

Artificial intelligence and law: Regulatory challenges, liability, and human rights in the digital age

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Abstract---This article examines the legal challenges that artificial intelligence poses to modern legal systems through a three-dimensional analytical approach encompassing (i) the legal and regulatory framework, (ii) legal liability, and (iii) ethical considerations and human rights. The study highlights that traditional legislation is no longer capable of adequately accommodating the novel legal realities generated by intelligent systems, particularly those associated with relatively autonomous automated decision-making. The article further discusses the difficulties of attributing civil and criminal liability for harm caused by artificial intelligence, as well as the risks posed by algorithmic bias and a lack of transparency. It concludes by underscoring the need to adopt an integrated and adaptable legal framework that strikes an appropriate balance between fostering innovation and safeguarding fundamental rights and freedoms.

Keywords---Artificial intelligence, law, legal liability, algorithmic bias, transparency, human rights, legal regulation, automated decision making.

Introduction

In recent decades, the world has witnessed an unprecedented technological revolution, and artificial intelligence (AI) has become a driving force of change across diverse economic, social, and legal domains.¹ Advances in machine learning techniques and the analysis of big data have enabled intelligent systems to make relatively autonomous decisions and perform functions previously regarded as the

¹ Stuart Russell and Peter Norvig, *Artificial Intelligence: A Modern Approach*, 4th ed. (Pearson, 2021).

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exclusive province of human beings, including the legal processing of data, the preparation of assessments, and decision-making.²

The introduction of artificial intelligence into the legal field raises serious questions about the suitability of traditional legislation, which was initially designed to address direct human conduct. The challenges extend beyond mere technological use to encompass issues of legal liability for harm, the ethical limits of automated decision-making, and fundamental human rights such as equality, transparency, and the right to defence.

Moreover, the rapid expansion of artificial intelligence into sensitive sectors such as the judiciary, security, and financial and health services underscores the need to regulate its use through clear legal frameworks that balance protecting rights and freedoms with encouraging innovation. The legislature thus faces the challenge of reconciling the pace of technological development with the slowness of the conventional legislative process. This disparity creates a legal vacuum that threatens the rule of law and necessitates the development of flexible, effective legislative strategies.³

Accordingly, the central problem of this study is encapsulated in the following question: To what extent can the law, with its traditional principles and rules, accommodate the challenges posed by artificial intelligence and regulate its use in a manner that protects rights and freedoms and ensures the rule of law?

This article aims to examine this problem through three principal axes—the legal and regulatory framework, legal liability, and ethical considerations and human rights—while proposing practical solutions and recommendations for addressing these challenges in light of contemporary international experiences.

Axis One: Legal and Regulatory Challenges of Artificial Intelligence

The accelerated development of artificial intelligence technologies has produced a new legal reality that compels legislators to reconsider the traditional rules governing human conduct. As an instrument of social regulation, the law today confronts a new, nonhuman actor capable of analysis, decision-making, and influencing individuals' legal positions. This raises fundamental questions about the extent to which the current legal framework is fit to accommodate these transformations and about the limits of its effectiveness in regulating the use of artificial intelligence and ensuring that it does not deviate from the aims of justice and the rule of law.⁴

First: The Inadequacy of Traditional Legislation in the Face of Technological Development

Most existing legal rules were formulated within a traditional context that assumes that the actor is a human being and that the legal decision emanates from that person through a conscious will that can be questioned and held accountable.⁵ This conception rests on classical notions such as capacity, intent, fault, and personal liability. However, artificial intelligence, particularly self-learning systems (machine learning), has developed the ability to process vast datasets and make relatively autonomous decisions without direct human intervention at every stage.⁶

This transformation places existing legal texts in a genuine predicament, as they become unable to interpret or characterise the facts resulting from complex automated decisions that cannot readily be attributed to a specific human act. Civil law, for example, links liability to the existence of fault attributable to a natural or legal person. In contrast, in the case of artificial intelligence, determining the source of a fault with precision is difficult.⁷

² Luciano Floridi et al., "AI4People—An Ethical Framework for a Good AI Society," *Minds and Machines* 28 (2018).

³ Ugo Pagallo, "When Machines Decide: Responsibility and Liability in AI," *Philosophy & Technology* 31 (2018).

⁴ Stuart Russell and Peter Norvig, *Artificial Intelligence: A Modern Approach*, 4th ed. (Pearson, 2021).

