

Legal Reasoning in the Artificial Intelligence Era: Possibilities, Challenges, and Core Orientations in Domestic and International Law

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Artificial intelligence (AI) is increasingly reshaping legal practice by assisting with statutory interpretation, precedent retrieval, document analysis, and prediction of litigation outcomes. Yet the rise of AI in adjudication and legal services also raises deeper questions about the nature of legal reasoning itself. This article examines three core issues: first, the extent to which AI can replicate traditional legal reasoning methods, especially statutory interpretation, case-based reasoning, and value balancing; second, the principal risks associated with AI-assisted legal reasoning, including opacity, bias, accountability gaps, liability problems, ethical limits, and contextual misunderstanding; and third, the legal, technological, and socio-ethical orientations required to ensure that AI remains subject to human oversight. Drawing on domestic and international materials, including the EU AI Act, UNESCO and OECD principles, and comparative legal scholarship, the article argues that AI may strengthen legal decision-making only if it operates as a supportive instrument within a human-centered rule-of-law framework.

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I. Introduction

Artificial intelligence (AI) is increasingly becoming an important support tool in the legal field, from looking up case law and analyzing data to predicting the likelihood of appeals and suggesting penalties. With its ability to process vast amounts of data quickly, AI is expected to reduce court workloads, improve efficiency, and promote consistency.¹ However, behind the vision of “smart justice” lie fundamental questions: Does a formally “lawful” judgment guarantee substantive “fairness”? When trained on historical data containing social biases, AI risks reproducing and amplifying injustice, as demonstrated by criticisms of the COMPAS algorithm in the US for its bias toward people of color.² Additionally, some scholars argue that legal reasoning is not unique to the legal field but is rather a combination of conventional reasoning methods, including moral reasoning, empirical reasoning, and deduction from rules.³ This view raises a major challenge: If legal reasoning is not exclusively methodological, can AI, with its formal logic and computational capabilities, fully replicate the spirit and values of justice?⁴

The intersection of AI and legal reasoning has been explored from several perspectives. Ashley⁵ examined the potential of AI to support legal analytics, while Bankowski⁶ emphasized the philosophical dimensions of legal reasoning that AI struggles to replicate. O’Neil⁷ highlighted the risks of algorithmic bias, and

1 KEVIN ASHLEY, ARTIFICIAL INTELLIGENCE AND LEGAL ANALYTICS: NEW TOOLS FOR LAW PRACTICE IN THE DIGITAL AGE 15-8 (2017).

2 Julia Angwin et al., Machine Bias, ProPublica (May 23, 2016), <https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing>; Julia Dressel & Hany Farid, *The accuracy, fairness, and limits of predicting recidivism*, 4(1) SCL ADVANCES eao5580 (2018), <https://www.science.org/doi/10.1126/sciadv.aao5580>.

3 LARRY ALEXANDER & EMILY SHERWIN, DEMYSTIFYING LEGAL REASONING 1-31 (2008).

4 *Id.*

5 ASHLEY, *supra* note 1.

6 Neil MacCormick, *Defeasibility in Law and Logic*, in INFORMATICS AND THE FOUNDATIONS OF LEGAL REASONING 99-159 (Zenon Bankowski et al. eds., 1995).

7 CATHY O’NEIL, WEAPONS OF MATH DESTRUCTION: HOW BIG DATA INCREASES INEQUALITY AND THREATENS DEMOCRACY 7-8 & 152-3 (2016).

Lipshaw⁸ critiqued the reduction of legal practice to formalized logic devoid of ethical responsibility. Recent works, such as Engstrom, address the implications of legal tech for access to justice but often focus on technological efficiency rather than the normative foundations of justice.⁹

This article focuses on three axes of discussion: (1) the capabilities and limitations of AI in reproducing traditional legal reasoning; (2) risks to transparency, accountability, and humanism in the judiciary when applying AI; and (3) legal, ethical, and technological frameworks to ensure that AI supports, rather than replaces, humans, while upholding the rule of law and protecting human rights.

The key legal issues for debate include (1) the capabilities and limitations of AI in replicating traditional legal reasoning methods, such as legal interpretation, case law reasoning, and value-based considerations; (2) potential risks to transparency, accountability, legal responsibility, and humanness in the judiciary when AI is involved; and (3) legal, ethical, and technological strategies to ensure that AI remains a supportive tool for humans, safeguarding the rule of law and human rights. This article not only explores these core issues but also discusses how to reconcile the power of digital technology with the judiciary's mission to create justice, protect human rights, and strengthen public trust in domestic as well as international law.

