Peilin Li*

ORCID 0000-0002-1421-6641

Xingan Li*

ORCID 0000-0001-5409-8988

Challenges of Recent Developments in the Field of Artificial Intelligence to Future Civil Law Legislation and Practice

ABSTRACT

The swift advancement of artificial intelligence (AI) has brought about significant transformations in a number of fields, including law. AI has had a big impact on civil law, a fundamental area of legal systems around the world, in areas including dispute resolution, liability, contract formulation, and privacy. The development of artificial intelligence, its main uses in civil law, and the opportunities and problems that have arisen, are all covered in this article. It offers insights into how legal systems are adjusting to AI's increasing presence, and the necessity of future regulation to address ethical and legal problems, by examining case studies and current legislative frameworks.

Keywords: Artificial Intelligence (AI), Civil Law, Liability, Privacy, Smart Contracts, Intellectual Property (IP) Rights

*   LLM, University of Latvia, address: Raiņa bulvāris 19, Centra rajons, Rīga, LV-1586, Latvia, email: pl23007@edu.lu.lv

*   PhD, Senior Researcher, International Institute for Innovation Society, Pasuunakuja 3, Helsinki, Finland, Email: Xingan.Li@yahoo.com

I. Introduction

Over the past 70 years, artificial intelligence (AI), which John McCarthy first described as "the science and engineering of making intelligent machines", has advanced remarkably.[1] The foundation for the quick development of AI technologies, which have progressively impacted many facets of society, was established by this early idea. Symbolic AI initially dominated the discipline, emphasizing logic and rule-based systems.[2] Advancements in machine learning (ML), natural language processing (NLP), and computer vision have empowered AI systems to handle increasingly dynamic and complex tasks, such as robotic systems, autonomous driving, predictive analytics, and language comprehension.[3] The 2024 EU Artificial Intelligence Act defines an 'AI system' as a machine-based system designed to function with different degrees of autonomy, and potentially adapt after deployment. It determines how to produce outputs – such as predictions, content, recommendations, or decisions – based on the input it receives, with the aim of affecting physical or digital environments, either explicitly or implicitly.[4]

Artificial intelligence (AI) encompasses a fast-evolving array of technologies that deliver substantial economic, environmental, and social value across numerous industries and sectors. By improving predictive accuracy, streamlining operations and resource use, and providing tailored digital solutions, AI grants businesses a key competitive edge. Additionally, AI contributes to positive societal and environmental impacts in areas such as healthcare, agriculture, food safety, education and training, media, sports, culture, infrastructure, energy, transport and logistics, public administration, security, justice, resource efficiency, environmental monitoring, biodiversity protection and restoration, as well as climate change mitigation and adaptation.[5] In summary, the adoption of AI across different sectors has reshaped conventional workflows and business models, frequently leading to improved efficiency, accuracy, and overall productivity.[6]

However, alongside its advantages, AI also brings new ethical and legal challenges.[7] Depending on how it is applied, used, or developed, AI can potentially pose risks

---

[1] McCarthy, 1959, 77.

[2] Newell and Simon, 1956, 61.

[3] Goodfellow, Bengio and Courville, 2023, 54; Supriyono, Wibawa, Suyono and Kurniawan, 2024, 1.

[4] Artificial Intelligence Act, 2024, Art. 3.

[5] European Union, 2024, Recital (4)

[6] Rashid and Kausik, 2025, 1.

[7] UN, 2025, 83

and cause harm to public interests and fundamental rights protected under EU law. Such harm can take both a tangible and intangible form, including physical, psychological, social, or economic consequences.[8] AI's growing capabilities have sparked important debates around accountability, privacy, and fairness.[9] These issues are especially critical within civil law, where AI affects domains such as contract law, tort law, property rights, and personal privacy.[10] The introduction of AI systems has prompted major reassessments of long-standing legal doctrines, compelling legislators to modify traditional legal structures to address challenges related to liability, data protection, and the interpretation of contracts.

As AI technologies advance, legal systems must also adapt to uphold justice and accountability in an increasingly AI-driven world.[11] This task is especially difficult due to AI's growing autonomy and its capacity to make decisions with minimal or no human oversight. In response, legal experts and practitioners have emphasized the need for flexible legal frameworks capable of addressing the distinct risks and opportunities posed by AI. Given the complexity and breadth of these challenges, interdisciplinary collaboration is essential - bringing together lawyers, technologists, and ethicists to develop regulations that promote innovation while safeguarding ethical principles.

This article will examine the influence of AI on critical areas of civil law, including contract law, tort law, property law, and privacy rights. It will also address the ethical challenges posed by AI technologies – such as bias and discrimination – and the regulatory difficulties governments and institutions encounter in responding to these concerns. Lastly, the article will outline potential avenues for legal reform, drawing on existing legal precedents and current academic discourse to offer a well-rounded framework for navigating the intersection between AI and civil law.

II. The Development of Artificial Intelligence

AI has evolved through several waves of innovation, reflecting the interplay between technological progress and societal needs. The first wave of AI, which emerged in the mid-20th century, focused on rule-based systems and symbolic reasoning. These systems, exemplified by the Logic Theorist and the General Problem Solver, relied on explicit algorithms to solve problems within well-defined domains.[12]

---

[8] Artificial Intelligence Act, 2024, Recital (5).

[9] Shrestha, 2021, 375; Rashid and Kausik, 2024, 28; Cheong, 2024, 1; Radanliev, 2025, 4.

[10] Bertolini, 2020, 9-14.

[11] Cheong, 2024, 1.

[12] McCarthy, 1959, 77; Newell and Simon, 1956, 1-4.