⁵ H. L. A. Hart, *The Concept of Law* (Oxford University Press, 2012).

⁶ Ugo Pagallo, "The Impact of Artificial Intelligence on Law: Legal Uncertainty and Regulatory Challenges," *Harvard Journal of Law & Technology* 33, no. 2 (2020): 455–482.

⁷ Bert-Jaap Koops, "Responsibility for Autonomous Systems," *International Review of Law, Computers & Technology* 34 (2020).

Several doctrinal and legal studies have confirmed that the absence of specific legislation regulating artificial intelligence creates a serious legal vacuum, allowing these technologies to be used in sensitive fields such as the judiciary, security, and economy without precise controls or effective oversight.⁸ This, in turn, poses a potential threat to fundamental rights, particularly the rights to equality, a fair trial, and the protection of personal data.⁹

Second, the Difficulty of Reconciling Regulatory Requirements with the Imperative of Innovation

Achieving a balance between the need to regulate artificial intelligence and the promotion of technological innovation is among the most significant challenges confronting contemporary legislators. On the one hand, the use of artificial intelligence in sensitive fields such as the judiciary, health, security, and economy necessitates subjecting it to a stringent legal framework that protects fundamental rights and freedoms and prevents arbitrariness or misuse.¹⁰

On the other hand, excessive regulation may slow innovation and deprive societies of the substantial benefits these technologies offer.

The difficulty lies in the fact that artificial intelligence is characterised by dynamism and continuous development, whereas legal rules are often marked by relative rigidity and slow amendment. This temporal divergence between technological development and legislative response creates two opposing risks:

- the risk of delayed regulation, which leaves a legal vacuum; and
- the risk of overregulation, which constrains research and development.¹¹

A strand of legal scholarship has argued for moving beyond the traditional legislative approach and relying on flexible regulatory mechanisms, such as soft law guidelines, codes of conduct, and technical standards, rather than limiting regulation to punitive legal provisions.¹² This approach is better suited to the nature of artificial intelligence, as it allows for continuous adaptation to technical developments without undermining the core of legal protection.

In this context, the European experience is regarded as a prominent model. In the draft EU Artificial Intelligence Act (EU AI Act), the European legislature has sought to adopt a risk-based approach, under which high-risk applications are subject to strict regulation. In contrast, low-risk applications are afforded a broader margin for innovation.¹³ This model aims to achieve a precise equilibrium between ensuring legal certainty, on the one hand, and encouraging innovation and investment, on the other.

Accordingly, the real challenge lies not in regulating artificial intelligence per se but in how such regulation is designed and in the extent to which it can be anticipatory and flexible without becoming an obstacle to scientific and technological progress.

Axis Two: The Challenges of Legal Liability in the Age of Artificial Intelligence

The system of legal liability constitutes one of the fundamental pillars of law, as it is the mechanism that ensures reparation for harm, achieves deterrence, and protects rights. However, the integration of artificial intelligence into a wide range of human activities and the autonomous capacities it possesses for analysis and decision-making have generated new legal situations that traditional legislators do not envisage. In light of this reality, it has become necessary to re-examine the classical concepts of liability, both civil and criminal, and to assess their capacity to accommodate harms arising from intelligent systems that operate with a degree of autonomy.

⁸ European Commission, “Artificial Intelligence and Liability,” White Paper (2020).

⁹ Sandra Wachter, Brent Mittelstadt, and Luciano Floridi, “Why a Right to Explanation of Automated Decision-Making Does Not Exist,” *International Data Privacy Law* 7, no. 2 (2017).

¹⁰ Luciano Floridi et al., “AI4People—An Ethical Framework for a Good AI Society,” *Minds and Machines* 28 (2018).

¹¹ Roger Brownsword, “Law, Technology and Society: Reimagining the Regulatory Environment,” *Oxford Journal of Legal Studies* (2019).

¹² Kenneth W. Abbott and Duncan Snidal, “Hard and Soft Law in International Governance,” *International Organisation* 54, no. 3 (2000).

¹³ European Commission, *Proposal for a Regulation Laying Down Harmonised Rules on Artificial Intelligence (AI Act)* (2021).