While these studies provide valuable insights, a gap remains in comprehensive analysis that integrates legal, technological, and ethical dimensions to assess whether AI can meaningfully participate in legal reasoning without eroding the core values of the rule of law. This study aims to fill this gap.

This research article employs a doctrinal legal methodology combined with comparative analysis. The authors focus on a qualitative analysis of the capabilities and limitations of AI in statutory interpretation, case-based reasoning, and value balancing, as well as the associated risks regarding transparency, accountability, and human rights protection related to international law. Given its exploratory nature, this study does not include empirical data or quantitative analyses of AI adoption in judicial systems. Future studies could complement this work with surveys or interviews with legal professionals to assess perceptions of AI integration in practice.

8 JEFFREY LIPSHAW, *BEYOND LEGAL REASONING: A CRITIQUE OF PURE LAWYERING* 17-41 (2017).

9 David Engstrom, *Introduction: Civil Justice at the Crossroads*, in *LEGAL TECH AND THE FUTURE OF CIVIL JUSTICE* 1 & 8-9 (David Engstrom ed., 2023).

II. Possibilities, Challenges, and Core Orientations of Legal AI

A. Can AI replicate traditional legal reasoning methods, such as statutory interpretation, case-based reasoning, and value balancing, which are the foundations of legal reasoning?

First, AI has the ability to process semantics and analyze the structure of legal documents, helping to review millions of documents, identify terminology and clause relationships, and detect potential conflicts. In the EU, for example, an AI system analyzed data protection laws and detected conflicts between the GDPR and cross-border data-sharing regulations in e-commerce.¹⁰ Beyond their ability to process legal data and support traditional argumentation methods, AI and legal technology are creating profound changes in the legal profession. Legal tech is reshaping the way legal services are delivered, streamlining workflows, and requiring lawyers to combine technological skills with legal expertise.¹¹

This shift not only affects the way we practice but also raises important questions about the role of attorneys and judges in an increasingly automated legal ecosystem. Will these technologies complement legal work or gradually replace the functions considered central to legal thinking? However, legal interpretation requires not just understanding the letter of the law; it also requires understanding the spirit of the law, its political, social, and historical context, and its engagement with the legal system. Bankowski emphasizes that legal reasoning is not only based on logic, but also reflects the underlying philosophy and values.¹² This raises the following question: Can AI, which relies on mathematical modeling, reproduce these implicit, hard-to-quantify factors?¹³ For example, AI correctly identifies “the right to be forgotten” and related text but fails to understand debates about balancing privacy and freedom of information, which are factors that humans might consider.

Second, in case-based reasoning, AI processes large datasets, recognizes

10 For details on EU GDPR, see generally Juyoen Lee & Eric Lee, *Personal data protection of academic journals in the age of the European General Data Protection Regulation: guidelines for Korean journals*, 6(1) SCI. EDITING 73-7 (2019), <https://www.escienceediting.org/upload/pdf/kcse-158.pdf>.

11 JENS WAGNER, LEGAL TECH AND LEGAL ROBOTS: THE TRANSFORMATION OF THE LEGAL SYSTEM THROUGH NEW TECHNOLOGIES AND ARTIFICIAL INTELLIGENCE [Legal Tech und Legal Robots: Der Wandel im Rechtswesen durch neue Technologien und Künstliche Intelligenz] 10-25 (2018).

12 Zenon Bankowski et al., *Introduction*, in *INFORMATICS AND THE FOUNDATIONS OF LEGAL REASONING 1 & 10-20* (Zenon Bankowski et al. eds., 1995).

13 *Id.* at 12.

similar patterns, suggests outcomes from previous cases, reduces arbitrariness, and helps judges quickly look up precedents. However, case-based reasoning is not simply a formal comparison. This requires a deep assessment of legal relevance, distinguishing subtle differences, and considering changes in the social context over time. AI, which is based on statistical algorithms, has difficulty reproducing “legal similarity,”¹⁴ a concept that requires professional intuition and value perception. The following examples reflect the limitations of AI in making deep legal judgments that rely on human intuition, experience, and contextual knowledge.