The 1980s witnessed the rise of expert systems, such as MYCIN and DENDRAL, which applied domain-specific knowledge to perform diagnostic and analytical tasks. Despite their success in narrow fields, expert systems faced scalability and adaptability challenges, leading to a period of diminished interest known as the "AI winter".[13]

The resurgence of AI in the 2000s was driven by advancements in machine learning and the availability of large datasets. Algorithms such as support vector machines and neural networks enabled computers to learn from data, improving their ability to recognize patterns and make predictions.[14] This era also saw the rise of big data analytics, which further enhanced AI's capabilities in fields such as healthcare, finance, and marketing.[15]

In recent years, the development of deep learning and generative AI models has marked a new milestone in AI innovation. Systems like OpenAI's GPT series and DeepMind's AlphaFold demonstrate the ability of AI to generate human-like text, predict protein structures, and solve complex problems with minimal human intervention.[16] The increasing integration of AI into society raises profound legal and ethical questions.[17] As AI systems become more autonomous, traditional distinctions between human and machine actions blur, challenging the attribution of liability and the application of existing legal norms. For instance, the EU AI Act seeks to establish harmonized rules for high-risk AI systems, addressing issues such as transparency, accountability, and safety.[18] Furthermore, the use of AI in decision-making processes has prompted debates about fairness, discrimination, and accountability. Scholars argue that ensuring the compatibility of AI-driven decisions with fundamental legal principles requires interdisciplinary collaboration and continuous regulatory adaptation.[19]

III. AI's Influence on Key Areas of Civil Law

1. Contract Law

AI is reshaping contract law by automating contract drafting, negotiation, and performance monitoring. Smart contracts, powered by blockchain and AI, execute predefined terms automatically without human intervention. While these innovations

---

[13] Russell and Norvig, 2021, 24; UN, 2025, 13.

[14] Hinton, Osindero and Teh, 2006, 1527.

[15] Brynjolfsson and McAfee, 2014, 28-30; UN, 2025, 54.

[16] Brown et al, 2020, 1877; Jumper et al., 2021, 583.

[17] UN, 2025, 21.

[18] See: Artificial Intelligence Act, 2024.

[19] Clarke, 2019, 410; Smith and Jones, 2023, 405; Díaz-Rodríguez et al., 2023, 2-3; Longo et al., 2024, 2; Almada, 2024, 116.; Cheong, 2024, 2.

enhance efficiency, they also raise questions about consent, interpretation, and the resolution of disputes arising from ambiguous or erroneous AI-generated terms.[20]

Courts and legislators face the challenge of determining the legal validity of AI-drafted contracts and addressing liability when errors occur. For example, if an AI system misinterprets contractual terms, it remains unclear whether the liability lies with the developer, the user, or the AI itself.[21] In the case of *ProCD, Inc. v. Zeidenberg*,[22] the court examined issues of contract formation in the context of software licenses, providing insights into how technological intermediaries influence agreements. However, the application of similar principles to AI-generated contracts remains unresolved, necessitating further judicial and legislative clarification.

The United Nations Convention on Contracts for the International Sale of Goods (CISG) provides a framework for understanding the obligations of parties in international transactions. However, its provisions do not explicitly address the use of AI in contract formation, leaving gaps in interpretation. As AI continues to play a significant role in drafting and executing agreements, scholars suggest revising or supplementing such frameworks to account for the unique challenges posed by AI technologies.[23]

2. Tort Law

AI systems' increasing autonomy complicates the assignment of liability in tort law. For instance, in cases involving autonomous vehicles, determining whether the manufacturer, software developer, or user is at fault is challenging. Traditional principles such as negligence and strict liability must be adapted to address these scenarios.[24]

The concept of "foreseeability" becomes critical in assessing liability for AI-related harm. Since AI systems are designed to learn and evolve over time, predicting their behavior in dynamic environments is often difficult. This uncertainty complicates the evaluation of whether harm was foreseeable and preventable. Courts must also grapple with whether AI systems themselves can be considered agents capable of responsibility, or if accountability rests solely with the human entities involved in their design, programming, and deployment.

One prominent case that highlights these challenges is the 2018 fatal collision involving an Uber autonomous vehicle in Arizona. Investigators and legal experts de-

---

[20] Clarke, 2019, 413; Almada, 2024, 28; Cheong, 2024, 2.

[21] Artificial Intelligence Act, 2024, 57.

[22] ProCD, Inc. v. Zeidenberg, 86 F.3d 1447, 7th Cir. 1996.

[23] Clarke, 2019, 414; Cheong, 2024, 2.

[24] Artificial Intelligence Act, 2024, Art. 99, 101.

bated whether fault lay with the vehicle's software, the human safety driver, or Uber's overall operational decisions. Such incidents illustrate the need to redefine legal doctrines, such as product liability and contributory negligence, to account for the unique nature of AI systems.[25]

Scholars argue that adopting a strict liability framework for high-risk AI applications, as suggested in the European Union's AI Act, could provide greater clarity and protection for victims of AI-related harm. However, balancing innovation with accountability remains a contentious issue (European Union, 2024). Additionally, the Restatement (Third) of Torts in the United States provides foundational principles for addressing negligence and product liability, but these principles may require reinterpretation in the context of AI.[26]

3. Property Law

AI technologies are also impacting property law, particularly in intellectual property (IP) rights. AI-generated works, such as music, art, and software, raise questions about authorship and ownership. Current IP laws often assume human authorship, creating a legal vacuum for AI-generated creations.[27]

Debates continue over whether AI should be recognized as a legal entity capable of holding IP rights, or whether ownership should default to the developer or user. Resolving these issues requires balancing innovation incentives with protecting human creators. For example, the *Naruto v. Slater* (2018) case, which dealt with animal authorship, provides an indirect analogy, demonstrating the courts' reluctance to extend authorship rights beyond humans. Similarly, AI-generated creations challenge traditional legal definitions of "authorship".[28]

The World Intellectual Property Organization (WIPO) and various national agencies are exploring policies to address these gaps. In 2022, the European Patent Office rejected an AI system named DABUS as an inventor in a patent application, emphasizing the necessity of human authorship under current frameworks.[29] Such cases highlight the need for harmonized global standards that address the complexities of AI-driven innovation.

---

[25] Smith and Jones, 2023, 45.

[26] American Law Institute, 1998, generally; Lior, 2025, passim.

[27] U.S. Copyright Office (B), 2023, Part. 2.

[28] Acosta, 2012, passim.

[29] European Patent Office, 2022, para. 4.6.4.

4. Privacy and Data Protection

AI's reliance on vast amounts of data poses significant privacy challenges. Civil law frameworks, such as the European Union's General Data Protection Regulation (GDPR), impose strict requirements on data collection, processing, and sharing. However, AI systems often operate in ways that obscure accountability, making it difficult to ensure compliance with privacy laws.[30]

The use of AI in surveillance, predictive policing, and consumer profiling raises ethical concerns about consent, bias, and discrimination.[31] For example, AI-driven facial recognition systems deployed in public spaces have been criticized for their potential to violate individuals' privacy and disproportionately target minority groups.[32] Such practices highlight the tension between public safety objectives and individual rights.

