victims of AI-related harm without proper recourse, while innovators and technology developers could face ambiguous and unpredictable liability. A failure to adapt would stifle innovation, as companies might be deterred from developing or deploying new technologies due to the fear of unmanageable legal risks. On the other hand,

without robust legal frameworks, victims could struggle to prove fault and obtain compensation for harm caused by AI systems.

Thus, a balanced approach is essential. Reform must ensure that the law provides clear guidelines for liability, allowing for the accountability of AI systems while still fostering technological advancement. Legal frameworks must take into account the autonomous nature of AI and the specific challenges it presents, while continuing to prioritize justice and fairness for all stakeholders. Potential reforms could involve creating new standards of care specifically tailored to AI systems, establishing clearer guidelines for determining causation in AI-driven harm, and introducing liability caps or insurance schemes for emerging technologies to mitigate risks. Additionally, regulatory bodies could play an essential role in ensuring that AI technologies are developed and deployed in ways that do not compromise public safety or violate basic human rights.

Ultimately, AI and automation hold the promise of immense benefits, but without careful legal rethinking and reform, the law of negligence risks becoming obsolete. The legal system must evolve to protect citizens from harm while encouraging the responsible innovation that will shape the future.

References

1. Donoghue v. Stevenson [1932] AC 562
2. Caparo Industries plc v. Dickman [1990] 2 AC 605
3. Nettleship v. Weston [1971] 2 QB 691
4. R.K. Bangia, *Law of Torts*, Allahabad Law Agency, 2023 Edition
5. Winfield and Jolowicz, *Tort Law*, 20th Edition, Sweet & Maxwell, 2020
6. European Commission, *Proposal for an Artificial Intelligence Act*, COM(2021) 206 final
7. European Commission, *AI Liability Directive Proposal*, 2022
8. Restatement (Third) of Torts: Liability for Physical and Emotional Harm, American Law Institute
9. Susan Leigh Star, "Power, Technology and the Phenomenology of Standards," *Information Society*, 14(3), 1998
10. M. Taddeo & L. Floridi, "How AI Can Be a Force for Good," *Science*, Vol. 361, Issue 6404, 2018
11. S.G. Gilles, "The Invisible Hand of Compensation," *Virginia Law Review*, Vol. 86, No. 6, 2000
12. European Parliamentary Research Service, "Civil Liability Regime for AI," PE 654.178, 2020

13. Bryant Walker Smith, "Automated Vehicles Are Probably Legal in the United States," *Stanford Law Review Online*, 2014
14. Matthew U. Scherer, "Regulating Artificial Intelligence Systems," *Harvard Journal of Law & Technology*, Vol. 29, No. 2, 2016
15. Woodrow Barfield, *The Law of Artificial Intelligence and Smart Machines*, ABA Publishing, 2018
16. John Kingston, "Artificial Intelligence and Legal Liability," *Law, Innovation and Technology*, Vol. 10, No. 2, 2018
17. NITI Aayog, *National Strategy for Artificial Intelligence*, Government of India, 2018
18. Justice B.N. Srikrishna Committee Report on Data Protection, Government of India, 2018
19. Arvind Narayanan et al., "Big Data and Discrimination," *Privacy Law Scholars Conference*, 2014
20. UNESCO, *Recommendation on the Ethics of Artificial Intelligence*, 2021