ROSS Intelligence (US) helps retrieve case law quickly but does not analyze policy differences between states¹⁵; LexisNexis AI (UK) supports medical liability cases but does not distinguish between civil and criminal matters¹⁶; in Germany, a pilot study showed that AI suggested case law on data privacy rights but missed factors relating to social developments and legal reforms after the Schrems II ruling¹⁷; in Canada, AI assessed individual and collective labor disputes as similar in behavior but did not distinguish the fundamental differences in their legal bases (Delete). Similar concerns arise in labour disputes: AI systems may identify surface similarities between employment-related cases, but they are poorly suited to capture the collective dimension of labour law, including bargaining power, union representation, and the broader social function of collective bargaining.¹⁸

Finally, in value balancing, this is perhaps the area in which AI has its greatest limitations. Value balancing requires the law enforcers to reconcile conflicting interests and protect fundamental principles such as human rights, liberty, and

14 “Legal similarity” is the degree of legal closeness between a new case and past cases. It is not only based on formal factors (for example, two cases are about contract disputes) but also depends on content factors: Are the legally relevant facts similar? Are the applicable legal provisions similar? Has the social and economic context changed during the trial? In other words, legal similarity is not “100% similar” but is similar enough that applying a previous precedent to the new case is reasonable and fair. See KEVIN D. ASHLEY, *ARTIFICIAL INTELLIGENCE AND LEGAL ANALYTICS: NEW TOOLS FOR LAW PRACTICE IN THE DIGITAL AGE* 35-8 (2017), <https://www.scribd.com/document/1020409610/Artificial-Intelligence-and-Legal-Analytics-Kevin-D-Ashley-Z-Library>.

15 Harry Surden, *Artificial Intelligence and Law: An Overview*, 35(4) GA. ST. U. L. REV. 1305-30 (2019), <https://scholar.law.colorado.edu/faculty-articles/1234>; *Machine Learning and Law*, 89(1) WASH. L. REV. 87 (2014), <https://digitalcommons.law.uw.edu/wlr/vol89/iss1/5>.

16 Surden, *supra* note 15.

17 PAUL VOIGT & AXEL BUSSCHE, *THE EU GENERAL DATA PROTECTION REGULATION (GDPR): A PRACTICAL GUIDE* 203-5 (2021).

18 Valerio Stefano & Simon Taes, *Algorithmic Management and Collective Bargaining*, 29(1) TRANSFER: EUR. REV. LAB. & RES. 21-36 (2023), <https://doi.org/10.1177/10242589221141055>; OECD, *Social Dialogue and Collective Bargaining in the Age of Artificial Intelligence*, in OECD EMPLOYMENT OUTLOOK 2023: ARTIFICIAL INTELLIGENCE AND THE LABOUR MARKET 167-205 (2023), <https://doi.org/10.1787/08785bba-en>.

fairness. This method is based not only on legal logic, but also on moral intuition, experience, and sensitivity to the social context. Although AI is able to calculate quantitative benefits, it has difficulty grasping abstract values and is often limited by training data that carry social bias.

Lipshaw has criticized this trend, arguing that it turns lawyers into “weaponized rational tools,” treats the law as a purely logical exercise, and ignores the ethical responsibilities inherent in the legal profession.¹⁹ This raises a warning: if AI is trained on existing human data and practices, it could replicate the limitations of this “pure lawyering” model, rather than providing a more just and humane justice system.²⁰ The following examples show that AI can only assist but not replace human intuition and deliberation when it comes to judgments involving social values and human rights.

Example 1: AI can identify relevant laws and analyze data security risks in cases involving privacy and national security. However, weighing individual privacy rights against public interests requires the consideration of constitutional values and societal implications that AI cannot decide on its own.²¹

Example 2: In Europe, an AI system was tested to suggest fines for environmental violations. While AI is good at handling quantitative factors such as economic damage, it does not recognize non-economic factors such as ecological values or community rights associated with the environment.²²

Example 3: In Canada, research on AI in labor disputes found that the system proposed compromises based on wage compensation data but did not fully consider broader social implications such as gender equity and collective bargaining rights.²³

Binns warns that case-by-case judgments are unlikely to be guaranteed if decisions are based entirely on algorithms.²⁴ Similarly, O’Neil points out the risk of algorithms reinforcing social biases,²⁵ whereas Rahman acknowledges that

19 LIPSHAW, *supra* note 8, at 17-41.

20 *Id.*

21 Surden, *supra* note 15, at 13-5.

22 Voigt & Bussche, *supra* note 17, at 210-1.

23 L. Casey, *Legal AI in labor disputes: Canadian case studies*, 18(2) CAN. J. L. & TECH. 85-6 (2020).

24 Reuben Binns, *Fairness in Machine Learning: Lessons from Political Philosophy*, in CONFERENCE ON FAIRNESS ACCOUNTABILITY AND TRANSPARENCY PROC. 1-11 (2018).

