
NAVIGATING LEGAL LIABILITY IN AI-DRIVEN SECTORS

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ABSTRACT

Existing legal frameworks are finding it difficult to handle the special challenges posed by artificial intelligence (AI) as it becomes more integrated into critical industries like finance, healthcare, and transportation. Legal and ethical ambiguities arise from the "black box" nature of AI systems, where decisions are hard to track down and explain, involve multiple parties, and have unpredictable results. The fact that conventional liability laws were not created to address the subtleties of AI's autonomous and data-driven decision-making further complicates this problem.

The report examines new liability concerns and possible fixes in a number of important areas. The need for distinct accountability boundaries is highlighted by the move in autonomous vehicles from manufacturer-only liability to include software developers and third-party service providers. Concerns regarding algorithmic bias, patient safety, and the challenge of enforcing moral principles on systems devoid of personhood or abstract thought are all brought up by the application of AI in healthcare. The speed and scale of AI pose risks to the financial industry and algorithmic trading, which depends on massive datasets, may cause market volatility and privacy issues.

Numerous solutions are being contemplated to tackle these issues. These include giving AI systems legal personhood, enacting strict liability or required insurance plans, and modifying the current fault-based liability regimes to include new regulations for AI technology manufacturers and operators. A balanced strategy that fosters accountability, transparency, and human oversight without impeding innovation is also emphasized in the document. To guarantee that the technology is used in a way that benefits the public while maintaining justice, safety, and trust, a strong legal framework for AI ultimately necessitates an interdisciplinary effort.

Introduction

Artificial Intelligence (AI) is a growing field that has greatly improved our lives in many ways. It helps a wide variety of users, including students and professionals, by meeting different needs. AI systems depend on data from individuals and other sources to work properly.

However, using this data can affect people's legal rights and privacy. The existing principles of liability are generally capable of working unfairness to one party or another and may leave a gap in legal responsibility.¹ The old rules were not written with the subtleties of AI decision-making in mind, particularly in systems that become more autonomous and less transparent, commonly known as the "black box" issue. As accountability becomes harder to trace, the issue of ascertaining liability when AI systems fail or make harmful decisions becomes increasingly urgent.

Scholars have even suggested the legal recognition of AI systems as entities with a status similar to corporate personhood, whereas regulatory agencies are taking major strides towards harmonizing AI regulation through instruments like the pending AI Act. This shifting landscape requires a balanced approach that maintains transparency, accountability, and human oversight, while neither overregulating nor inhibiting innovation.

Ultimately, the creation of a good and moral legal framework for AI involves acknowledging its huge potential, but without compromising its deployment as per public interest and inherent rights.²

AI Liability in Key Sectors

With increasing embedding of AI across industries, sector-specific regulatory and legal issues are arising. Sectors such as transportation, healthcare, or finance poses distinctive risks, stakeholders, and liability issues. It is important to understand the behavior and limitations of AI in these areas in order to develop effective and fair law. The subsequent sections discuss

¹ Mohammad Bashayreh, Fadi N. Sibai & Amer Tabbara, 'Artificial intelligence and legal liability: towards an international approach of proportional liability based on risk sharing', 30 Information & Communications Technology Law 169 (2021).

² Mohammad Bashayreh, Fadi N. Sibai & Amer Tabbara, 'Artificial intelligence and legal liability: towards an international approach of proportional liability based on risk sharing', 30 Information & Communications Technology Law 169 (2021).

the developing framework of AI liability in three essential sectors: autonomous vehicles, healthcare, and financial services.

AI Liability in Autonomous Vehicles

Autonomous vehicles (AVs) represent a convergence of advanced technologies, with Artificial Intelligence (AI) serving as the cornerstone.³ AVs offer comfort-based services with vision of reduced traffic accidents and safety-oriented experiences. They use an array of sensors such as LiDAR, radar, cameras, and ultrasonic sensors to collect data about their surroundings.⁴ Such systems are trained based on driving instructions and guidelines but there is no regulatory or statutory framework imposing any liability for defects or malfunction.

Securing AV systems against such threats is imperative to prevent malicious exploitation that could endanger passengers and others.⁵ It is important to maintain public trust and credibility for incorporating AI in the transportation system. Unlike traditional systems where liability was limited to manufacturers only, the use of AVs brings liability for software developers, or even third-party service providers. This highlights the need for clearly defined liability boundaries to avoid ambiguity regarding accountability.