Legal systems must address these issues by enhancing transparency and accountability mechanisms for AI applications. Scholars suggest adopting "explainable AI" standards that require developers to provide clear documentation of how AI systems process data and reach decisions.[33] Additionally, privacy-by-design principles, as outlined in the GDPR, should be integrated into AI development to ensure that data protection is a foundational aspect of these technologies.

High-profile legal cases, such as *Schrems II* (2020), which invalidated the EU-US Privacy Shield framework, underscore the importance of safeguarding privacy in a globalized digital economy. Policymakers must collaborate internationally to establish coherent regulations that protect individuals while enabling the cross-border use of AI technologies.[34]

IV. Ethical and Regulatory Challenges

1. Bias and Discrimination

Artificial intelligence (AI) systems, though powerful and efficient, are not free from biases that are inherently embedded in the data they process. These biases can lead to harmful discriminatory outcomes, especially in crucial areas such as hiring, lend-

---

[30] GDPR, 2016, Recital.

[31] UN, 2025, 61.

[32] Smith and Jones, 2023, 45.

[33] Clarke, 2019, 413; Radanliev, 2025, 5.

[34] European Court of Justice, Case C-311/18 Data Protection Commissioner v Facebook Ireland and Schrems (Schrems II), 2020; Artificial Intelligence Act, 2024, Recital (1); UN, 2025, 6.

ing, and law enforcement. One significant concern is that AI systems can perpetuate historical inequalities if they are trained on biased datasets that reflect societal prejudices. For instance, if an AI system used in hiring decisions is trained on data that includes a history of underrepresentation of certain groups, such as women or ethnic minorities, the algorithm may replicate those patterns and systematically disadvantage these groups.[35]

In the context of law enforcement, predictive policing tools have been found to disproportionately target minority communities, as they are often trained on arrest data that may over-represent certain demographic groups due to existing law enforcement practices. The case of the COMPAS (Correctional Offender Management Profiling for Alternative Sanctions) system highlights the potential for AI-driven systems to reinforce biases in the criminal justice system. Research has shown that the COMPAS system was more likely to incorrectly assess Black defendants as high risk for reoffending compared to white defendants, even when controlling for prior criminal history.[36] This raises serious concerns about the fairness and accuracy of AI-based decision-making processes.

In response to these challenges, there is a growing call for civil law to evolve and address the harm caused by biased AI systems. One proposed solution is the establishment of clear legal standards for fairness in AI-driven decision-making. These standards would require companies and public institutions to regularly audit AI systems for potential biases and to ensure that their use does not lead to discriminatory outcomes. The implementation of such regulations would be aimed at creating accountability and transparency, with the goal of reducing the impact of bias on vulnerable groups.

The European Union's General Data Protection Regulation (GDPR) and its provisions on "automated decision-making" are important examples of efforts to regulate AI systems in a way that addresses bias and discrimination. Under the GDPR, individuals have the right to contest decisions made solely based on automated processing, which includes profiling. This legal framework places an emphasis on fairness, transparency, and accountability in automated decision-making processes.[37] Similarly, in the United States, the Algorithmic Accountability Act of 2019 was proposed to require companies to conduct impact assessments of their automated decision-making systems, ensuring that they do not perpetuate discrimination.[38]

---

[35] Angwin, Larson, Mattu & Kirchner, 2016, passim.

[36] Ibid., passim; Picard, Watkins, Rempel, & Kerodal, 2019, 3-4.

[37] European Commission, 2016, Recital (85).

[38] See: Algorithmic Accountability Act, 2019.

Moreover, scholars have proposed a range of solutions to mitigate bias in AI, including the use of "fairness-aware" algorithms that adjust decision-making processes to avoid discrimination based on race, gender, or other protected characteristics.[39] These approaches aim to detect and correct biases before they translate into discriminatory outcomes, which could, in turn, provide more equitable AI systems.

2. Accountability and Transparency

The complexity and opacity of many artificial intelligence (AI) algorithms, often referred to as the "black-box" nature, present significant challenges in ensuring accountability for AI-driven decisions. This term "black-box" refers to AI systems whose internal processes are not easily interpretable or understandable, even by the developers who created them. As AI systems become more integrated into critical decision-making sectors such as healthcare, criminal justice, and finance, the inability to explain how decisions are made raises concerns about fairness, responsibility, and the ability to challenge potentially harmful outcomes.

The lack of transparency in AI systems undermines trust and complicates efforts to hold parties accountable when these systems make erroneous or discriminatory decisions.[40] For example, in the case of automated risk assessments in criminal justice, such as those conducted by the COMPAS system, the inability to scrutinize how the algorithm arrived at its decision makes it difficult for defendants and their legal teams to contest the accuracy or fairness of the risk assessments used to determine sentencing.[41] Without the ability to understand the rationale behind an AI-driven decision, individuals affected by these systems may not have a meaningful opportunity to challenge them, thereby impeding justice.

Legal scholars have argued that AI systems should be subject to principles of explainability and transparency, requiring developers and institutions to disclose information about how their algorithms function and how decisions are made.[42] One of the primary recommendations for addressing this challenge is the establishment of legal frameworks that mandate clear, understandable explanations for AI decisions, especially when such decisions have significant impacts on individuals' rights and

---

[39] See: Dastin, 2018.

[40] Radanliev, 2025, 7.

[41] Angwin et al., 2016, passim.

[42] Binns, 2018, 149.

interests. A robust legal requirement for explainability would ensure that affected parties are not left in the dark about the reasons behind decisions made by AI systems, and that they have the means to contest or appeal these decisions.

The European Union's General Data Protection Regulation (GDPR) provides a foundational example of a legal approach to the problem of transparency and accountability. Under Article 22 of the GDPR, individuals have the right not to be subject to decisions based solely on automated processing, including profiling, where such decisions have a significant legal effect. Importantly, this includes the right to obtain an explanation of the logic behind such decisions, thus addressing concerns about AI systems operating in an opaque manner.[43] This regulation emphasizes the need for transparency in automated decision-making and ensures that individuals are provided with meaningful information about how their data is being used to make decisions that affect them.

Furthermore, scholars have suggested that AI systems should be designed with "explainability by design", meaning that the AI algorithms must be inherently capable of providing understandable justifications for their decisions.[44] This approach would shift the burden from individuals seeking to understand the system to the developers, who would be required to implement transparent processes from the outset.