25 O’Neil, *supra* note 7, at 7-8 & 152-3.

legal reasoning is the result of deep historical and philosophical processes that AI finds difficult to replicate.²⁶ If deployed properly, legal technology can expand vulnerable groups' access to justice and reduce the burden on the justice system. Engstrom warns, however, that a lack of proper governance could lead to a new "justice gap," in which those who lack access to technology are left behind.²⁷ This requires lawmakers and the judiciary to consider the broader societal impact; otherwise justice become a service stratified by the ability to pay.

The above arguments and examples show that AI can process data quickly, recognize patterns, and make suggestions from precedents. Nonetheless, it has not yet reproduced the essence of legal reasoning or the combination of legal knowledge, intuition, experience, and value considerations. Therefore, the central role of humans in the judiciary remains irreplaceable in ensuring that decisions are both legal and reasonable.

B. Potential Risks to Transparency, Accountability, Liability, Data Bias, Ethical Limits and the Ability to Understand Context in Legal Reasoning When Using AI

1. Transparency

Transparency is a core risk when AI is applied to legal reasoning. Contemporary AI systems operate like "black boxes," with millions of parameters and complex optimization processes that even their developers have difficulty explaining. This is especially important in the legal field, where transparency is not just a technical requirement but a fundamental principle for ensuring trust in justice. If AI participates in a trial without explaining how it operates, the parties' access to information and their ability to challenge it are severely affected. Many AI systems today have been criticized for being "opaque and unpredictable."²⁸ If a court uses an algorithm that neither judges nor litigants fully understand, it could erode public confidence in the entire justice system. Transparency, in this context, should be understood at two levels: (1) publicly disclosing the use of AI in decision-making; and (2) more ideally, disclosing the key criteria or underlying logic on which the AI relies to arrive at its outcome.

26 Shahid Rahman et al., *Introduction*, in *NEW DEVELOPMENTS IN LEGAL REASONING AND LOGIC: FROM ANCIENT LAW TO MODERN LEGAL SYSTEMS* 5-10 (Shahid Rahman et al. eds., 2022).

27 Engstrom, *supra* note 9, at 8-9; David Engstrom & Jonah Gelbach, *Legal Tech, Civil Procedure, and the Future of Adversarialism*, 169(4) U. PA. L. REV. 1010-5 (2021).

28 FRANK PASQUALE, *THE BLACK BOX SOCIETY: THE SECRET ALGORITHMS THAT CONTROL MONEY AND INFORMATION* 3-15 &19-25 (2015).

Transparency, at its most basic level, requires that the judicial system disclose the use of AI in decision-making. This is a prerequisite for ensuring stakeholders' right to know. When AI is involved in analyzing evidence, recommending sentences, or predicting recidivism, litigants and their attorneys should be clearly informed that this technology has contributed to the conclusions. Hiding the presence of AI not only violates the right to information but also undermines the ability to challenge and question the legal basis of the decision. The following is an example of COMPAS algorithm.

The case of the COMPAS algorithm used in the U.S. to assess the risk of recidivism illustrates the consequences of lack of transparency. Many defendants and lawyers were unaware that the risk scores on which the courts relied were generated by an AI system, leading to a fierce debate about the legitimacy of the process.²⁹

At a higher level, transparency requires that an AI system be able to explain how and what criteria it uses to make decisions. This does not necessarily require disclosing the entire source code or detailed algorithms (as this may involve intellectual property rights), but it should indicate the key legal criteria applied, the training data on which the system relies, and the overall logic that connects the data to the conclusions. The following is an example of personal data protection.

Some AI systems in Europe used to help determine fines for personal data breaches under the GDPR, have been required to provide reports describing how they weigh both quantitative (e.g., financial loss) and non-quantitative (e.g., the extent of the privacy breach) factors. This is to ensure that decisions are not completely opaque and to help judges understand the reliability of the AI suggestions.³⁰

Transparency is not just a technical requirement, but is also closely linked to the principles of accountability and due process. If a defendant cannot understand the basis of a judgment because the AI cannot or is not allowed to explain it, the right to appeal and full protection are at risk. From a human rights perspective, a lack of transparency can lead to systemic injustices when data biases are “camouflaged” in seemingly objective algorithms.³¹ Lee argues that law

29 Angwin et al., *supra* note 2; Dressel & Farid, *supra* note 2.

30 VOIGT & BUSSCHE, *supra* note 17, at 203-5.

31 O'Neil, *supra* note 7.

operates based on cultural context and rich human life experiences; therefore, purely language-based AI models cannot fully capture the subtleties of human experience and the abstract reasoning behind legal language.³²