First: The Problem of Attributing Civil Liability for Harm Caused by Artificial Intelligence

Civil liability in its traditional form rests upon specific constituent elements: fault, damage, and the causal link. However, applying these elements to intelligent systems raises complex practical and theoretical difficulties, particularly in self-learning systems, whose behaviours and decisions evolve.¹⁴

In many cases, harm does not result from direct human faults but rather from complex interactions among algorithms, data, and the operating environment. This makes the attribution of a fault to a particular person, such as the system's programmer or its user, a matter of extensive doctrinal controversy.¹⁵ Moreover, the notion of fault, as a deviation from the conduct of the reasonable person, loses its traditional meaning when the actor is a nonhuman system. In response to this difficulty, legal scholars have proposed several solutions, including the following:

- adopting strict liability on the basis solely of the occurrence of harm, without the need to prove fault;¹⁶
- treating artificial intelligence as an instrument, such that liability for its acts is attributed to its custodian or operator; or
- establishing a specific legal regime for liability relating to artificial intelligence that takes into account its degree of autonomy and its level of risk.

The European legislature has adopted an approach close to this position by calling for the modernisation of civil liability rules that ensure the protection of injured parties without imposing upon them an insurmountable burden of proof.¹⁷

Second: Limits of Criminal Liability in the Face of Artificial Intelligence

If civil liability raises technical difficulties, criminal liability presents deeper problems that touch the very core of criminal theory. Criminal liability rests, in addition to the material element, on the mental element represented by intent or criminal fault, which presupposes the existence of a conscious and informed will.¹⁸ However, artificial intelligence remains a technical entity that lacks perception and consciousness, and it is not possible to presume criminal intent on its part. This renders the notion of holding it criminally liable inapplicable under current legal concepts. Nevertheless, practical reality shows that artificial intelligence is used to commit serious criminal acts, such as deepfakes, automated fraud, market and data manipulation, and large-scale privacy violations.¹⁹

In this context, the prevailing view is that criminal liability should be borne by the natural or legal persons responsible for developing or deploying these systems, where their knowledge or gross negligence is established. A strand of scholarship likewise calls for the introduction of aggravated circumstances when an offense is committed using intelligent systems, in view of the heightened risk and the wide dissemination of harm that they enable.²⁰

Accordingly, artificial intelligence is not regarded as a criminal actor but rather as a contemporary instrument of crime, which requires the updating of criminal policy and the methods of criminalisation and punishment in a manner commensurate with this technological transformation.

Axis Three: Ethical Challenges and Human Rights in the Age of Artificial Intelligence

The effects of artificial intelligence have not been confined to purely technical or legal aspects; they have also raised profound ethical issues that implicate the substance of human rights and the principles of a state governed by the rule of law. The reliance on intelligent systems to make decisions that directly affect individuals across domains such as justice, employment, security, and public services raises serious concerns about bias, discrimination, transparency, and respect for human dignity.

¹⁴ Ugo Pagallo, "When Machines Decide: Responsibility and Liability in AI," *Philosophy & Technology* 31 (2018).

¹⁵ Bert-Jaap Koops, "The Trouble with European Liability Law and Artificial Intelligence," *European Journal of Risk Regulation* 10 (2019).

¹⁶ Mark Geistfeld, "Strict Liability for Artificial Intelligence," *Columbia Law Review* 119 (2019).

¹⁷ European Commission, *White Paper on Artificial Intelligence—A European Approach to Excellence and Trust* (2020).

¹⁸ George P. Fletcher, *Rethinking Criminal Law* (Oxford University Press, 2000).

¹⁹ Susan W. Brenner, "Law in an Era of Smart Machines," *Oxford Journal of Legal Studies* (2014).

²⁰ Gabriel Hallevy, "The Criminal Liability of Artificial Intelligence Entities," *Akron Intellectual Property Journal* 4 (2010).

Accordingly, the integration of artificial intelligence into the legal order remains contingent upon the extent of its adherence to universal ethical values and to the fundamental guarantees of human rights.

Section One: Algorithmic Bias and the Principle of Equality before the Law

The principle of equality and nondiscrimination constitutes one of the fundamental constitutional and rights-based pillars of modern legal systems. However, the use of artificial intelligence, which is primarily based on big data analysis, may entrench new forms of indirect discrimination.²¹

Algorithms do not operate in a vacuum; instead, they rely on historical data that may be tainted by social, economic, or racial biases. When such data are used to train intelligent systems, the outcomes may reflect and reproduce the same biases, particularly in sensitive fields such as employment, loan granting, crime prediction, or judicial risk assessment.²²

Legal studies have shown that specific intelligent systems used in criminal justice tend to classify certain groups as posing greater risk without an adequate objective basis, thereby constituting an apparent infringement of the principle of equality before the law.²³ The greater danger lies in the fact that such discrimination is often invisible, given the complexity of algorithms and the difficulty of understanding their internal logic.