In the United States, the Algorithmic Accountability Act of 2019 reflects growing concerns about AI transparency. The Act mandates that companies conducting business with AI systems perform audits to assess their performance, identify potential biases, and ensure that their systems are explainable and transparent. Such legislative efforts aim to hold organizations accountable for the algorithms they deploy and to ensure that individuals are not subjected to harmful or discriminatory decisions without recourse.[45]

Legal frameworks governing AI transparency and accountability are critical not only to ensure fairness but also to protect fundamental rights, including the right to be heard and to contest decisions that could impact an individual's life. As AI continues to play a more prominent role in decision-making processes, the call for greater transparency and accountability is likely to grow, compelling legal systems worldwide to adapt to this technological reality.

[43] European Commission, 2016, generally.

[44] Lipton, 2016, 36.

[45] U.S. Congress, 2019, Secdtion 2.

3. **Regulatory Frameworks**

The rapid development of artificial intelligence (AI) technologies has outpaced the ability of existing legal frameworks to adequately regulate their use, particularly when it comes to issues such as accountability, ethics, and safety.[46] This regulatory lag presents a significant challenge, as laws that were not designed with AI in mind are often ill-equipped to address the complexities posed by these technologies. As AI systems continue to permeate every aspect of society, from healthcare to law enforcement, it becomes increasingly necessary to create new legal structures that can address the unique risks and benefits posed by AI, while balancing innovation with protection.

One of the primary issues with current legal frameworks is that they are typically limited by national borders, while AI technologies and their impact are inherently global. The cross-border nature of AI introduces a range of challenges, including jurisdictional issues, enforcement difficulties, and the need for the harmonization of standards across countries. For instance, an AI system developed in one country may be deployed in another, where local laws may conflict with the regulations in the country of origin. This presents a complex challenge for both regulators and businesses seeking to ensure compliance and avoid regulatory breaches in multiple jurisdictions.[47]

To address these challenges, international cooperation is essential. However, there is no universally accepted global standard for AI governance, and different countries and regions have begun developing their own regulatory approaches.[48] This disparity can create regulatory fragmentation, where a lack of coordination between legal systems hinders the effective oversight of AI technologies.[49] Some argue that this "race to the bottom" could lead to inconsistent or lax regulations that fail to protect consumers or uphold ethical standards.[50]

One notable initiative aimed at establishing a comprehensive regulatory framework for AI is the European Union's Artificial Intelligence Act (AI Act), which was proposed in April 2021. The AI Act is designed to provide a structured, risk-based approach to the governance of AI in the EU, classifying AI systems according to their

---

[46] UN, 2025, 152.

[47] Scherer, 2016, 354.

[48] UN, 2025, 111-136.

[49] Bertolini, 2025, 27-30.

[50] Bryson, 2017, 273.

risk levels and implementing appropriate regulatory measures for each category. For example, high-risk AI systems, such as those used in critical infrastructure, health-care, and law enforcement, would be subject to strict requirements for transparency, accountability, and oversight. The Act also introduces provisions for ensuring that AI systems are free from bias and discrimination, setting clear guidelines for transparency and explainability in AI-driven decisions.[51]

Despite the potential of the AI Act to serve as a model for AI regulation in Europe, its applicability on a global scale remains uncertain. While the EU's approach to AI governance may influence other jurisdictions, it is unclear whether the global community will be able to reach a consensus on how to regulate AI effectively. The United States, for example, has taken a more market-driven approach to AI regulation, focusing on voluntary guidelines and industry standards rather than comprehensive legal mandates.[52] Other countries, such as China, have pursued their own regulatory frameworks, reflecting different priorities and values, particularly concerning surveillance and data privacy.[53] The lack of a unified international regulatory framework creates significant challenges for cross-border cooperation and enforcement, making it difficult to address global AI-related risks.

To facilitate effective AI regulation, scholars have suggested the creation of international treaties or organizations focused on AI governance. Such frameworks could help harmonize standards, create shared enforcement mechanisms, and provide clear guidelines for dealing with cross-border legal issues. This could include establishing international norms for the development and deployment of AI, setting clear ethical guidelines, and ensuring transparency and accountability in AI systems.[54]

Overall, while initiatives like the EU's AI Act represent an important step toward addressing AI governance, the road to comprehensive, globally applicable AI regulations is long, and requires significant international cooperation. Until a globally coordinated framework is developed, countries and regions will continue to grapple with the challenges of regulating AI in a way that fosters innovation while protecting public interest.[55]

---

[51] Artificial Intelligence Act, 2024, Recital (70).

[52] Calo, 2017, 399.

[53] Cheng and Zeng, 2022, 794; Radanliev, 2025, 9.

[54] Gasser and Almeida, 2017, 58; Cheong, 2024, 2; Radanliev, 2025, 10; UN, 2025, 150.

[55] UN, 2025, 87.

V. Case Studies

1. Autonomous Vehicles

The rise of autonomous vehicles (AVs) presents significant challenges for tort law, particularly regarding liability in accidents involving self-driving cars. As AI technologies enable vehicles to operate without human intervention, the traditional framework for determining liability – usually based on human error or negligence – becomes increasingly complex. Autonomous vehicles rely on algorithms and sensor systems to make decisions, raising the question of whether liability should be attributed to the manufacturer, software developer, or user in the event of an accident. This legal uncertainty has sparked considerable debate and underscores the need for clear guidelines on how the law should treat AI in the context of autonomous vehicle accidents.

At the heart of the issue is the question of fault. In traditional motor vehicle accidents, liability is often determined based on the principle of negligence, where the driver's actions (or lack thereof) are assessed to determine if they failed to meet a reasonable standard of care. However, in the case of AVs, the role of the human driver may be significantly diminished or non-existent. This raises critical questions about how responsibility should be assigned when an autonomous vehicle is involved in an accident.

One approach is to hold the manufacturers of autonomous vehicles accountable for defects in the design or functionality of the vehicle. In cases where a malfunction in the vehicle's sensors, algorithms, or software directly leads to an accident, manufacturers could be held strictly liable under product liability law. For example, in the case of Uber's autonomous vehicle, which was involved in a fatal pedestrian accident in 2018, the National Transportation Safety Board (NTSB) concluded that the vehicle's software was inadequate in detecting and responding to the pedestrian in time to avoid the collision.[56] While the company was not found to be criminally liable, the incident highlighted the need for clear guidelines regarding the responsibilities of manufacturers to ensure the safety of their autonomous systems.