2. Explainability and Accountability

Explainability and accountability are core requirements of judicial fairness. Although judges must clearly justify their decisions so that parties can understand and challenge them, AI produces outputs from deep learning models without providing natural language explanations. This makes it difficult to ensure the right to appeal and accountability, especially when AI operates as a “black box.” As mentioned, the COMPAS system in the US can assign a risk score of “7/10” to a defendant but cannot explain the specific reasons behind it, because its logic is deeply embedded in the algorithmic structure that even programmers find difficult to explain.³³

As a result, litigants’ rights are threatened when they do not know the basis of the AI’s assessment, while courts struggle to justify judgments based largely on its suggestions. A Canadian study found that although AI was statistically more accurate at predicting recidivism than humans, it provided only a list of input data elements when an explanation was requested; this lacks legal weight and fails to provide a sufficient basis for litigants’ rebuttals.³⁴ Even large language models like GPT-4 – which excels at generating text – produce “pseudo-explanations” that sound plausible but do not reflect the reasoning behind them.³⁵ To address this, researchers have proposed explainable AI (XAI), which provides clear reports of decision logic and criteria. However, this technology is still in the experimental stage and is not yet sufficiently reliable to replace humans in the judicial system.

3. Liability

Liability is a complex issue: if an AI makes a mistake, who is responsible – the developer, supplier, court, or judge? When an AI learns and behaves unexpectedly, assigning responsibility becomes more complicated. As machine-learning systems become increasingly complex, they can behave in ways unanticipated by

32 Kevin Lee, *Naturalizing Legal Interpretation After Generative AI*, in CONFERENCE ON FAIRNESS ACCOUNTABILITY AND TRANSPARENCY PROC. 1-11 (2024), https://am.aals.org/wp-content/uploads/sites/4/2024/12/naturalizing_jurisprudence__after_ai_distrib.cleaned.pdf.

33 Angwin et al., *supra* note 2.

34 Casey, *supra* note 23, at 77-89.

35 Cynthia Rudin, *Stop explaining black box machine learning models for high stakes decisions and use interpretable models instead*, 1 NATURE MACH. INTEL. 206-15 (2019).

their developers, creating significant challenges in attributing liability.³⁶

Currently, most legal systems do not have clear regulations on the responsibility in cases where AI causes damage. This challenge arises from AI, which can learn by itself, allowing systems to produce results beyond direct human control. This blurs the line between the behavior of the participating subjects and the errors arising from the system itself. Many AI models operate as “black boxes,” making it difficult for both developers and users to determine the cause of an erroneous decision. The decision-making process in these systems lacks transparency because “no one can know for sure who or what is responsible.”³⁷ As a result, attributing legal liability becomes difficult and risks obscuring the principle of personal responsibility, an essential foundation for justice and deterrence in a rule-of-law society.

4. Data bias

Data bias is a serious risk when AI relies on training data. If the data reflect social or economic biases, AI will reproduce and even reinforce inequities in its predictions and legal recommendations.³⁸ More worrying is that AI can not only reflect but also reinforce existing inequities, turning them into implicit rules that operate within the system.³⁹ Legally, this challenges the principles of due process and equality before the law. The justice system requires that individuals be evaluated based on their unique circumstances, whereas AI often applies generalized models based on historical data, risking the omission of important human factors.⁴⁰ It is the responsibility of developers and the judiciary to ensure that data and algorithms do not reproduce the biases that law seeks to eliminate.⁴¹ Maintaining trust in the legal system requires independent checks and balances on data and algorithms, along with transparent standards for how AI handles sensitive factors such as race, gender, and social status. The absence of these measures not only threatens the legitimacy of judgments, but also undermines

36 “As machine learning systems grow more complex, they may act in unforeseen ways by their developers, complicating attribution of legal responsibility.” See Surden, *supra* note 15, at 1325.

37 PASQUALE, *supra* note 28.

38 Solon Barocas & Andrew Selbst, *Big Data’s Disparate Impact*, 104(3) CAL. L. REV. 671-732 (2016), <https://lawcat.berkeley.edu/record/1127463>.

39 VIRGINIA EUBANKS, AUTOMATING INEQUALITY: HOW HIGH-TECH TOOLS PROFILE, POLICE, AND PUNISH THE POOR 38-44 & 122-30 (2018).