There are other suggestions to define legal status and also address ethical concerns like moral responsibility, transparency, privacy and algorithmic bias.⁶ Designs for redundancy and fail-safe systems need to be emphasized to reduce the risks from individual component failures. The inclusion of Explainable AI (XAI) is also crucial as it strengthens user trust, facilitates regulatory compliance, and allows proper post-incident analysis. Since self-driving cars are likely to bring huge waves in the labor market, it is essential that policies be devised to facilitate workforce retraining and build strong social safety nets.

Additionally, tapping into new technologies like quantum computing may open up new horizons for AV system optimization and data processing. In the end, solving the regulatory,

³ AI-Driven Autonomous Vehicles: Safety, Ethics, and Regulatory Challenges', 1 Journal of Science, Technology and Engineering Research 18 (2024).

⁴ AI-Driven Autonomous Vehicles: Safety, Ethics, and Regulatory Challenges', 1 Journal of Science, Technology and Engineering Research 18 (2024).

⁵ AI-Driven Autonomous Vehicles: Safety, Ethics, and Regulatory Challenges', 1 Journal of Science, Technology and Engineering Research 18 (2024).

⁶ AI-Driven Autonomous Vehicles: Safety, Ethics, and Regulatory Challenges', 1 Journal of Science, Technology and Engineering Research 18 (2024).

ethical, and technological issues in this area will involve a concerted, interdisciplinarian effort based on innovation, robust governance structures, and open society values.

With AI increasingly driving key industries such as transport, healthcare, and finance, conventional liability models find it difficult to keep up. The black box nature of AI systems, multiple actors' involvement, and unpredictable results lead to legal and ethical ambiguities. This section delves into nascent liability issues and mooted solutions in autonomous vehicles, healthcare, and algorithmic trading with the objective of encouraging responsible and accountable uses of AI across sectors.

Beyond mobility, AI's impact on critical sectors like healthcare raises unique ethical and legal questions, particularly where patient safety and algorithmic transparency intersect.

AI and Healthcare

It is currently unclear how current liability regimes will consider AI harm in healthcare.⁷ With use of AI, lack of legal penalties and defined responsibilities determining machine behaviour can significantly reduce accountability and public trust. Such problems provide scope for defects and malfunction which can endanger patient's well-being.

High ethical and legal standards conformed by healthcare professionals may not be abided judiciously by AI as it is driven by database and biased algorithms. Lack of abstract thought and absence of personhood with black box nature of these algorithms reduce transparency in procedural process and its necessary unpredictability⁸ makes it impossible for particular party to act to prevent harm.

To achieve responsible and fair integration of AI systems into healthcare, legal regulation should assume a key position in rendering legal certainty and directing AI development.⁹ Courts should be granted the authority to apportion liability in proportion to disclosures of fact, particularly considering that many AI systems are complex and opaque.

⁷ Bottomley D and Thaldar D, 'Liability for harm caused by AI in healthcare: an overview of the core legal concepts', 14 *Frontiers in Pharmacology* 1297353 (2023).

⁸ Bottomley D and Thaldar D, 'Liability for harm caused by AI in healthcare: an overview of the core legal concepts', 14 *Frontiers in Pharmacology* 1297353 (2023).

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Applying principal–agent liability principles to cover AI systems under the purview of healthcare professionals can help to ensure accountability, although it would have to be combined with well-defined guidance and support. Current consumer protection legislation is likely to fail to cover AI-related risks, particularly when there are interconnected systems involved, making it extremely difficult to attribute fault. Strict liability might grant victims a more accessible route for compensation, but there need to be adequate safeguards against incurring excessive reputational and economic damage on stakeholders.

Reconciliation-based mechanisms, funded by stakeholders, might serve to reconcile these interests. Lastly, embracing reconciliation-based mechanisms in regulatory sandboxes presents a promising alternative to the adversarial legal process, encouraging mutual learning, equity, and confidence. This model warrants increased scholarly and policy attention to facilitate the ethical and efficient use of AI in healthcare.¹⁰

While healthcare raises ethical and personal concerns in AI use, the financial sector presents risks tied to speed, scale, and market stability. The next section examines how AI in finance challenges traditional accountability and regulatory structures.

AI and Finance and Algorithmic Trading

Artificial Intelligence (AI) has become central to the functioning of modern financial systems, especially in areas like algorithmic trading, fraud detection, and risk management. However, its increasing use presents several legal, ethical, and regulatory challenges.