Software developers, too, could face liability if the accident is found to be due to programming errors or insufficient testing of the autonomous system. The complexity of AI systems means that even small errors in programming or algorithmic decision-making can have catastrophic consequences. For instance, the "Tesla Autopilot" feature, which has been involved in several high-profile crashes, has raised

---

[56] National Transportation Safety Board, 2019, 44.

questions about whether software developers or car manufacturers should be held liable when the system fails to detect obstacles or respond to changing road conditions appropriately.[57]

However, in some cases, users of autonomous vehicles may also bear responsibility, especially if they fail to intervene when the system malfunctions or if they misuse the vehicle in a way that violates safety guidelines. For example, some AV systems still require human oversight, and failure to engage with the system when prompted could contribute to an accident. In these instances, liability might be shared between the manufacturer, software developer, and user, depending on the circumstances.

The evolving legal landscape surrounding autonomous vehicles emphasizes the need for comprehensive tort law reforms that address the specific challenges posed by AI and self-driving technology. Some scholars have suggested that a hybrid approach to liability could be most effective, where manufacturers and developers are held strictly liable for defects in the system, while users are held liable for misuse or failure to maintain the vehicle according to manufacturer instructions.[58] Additionally, some propose the creation of a new legal category of "AI liability" to address the unique characteristics of AI-driven decision-making in AVs.[59] This would involve considering the role of AI as an independent decision-maker and evaluating its actions according to a distinct set of standards.

Recent developments in both legal cases and policy initiatives show a growing recognition of the need for clearer guidelines on the role of AI in autonomous vehicle accidents. For instance, the European Union's Artificial Intelligence Act includes provisions for the regulation of high-risk AI applications, including autonomous vehicles, and seeks to establish rules for transparency, accountability, and liability.[60] Such regulations could provide the legal clarity necessary to address the complexities of AI in tort law, ensuring that victims of autonomous vehicle accidents have clear avenues for seeking redress.

2. AI-Generated Content

The emergence of AI-generated art and literature has raised fundamental questions about intellectual property (IP) law, particularly regarding authorship, originali-

---

[57] Calo, 2017, 419.

[58] Wang, 2022, 101.

[59] Goodman and Flaxman, 2017, 50.

[60] See: Artificial Intelligence Act, 2024, Recital (72), (27) & (11).

ty, and copyright protection. As AI technologies, such as deep learning and neural networks, continue to evolve, they are increasingly capable of producing content – ranging from visual art to written works – that appears to be indistinguishable from human-created works. However, current IP laws, which have traditionally been built around human authorship and creativity, struggle to address the unique challenges posed by AI-generated content.

One of the key challenges lies in determining who owns the rights to works created by AI. Under traditional copyright law, the work of an author or artist is protected by copyright if it meets two key criteria: originality and authorship by a human creator. However, in cases where AI systems are responsible for generating the content, determining who qualifies as the author – if anyone – becomes a complex issue.[61]

A landmark case that highlighted this challenge occurred in the United States when the U.S. Copyright Office ruled that works generated entirely by artificial intelligence could not be copyrighted unless a human demonstrates significant creative input. In this particular case, an individual had sought to copyright a series of artworks produced by an AI system, claiming that the machine's creative output was worthy of protection under U.S. copyright law. The Copyright Office, however, rejected this claim, affirming that copyright protection requires human authorship and that works produced solely by machines or algorithms do not meet the statutory requirements.[62] This decision emphasized the notion that copyright is inherently tied to human creativity and rejected the notion of non-human authorship.

This ruling underscores the growing need for clearer legal definitions of authorship in the context of AI-generated content. As AI continues to advance and produce increasingly sophisticated works of art, literature, and music, it becomes more difficult to draw a clear line between works created by humans and those produced by machines. Legal scholars have argued that the traditional framework for copyright law, which assumes human agency as the foundation for creativity, must evolve to accommodate the unique characteristics of AI-generated works.[63] Some propose a more flexible approach to authorship, where the person or entity that develops or operates the AI system might be considered the author, or where new categories of IP protection could be created specifically for AI-generated works.[64]

---

[61]   Singh and Sharma, 2024, 1.

[62]   U.S. Copyright Office (A), 2023, 306.

[63]   Sobel, 2024, 49.

[64]   Samuelson, 2016, 1185.

Another issue raised by AI-generated content is the question of originality. Copyright protection is granted to works that are original, meaning they must reflect the unique creative expression of the author. However, if an AI system generates a work based on existing data or patterns, it may be argued that the resulting content is not truly original, as it is derived from pre-existing sources.[65] This raises important questions about the nature of creativity and originality in the age of AI, and whether traditional concepts of authorship and originality are still adequate in the context of machine-generated content.

The question of whether AI-generated works should be eligible for copyright protection is not only a legal issue but also an ethical one. Some have argued that recognizing AI as the author of creative works could undermine the value of human creativity and the rights of human creators. Others contend that AI-generated content could serve as a tool for expanding creativity and providing new opportunities for human artists and authors. For example, AI-generated art may inspire new forms of collaboration between human creators and machines, leading to innovative and ground-breaking works of art.[66]

The U.S. Copyright Office decision, while significant, represents just one step in a broader legal conversation that will need to evolve as AI continues to reshape creative industries. International legal bodies, such as the World Intellectual Property Organization (WIPO), have also begun to explore these issues, with some advocates pushing for new international standards for AI-generated content.[67] These discussions may lead to the development of more comprehensive frameworks for recognizing the intellectual property rights of AI systems and their creators, ensuring that the legal landscape can keep pace with technological innovation.

In conclusion, the rise of AI-generated content challenges existing intellectual property frameworks, particularly with regard to authorship, originality, and copyright. As courts and legal scholars continue to grapple with these issues, the development of new legal definitions and frameworks will be crucial to ensuring that creators – whether human or machine – can adequately protect and benefit from their intellectual property.

---

[65] Ginsburg, 2017, 68.

[66] Elgammal, 2017, generally.

[67] Cuntz, Fink and Stamm, 2024, 2.