Accordingly, addressing algorithmic bias requires imposing stringent legal obligations on developers and users of artificial intelligence systems, including ensuring data quality, conducting periodic tests to detect discrimination, and subjecting these systems to judicial and administrative oversight.²⁴

Second: The Problem of Transparency and the Human Right to an Explanation of Automated Decisions

In addition to bias, transparency is among the most serious ethical challenges associated with artificial intelligence. Many intelligent systems operate according to what is known as the "black box" model (black box), in which it is difficult or sometimes impossible to determine how the system arrives at a particular decision.²⁵

This situation runs counter to fundamental legal principles, foremost the right of defence, the right to challenge decisions, and the principle that judicial judgements and administrative decisions must be reasoned.

Genuine justice cannot be envisaged if an individual is unable to understand the grounds upon which a decision affecting his or her rights has been made. Hence, contemporary scholarship has introduced the concept of the "right to an explanation of automated decisions" as a natural extension of traditional procedural rights.²⁶

European legislation has accorded particular importance to this matter, especially within the framework of the General Data Protection Regulation (GDPR), which enshrined the principle of transparency and restricted automated decisions that produce serious legal effects without meaningful human intervention.²⁷ This approach constitutes a fundamental step towards strengthening trust in the use of artificial intelligence and ensuring that it remains subject to the requirements of a state governed by the rule of law.

Accordingly, entrenching transparency does not constitute an obstacle to innovation; rather, it is an essential condition of legitimacy and a safeguard for respect for human dignity in the age of automated decision-making.

²¹ Solon Barocas and Andrew D. Selbst, "Big Data's Disparate Impact," *California Law Review* 104 (2016).

²² Cathy O'Neil, *Weapons of Math Destruction* (Crown Publishing, 2016).

²³ Julia Angwin et al., "Machine Bias," *ProPublica* (2016).

²⁴ Brent Mittelstadt et al., "The Ethics of Algorithms," *Big Data & Society* 3 (2016).

²⁵ Frank Pasquale, *The Black Box Society* (Harvard University Press, 2015).

²⁶ Sandra Wachter, Brent Mittelstadt, and Luciano Floridi, "Why a Right to Explanation of Automated Decision-Making Does Not Exist," *International Data Privacy Law* 7, no. 2 (2017).

²⁷ European Union, *General Data Protection Regulation (GDPR), Regulation (EU) 2016/679*.

Conclusion

This article concludes that artificial intelligence is no longer merely a neutral technical tool; instead, it has become an influential actor within the legal and institutional architecture of the modern state. The analysis has shown that traditional legal systems, founded on the assumption of direct human conduct, face genuine difficulties in accommodating automated decisions and the resulting legal effects that impinge upon fundamental rights and freedoms.

The study further demonstrates that the challenges posed by artificial intelligence are distributed across three interrelated levels: a legislative and regulatory level marked by inadequacies and a legal vacuum; a level concerning civil and criminal legal liability; and an ethical and rights-based level affecting the principles of equality, transparency, and human dignity. This renders engagement with artificial intelligence a quintessentially legal matter, no less significant than its technical dimension.

A. Findings

1. The inability of traditional legislation to keep pace with the rapid development of artificial intelligence technologies.
2. The insufficiency of existing rules of civil and criminal liability to address harms arising from intelligent systems.
3. The existence of real risks the principle of equality due to algorithmic bias and the opacity of automated decisions.
4. The need to redefine certain classical legal concepts, such as fault, intent, and the legal actor.
5. The emergence of an international trend, particularly in Europe, towards regulating artificial intelligence through a risk assessment-based approach.

B. Recommendations

1. Specific legislation on artificial intelligence that takes into account its technical nature and degree of autonomy should be enacted.
2. A flexible regulatory approach that combines binding rules (complex law) with guiding standards (soft law) is adopted.
3. A specific regime of civil liability for harm caused by artificial intelligence should be developed on the basis of alleviating the burden of proof for the injured party.
4. The criminal policy should be updated to criminalise acts committed via artificial intelligence, with strengthened penalties where appropriate.
5. Entrench the principles of transparency, explainability, and nondiscrimination as legal obligations imposed on the developers and users of intelligent systems.
6. International cooperation should be enhanced to harmonise the legal and ethical standards for artificial intelligence.