AI systems tend to act in a black box manner programmers specify goals, but the algorithm figures out how to satisfy them. This renders decisions hard to follow or explain. Regulators have a problem both of crafting rules for such systems (*ex ante*) and allocating liability in case of harm (*ex post*), given that intent is difficult to establish.¹¹

AI relies on big data, so it is susceptible to bad or biased data. The same algorithmic reactions can trigger market feedback loops and instability. Past data does not accurately represent future

¹⁰ Bottomley D and Thaldar D, ‘Liability for harm caused by AI in healthcare: an overview of the core legal concepts’, 14 *Frontiers in Pharmacology* 1297353 (2023).

¹¹ Gina-Gail S. Fletcher and Michelle M. Le, ‘The Future of AI Accountability in the Financial Markets’, 24 *Vanderbilt Journal of Entertainment and Technology Law* 289 (2022).

conditions, creating results that are not accurate. The continuous need for data also poses privacy and ethical issues.¹²

Regulators and institutions need to take a multidisciplinary approach to responding to the challenges from AI in finance and algo trading. Severely punitive enforcement measures remain crucial deterrents against abuse. Encouraging explainable AI (XAI) addresses the black box problem by making algorithmic decisions more intelligible, thereby improving regulatory confidence and user trust. Further, imposing data quality controls and privacy-friendly practices is required to avoid biased results and feedback loops in unstable markets. Combined, these measures form a solid approach to responsibly incorporating AI into financial systems.

Building Legal Frameworks for AI

As Artificial Intelligence technology advances and enters into essential sectors, the current legal frameworks find it hard to deal with the specific challenges it poses. The traditional doctrines of fault, liability, and personhood are becoming less sufficient in regulating autonomous and data-oriented technologies. In addressing the loopholes, scholars and policymakers have advanced various solutions that reshape legal frameworks to adapt to the special risks that come with AI.

There are some policy-driven (*lege ferenda*) solutions including reviewing the existing legal framework, lawmakers could decide to ascribe legal personhood to modern AI, thus giving it rights and a corresponding set of duties.

Moreover, strict regimes of liability might be the most appropriate way to guarantee compensation, particularly for technology operators such as AI-controlled robots that present greater dangers to third parties in public (non-private) areas.

Such could also be applied effectively together with mandatory liability insurance schemes. Establishing a compulsory fault-based insurance scheme regarding AI could allow a victim to be easily indemnified in most cases, but the issues discussed above would subsequently remain

¹² Gina-Gail S. Fletcher and Michelle M. Le, 'The Future of AI Accountability in the Financial Markets', 24 Vanderbilt Journal of Entertainment and Technology Law 289 (2022).

for insurers attempting to allocate liability between their respective policyholders.¹³

There are some *legal-lata* solutions to incorporate AI liability for addressing legal and ethical concerns with the usage. Adapting current fault-based liability regimes should be contemplated, simply by enhancing the negligence principles with supplementary rules that will set a predetermined acceptable level of care, applicable to producers and operators of emerging technologies.¹⁴

The operators should comply with duties concerning choice of technology, monitoring and maintenance along with safety checks and repairs; while the producers cannot escape the liability but comply and design, describe and monitor market product before and after circulation. Moreover, the producers should be required to include mandatory backdoors (“emergency brakes by design), shut-down capabilities, or features allowing operators or users to shut down the AI or make it “unintelligent” at the press of a button.

The existence of solidarity rules helps in understanding the dilemma because there are many people involved, and digital technologies are highly connected and rely on outside input, it's often hard to tell if the damage was caused by one single factor or by a mix of different causes.¹⁵ It can clarify ground on Joint Liability in Unclear Cases which applies when parties work together commercially, technically, or knowingly in wrongdoing. It also includes the principles of Proportional Liability. It also provides the option of recourse among tortfeasors to recover the fair share from others, unless they acted as a unified group.

Conclusion and Future of AI Liability

As Artificial Intelligence becomes more deeply integrated into critical sectors such as transportation, healthcare, finance, and beyond the need for a robust, adaptable legal framework becomes increasingly urgent.

While current legal principles can be partially adapted through enhanced negligence standards and sector-specific guidelines, they must be supported by forward-looking policy innovations.

¹³ Pina D’Agostino, Carole Piovesan & Aviv Gaon, *Leading Legal Disruption: Artificial Intelligence and a Toolkit for Lawyers and the Law*, (Thomson Reuters Canada, 2020).

¹⁴ Rachum-Twaig, in EU Report 16–17 (n 7), p. 32.

¹⁵ European Commission, EU Report No. 109 22 (Publications Office of the European Union, 2023).

The future of AI liability rests on an interdisciplinary approach that blends legal reform, technological transparency, ethical safeguards, and international cooperation. Only by anticipating the evolving nature of AI and fostering a balance between innovation and regulation can societies ensure that AI serves public interest while upholding justice, safety, and trust.