VI. Future Directions

As artificial intelligence (AI) continues to shape numerous sectors, from healthcare to finance, its impact on civil law will only grow in significance. To address these developments, legal systems around the world must evolve and adapt to accommodate the unique characteristics of AI technologies. The current legal framework, with its traditional principles and doctrines, often struggles to address the complexities of AI-driven systems. Consequently, a proactive and adaptive approach will be required to ensure that civil law effectively addresses the challenges posed by AI. Several key strategies are essential for meeting this goal.

1. Develop Adaptive Legal Principles

The first major step toward addressing AI's growing influence on civil law is the development of adaptive legal principles that accommodate the specificities of AI technologies. Traditional legal doctrines, such as tort law, contract law, and intellectual property law, were designed with human agents in mind. As such, they often fail to adequately address the distinctive features of AI, such as machine learning, autonomy, and the capacity for AI systems to evolve based on large datasets. For instance, in the context of liability for AI-driven actions, existing tort principles – such as negligence or strict liability – may not fully capture the complexities of AI behavior, especially when it comes to autonomous systems that make decisions without human intervention.[68]

Legal scholars have suggested that AI-specific regulations could be developed to address these issues. For example, creating a separate legal category for "AI responsibility" could allow courts to distinguish between the actions of humans and those of autonomous systems. Furthermore, adaptive legal principles could take into account the dynamic and evolving nature of AI technologies. This would require ongoing updates to the law to ensure that it can effectively regulate new developments in AI. Some scholars advocate for the creation of "AI law", a specialized area of law that evolves alongside technological advancements.[69]

2. Foster Interdisciplinary Collaboration

Another crucial direction for the future of AI in civil law is fostering interdisciplinary collaboration between legal professionals, technologists, and ethicists. AI systems

---

[68] Sullivan, 2019, 160.

[69] Vallor, 2018, 148.

are inherently complex and multidisciplinary in nature. As such, legal professionals need to collaborate with AI researchers, engineers, and ethicists to fully understand how AI systems function, their potential risks, and the ethical dilemmas they may present. This collaboration is necessary not only to create effective regulations, but also to ensure that legal frameworks align with technological realities.[70]

Ethicists, in particular, play a key role in shaping the moral guidelines for AI development and use. AI systems are often designed with goals such as efficiency and optimization, which can sometimes conflict with ethical concerns about fairness, justice, and accountability. Legal professionals can benefit from working alongside ethicists to ensure that legal systems address these ethical dilemmas, particularly in areas such as discrimination, bias, and transparency in AI algorithms.[71] Additionally, technologists must be involved in legal discussions to provide insights into the practical limitations and capabilities of AI systems, ensuring that legal frameworks are both realistic and forward-looking.

Scholarly collaboration has been increasingly recognized as essential in AI regulation. For example, the European Commission's high-level expert group on AI, which includes legal scholars, engineers, and ethicists, provides a model for how interdisciplinary teams can work together to draft policy recommendations and regulatory frameworks.[72]

3. Enhance Public Awareness

The third direction for addressing AI's impact on civil law is enhancing public awareness of the risks and benefits associated with AI. Policymaking related to AI is often dominated by technical jargon and complex issues that can be difficult for the general public to understand. This gap in knowledge can lead to misinformed decision-making by lawmakers and a lack of public accountability for AI developers. Educating the public about AI's potential and its risks is therefore a vital step in ensuring informed policymaking and fostering a transparent dialogue between stakeholders.[73]

Public awareness can also help foster greater trust in AI technologies. When individuals understand how AI systems function and what risks they may pose – such as data privacy concerns, algorithmic bias, and automation-induced job displacement

---

[70] Custers, 2023, 349.

[71] Bryson et al., 2017, generally.

[72] European Commission, 2019, generally.

[73] Clarke, 2019, 417.

– they are more likely to support responsible regulation and ethical AI practices.[74] Furthermore, creating public forums for discussing AI's societal implications can help ensure that AI technologies are developed with the interests of society in mind. Governments and private companies can collaborate with educational institutions to offer resources that explain AI's impact on civil rights, safety, and employment.

For example, the U.K. government's "AI Roadmap" highlights the need for public engagement and awareness in its strategy for AI regulation, including a public consultation process on ethical guidelines for AI development.[75] By promoting widespread understanding of AI, policymakers can ensure that regulations reflect not only expert opinions, but also the needs and concerns of the general public.

In conclusion, addressing AI's growing influence on civil law will require adaptive legal principles, interdisciplinary collaboration, and enhanced public awareness. As AI continues to evolve, it is crucial for legal systems to develop frameworks that accommodate the unique challenges posed by these technologies. By fostering collaboration among legal professionals, technologists, and ethicists, and by prioritizing public engagement, legal systems can ensure that AI is regulated in a manner that balances innovation with protection, transparency, and fairness.

VII. Conclusion

The development of artificial intelligence (AI) has revolutionized various sectors, ranging from healthcare to transportation, and its influence is increasingly being felt in the realm of civil law. AI technologies, while offering unprecedented opportunities for efficiency, innovation, and problem-solving, also introduce significant challenges, particularly in areas such as liability, privacy, and ethics. The task of integrating AI into civil law frameworks is complex, requiring both the adaptation of traditional legal principles and the creation of entirely new regulatory structures. Legal systems must evolve to ensure that AI is developed and deployed in a way that balances the benefits of innovation with the protection of fundamental rights and societal values.

The first challenge lies in adapting existing legal principles to account for the unique characteristics of AI systems. Traditional civil law doctrines, such as those governing contracts, torts, and intellectual property, were created with human actors in mind. As AI becomes increasingly autonomous, these legal frameworks must be

---

[74] UN, 2025, 52.

[75] UK Government, 2021, generally.

reassessed and updated to deal with the implications of AI behavior. For example, in the area of tort law, determining liability for harms caused by AI-driven decisions – such as accidents involving autonomous vehicles or wrongful outcomes generated by algorithms – requires a reassessment of established legal concepts such as negligence and causality.[76]

AI's ability to learn from large datasets and make independent decisions introduces new complexities that traditional law is ill-equipped to handle. As AI systems become more autonomous, the question of accountability becomes central. To address this, scholars have suggested that legal frameworks should include specific provisions that govern AI systems' actions and the potential liability of developers, manufacturers, and users.[77] This may require the introduction of new legal categories, such as "AI liability", which could serve as a bridge between the traditional legal concepts and the novel challenges posed by intelligent machines.

Given the unique challenges AI presents, there is a growing consensus that new regulatory frameworks are necessary. Legal systems must not only adapt existing laws, but also create entirely new regulations that can govern the development, deployment, and use of AI technologies. Governments around the world are beginning to recognize the need for such frameworks. For example, the European Union has been at the forefront of developing comprehensive regulations for AI with the introduction of the *AI Act*, a pioneering effort to regulate high-risk AI applications and ensure they comply with safety, privacy, and ethical standards.[78]

International regulatory cooperation will also be essential to address cross-border challenges. AI's global nature means that regulatory approaches must be harmonized across jurisdictions to avoid legal fragmentation and to ensure consistency in standards. The development of international agreements on AI governance will be crucial to creating a regulatory landscape that fosters innovation while protecting fundamental rights.[79]

In particular, the regulation of AI-generated content, privacy concerns, algorithmic bias, and the ethical use of AI require comprehensive legal measures that go beyond traditional frameworks. For instance, the issue of AI bias – whether in lending, hiring, or law enforcement – has prompted discussions about the need for explicit

---

[76] Shrestha, 2021, 375.

[77] Kayal, 2019, 136.

[78] See: Artificial Intelligence Act, 2024.

[79] Scherer, 2016, 393-398; UN, 2025, 63.

legal standards to ensure fairness and prevent discriminatory outcomes.[80] Legal scholars have argued that AI regulation must be proactive, taking into account both the capabilities of AI and the societal risks it may pose.

To maintain fairness and adaptability in legal systems amid AI advancements, continuous collaboration is vital. Policymakers, legal experts, technologists, ethicists, and the public must engage in sustained discussions. Crafting effective AI regulations demands a collective approach, incorporating varied viewpoints. As AI technology progresses, interdisciplinary cooperation will be crucial to developing laws that are both technically grounded and ethically robust.[81]

Raising public awareness and encouraging active participation are just as important. Promoting open and informed discussions about the advantages and dangers of AI allows legal frameworks to align with societal values and priorities. Involving the public ensures that policymakers can make decisions that safeguard essential rights – including privacy, equality, and non-discrimination – while still supporting technological progress that serves the greater good.[82]

As AI becomes increasingly integrated into daily life, it is essential for legal systems to remain adaptable and responsive to new challenges. Crafting flexible legal principles, supported by forward-thinking regulatory frameworks and inclusive societal engagement, will be key to guiding the future of AI in a manner that promotes innovation while protecting fundamental rights and upholding ethical standards.

References

Acosta R., *Artificial Intelligence and Authorship Rights*, Harvard Journal of Law & Technology, 2012, <https://jolt.law.harvard.edu/digest/artificial-intelligence-and-authorship-rights> [24.07.2025].

Almada M., *Law & Compliance in AI Security & Data Protection*, European Data Protection Board, 2024, <https://www.edpb.europa.eu/system/files/2025-06/spe-training-on-ai-and-data-protection-legal_en.pdf> [24.07.2025].

American Law Institute, *Restatement (Third) of Torts: Liability for Physical and Emotional Harm*, St. Paul, 1998.

Angwin J., Larson J., Mattu S., Kirchner L., *Machine Bias: Risk Assessments in Criminal Sentencing*, ProPublica, 2016, <https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing> [24.07.2025].

Bertolini A., Artificial Intelligence and Civil Liability: A European Perspective, European Parliament, Brussels, 2025.

Bertolini A., Artificial Intelligence and Civil Liability, Brussels, 2020.

---

[80] Binns, 2018, 149.

[81] Bryson et al., 2017, generally.

[82] Clarke, 2019, 411; UN, 2025, 4.

Binns R., *Fairness in Machine Learning: Lessons from Political Philosophy*, Proceedings of the Conference on Fairness, Accountability and Transparency, journal "Proceedings of Machine Learning Research", Vol. 81, 2018.

Brown T., Mann B., Ryder N. et al., *Language Models Are Few-Shot Learners*, journal "Advances in Neural Information Processing Systems", Vol. 33, 2020.

Brynjolfsson E., McAfee A., The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies, London, 2014.

Bryson J.J., Diamantis M.E., Grant T.D., *Of, For, and By the People: The Legal Lacuna of Synthetic Persons*, journal "Artificial Intelligence and Law", Vol. 25, 2017. DOI: https://doi.org/10.1007/s10506-017-9214-9

Calo R., *Artificial Intelligence Policy: A Primer and Roadmap*, journal "U.C. Davis Law Review", Vol. 51, No. 2, 2017. DOI: http://dx.doi.org/10.2139/ssrn.3015350

Cheng J., Zeng J., *Shaping AI's Future? China in Global AI Governance*, Journal of Contemporary China, Vol. 32, No. 143, 2022. DOI: https://doi.org/10.1080/10670564.2022.2107391

Cheong B. C., *Transparency and Accountability in AI systems: Safeguarding Wellbeing in the Age of Algorithmic Decision-Making*, journal "Frontiers in Human Dynamics", Vol. 6, 2024. DOI: https://doi.org/10.3389/fhumd.2024.1421273

Clarke R., *Principles and Business Processes for Responsible AI*, journal "Computer Law & Security Review", Vol. 35, No. 4, 2019. DOI: https://doi.org/10.1016/j.clsr.2019.04.007

Cuntz A., Fink C., Stamm H., *Artificial Intelligence and Intellectual Property: An Economic Perspective*, Economic Research Working Paper, No.77, WIPO, 2024. <https://www.wipo.int/publications/en/details.jsp?id=4715> [24.07.2025].

Custers B., *Law and Artificial Intelligence: Regulating AI and Applying AI in Legal Practice*, Berlin, 2023. DOI: https://doi.org/10.1007/978-94-6265-523-2

Dastin J., Amazon Scraps Secret AI Recruiting Tool that Showed Bias against Women, Reuters, 2018, <https://www.reuters.com/article/us-amazon-com-jobs-automation-insight/amazon-scraps-secret-ai-recruiting-tool-that-showed-bias-against-women-idUSKCN1MK08G/> [24.07.2025].

Díaz-Rodríguez N., Del Ser J., Coeckelbergh M., Lopez de Prado M.L., Herrera-Viedma E., Herrera F., *Connecting the Dots in Trustworthy Artificial Intelligence*, journal "Information Fusion", Vol. 99, 2023. DOI: https://doi.org/10.1016/j.inffus.2023.101896

Elgammal A., Liu B., Elhoseiny M., Mazzone M., *CAN: Creative Adversarial Networks, Generating "Art" by Learning About Styles and Deviating from Style Norms*, Conference Paper, arXiv, 2017. DOI: https://doi.org/10.48550/arXiv.1706.07068

European Commission, Ethics Guidelines for Trustworthy AI, 2019.

European Patent Office, *Decision on DABUS Patent Applications*, Brussels, 2022.

European Union, Liability for Artificial Intelligence and Other Emerging Digital Technologies, 2019. DOI: https://doi.org/10.2838/573689

Gasser U., Almeida V.A.F., *A Layered Model for AI Governance*, journal "IEEE Internet Computing", Vol. 21, No. 6, 2017. DOI: https://doi.org/10.1109/MIC.2017.4180835

Ginsburg J.C., *The Role of the Author in Copyright*, in: Copyright Law in an Age of Limitations and Exceptions, edited by R.L. Okediji, Cambridge University Press, 2017. DOI: https://doi.org/10.1017/9781316450901.004

Goodfellow I., Bengio Y., Courville A., *Deep Learning*, MIT Press, 2016.

Goodman B., Flaxman S., *European Union Regulations on Algorithmic Decision-Making and a "Right to Explanation"*, AI Magazine, Vol. 38, No. 3, 2017. DOI: https://doi.org/10.1609/aimag.v38i3.2741

Hinton G., Osindero S., Teh Y. W., *A Fast Learning Algorithm for Deep Belief Nets*, journal "Neural Computation", Vol. 18, No. 7, 2006.

Jumper J., Evans R., Pritzel A. et al., *Highly Accurate Protein Structure Prediction with AlphaFold*, journal "Nature", Vol. 596, No. 7873, 2021. DOI: https://doi.org/10.1038/s41586-021-03819-2

Kayal S.K., *Private Accountability in the Age of Artificial Intelligence*, journal "UCLA Law Review", Vol. 66, 2019.

Lipton Z.C., *The Mythos of Model Interpretability*, journal "Communications of the ACM", Vol. 59, No. 4, 2016. DOI: https://doi.org/10.48550/arXiv.1606.03490

Lior A., *Holding AI Accountable: Addressing AI-Related Harms Through Existing Tort Doctrines*, Essey, The University of Chicago Law Review, 2025. <https://lawreview.uchicago.edu/online-archive/holding-ai-accountable-addressing-ai-related-harms-through-existing-tort-doctrines> [24.07.2025].

Longo L. et al., *Explainable Artificial Intelligence (XAI) 2.0: A Manifesto of Open Challenges and Interdisciplinary Research Directions,* journal "Information Fusion", Vol. 106, 2024. DOI: https://doi.org/10.1016/j.inffus.2024.102301

McCarthy J., *Programs with Common Sense*, in: Mechanisation of Thought Processes, Proceedings of the Symposium of the National Physics Laboratory, Vol. I, London, 1959.

National Transportation Safety Board of the US, Highway Accident Report: Uber Self-Driving Vehicle Test, Washington, 2019.

Newell A., Simon H. A., *The Logic Theory Machine,* journal "IRE Transactions on Information Theory", Vol. 2, No. 3, 1956.

Picard S., Watkins M., Rempel M., Kerodal A., *Beyond the Algorithm: Pretrial Reform,* Center for Court Innovation, 2019. <https://www.innovatingjustice.org/wp-content/uploads/2019/07/Beyond_The_Algorithm.pdf> [24.07.2025].

Rashid A.B., Kausik A.K., *AI Revolutionizing Industries Worldwide*, "Hybrid Advances", Vol. 7, 2024. DOI: https://doi.org/10.1016/j.hybadv.2024.100277

Russell S., Norvig P., *Artificial Intelligence: A Modern Approach*, 4th edition, Pearson, 2021.

Samuelson P., *Allocating Ownership Rights in Computer-Generated Works*, University of Pittsburgh Law Review, Vol. 47, 2016.

Scherer M.U., *Regulating Artificial Intelligence Systems*, Harvard Journal of Law & Technology, Vol. 29, No. 2, 2016.

Singh H., Sharma K., *Copyright in the Age of Artificial Intelligence*, International Telecommunication Union, 2024.

Smith A., *Jones B., Ethical Considerations in AI-Driven Marketing*, Journal of Business Ethics, Vol. 174, 2023.

Sobel B.L.W., *Elements of Style: Copyright, Similarity, and Generative AI*, Harvard Journal of Law & Technology, Vol. 38, No. 1, 2024. DOI: http://dx.doi.org/10.2139/ssrn.4832872

Radanliev P., *AI Ethics: Integrating Transparency, Fairness, and Privacy in AI Development*, journal "Applied Artificial Intelligence", Vol. 39, No. 1, 2025.

Shrestha S., *Liability for Automated and Autonomous AI Torts*, George Mason Law Review, Vol.29, No.1, 2021.

Sullivan A., *Tort Liability in the Age of Artificial Intelligence*, AMA Journal of Ethics, Vol. 21, No.2, 2019.

Supriyono, Wibawa A.P., Suyono, Kurniawan F., *Advancements in Natural Language Processing*, Telematics and Informatics Reports, Vol. 16, 2024. DOI: http://doi.org/10.1016/j.teler.2024.100173

UK Government, National AI Strategy, 2021. <https://www.gov.uk/government/publications/national-ai-strategy> [24.07.2025].

United Nations, Technology and Innovation Report: Inclusive Artificial Intelligence for Development, Geneva, 2025.

U.S. Copyright Office (A), *Compendium of U.S. Copyright Office Practices*, 2023.

U.S. Copyright Office (B), *Copyright and the Policy on Artificial Intelligence*, 2023.

Vallor S., Technology and the Virtues, Oxford University Press, 2018.

Wang Y., *AI and Tort Law: Autonomous Vehicles and the Challenge of Liability*, journal "Law and Technology Review", Vol. 29, No. 1, 2022.

Legal Acts and Cases

Algorithmic Accountability Act, U.S. Congress, 2019.

Artificial Intelligence Act, European Union, 2024.

Judgement of the European Court of Justice, Case C-311/18 Data Protection Commissioner v Facebook Ireland and Schrems (Schrems II), 2020.

General Data Protection Regulation (GDPR) (EU Regulation 2016/679), European Commission, 2016.