40 KATE CRAWFORD, THE ATLAS OF AI: POWER, POLITICS, AND THE PLANETARY COSTS OF ARTIFICIAL INTELLIGENCE 8-12 (2021).

41 Tal Zarsky, *The Trouble with Algorithmic Decisions: An Analytic Road Map to Examine Efficiency and Fairness in Automated and Opaque Decision Making*, 41(1) SCI. TECH. HUM. VALUES 118-32 (2016).

the core values of the rule of law.⁴²

5. Ethical limits

Logically sound decisions do not necessarily mean morally correct ones. Many human values, such as the right to life, dignity, and compassion are beyond the understanding and programming capabilities of AI. Similarly, AI can optimize efficiency and social order, but at the same time violate basic rights such as privacy and the right to be heard, or even damage human dignity. When issuing its AI principles, the Japanese government emphasized that AI-assisted decisions must not lead to injustice or violate human dignity.⁴³ Furthermore, the absence of a clear “right to explanation” in current legal frameworks increases the moral hazard. As Wachter et al. analyzed, even the GDPR, a high standard for data protection, does not establish a legal obligation requiring AI systems to explain the basis of automated decisions, leaving a significant gap in the protection of fundamental rights.⁴⁴ The challenge is to draw clear ethical lines: What areas or levels of justice should not be delegated to AI? On the one hand, AI must be subject to the law and basic human rights; on the other, society needs to consider limits to avoid turning courts into cold, uncaring places of judgment.

6. Ability to understand context

AI relies on training data and preprogrammed algorithms to make predictions. In legal reasoning, however, the context, from customs to legal principles, plays a key role. Current language models are good at recognizing language patterns but weak at abstracting and connecting to the real world, lacking the ability to “understand” the context beyond the data.⁴⁵ In rural land dispute, for example, a human judge may understand and consider local customs when applying the law, such as dividing land between generations. Meanwhile, an AI system trained on urban case-law data may overlook this factor, leading to legal recommendations that are not appropriate for a specific social context.⁴⁶ Judges do not apply rules mechanically; they also rely on professional intuition and tacit

42 FRANK PASQUALE, *NEW LAWS OF ROBOTICS: DEFENDING HUMAN EXPERTISE IN THE AGE OF AI* 45-63 (2020).

43 Ministry of Economy, Trade and Industry (METI), *Social Principles of Human-Centric AI* (Mar. 29, 2019), <https://www.cas.go.jp/jp/seisaku/jinkouchinou/pdf/humancentricai.pdf>.

44 Sandra Wachter et al., *Why a Right to Explanation of Automated Decision-Making Does Not Exist in the General Data Protection Regulation*, 7(2) INT'L DATA PRIV. L. 76-99 (2017).

45 Bart Verheij, *Artificial intelligence as law*, 28 A.I. & L. 181-206 (2020).

46 CRAWFORD, *supra* note 40, at 111-4.

knowledge. AI lacks the life experience required to understand non-data signals, such as a defendant's remorse or victim psychology, which shape fair judgment.⁴⁷ In a domestic violence case, for example, a human judge can sense the victim's anxiety from her eyes or voice, something that AI, which relies on quantitative data such as recidivism, completely misses.

C. Legal, Technological, and Socio-Ethical Orientations of Legal Reasoning in the AI Era

1. Legal orientation: Protecting the spirit of legal reasoning

AI is reshaping the judiciary. However, it is important that legal reasoning is not merely a series of logical operations but also a blend of rules, precedents and value considerations. To preserve this nature, AI should not replace humans in making final judgments, but only play a supporting role.⁴⁸ The first step is to adopt the human-in-the-loop principle to ensure that all decisions are subject to human oversight and approval. Transparency and accountability regulations, particularly where algorithms are protected by trade secrets, should be developed to ensure the right to challenge decisions and maintain public confidence in the judicial system.⁴⁹

2. Technology Orientation: Enhance Capability and Control Risks

From a technological perspective, the challenge lies in developing systems that not only "understand" the law, but consider social context and underlying values.⁵⁰ Explainable AI (XAI) systems must move beyond providing technical reasoning toward explanations that can be verified and debated in legal settings.⁵¹ At the same time, data must be tightly regulated. Such techniques as algorithmic impact assessment or filtering sensitive data can help reduce bias. Independent

47 *Id.* at 118-20.

48 European Commission, Ethics guidelines for trustworthy AI (Apr. 8, 2019), <https://digital-strategy.ec.europa.eu/en/library/ethics-guidelines-trustworthy-ai>.

49 See Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence (Artificial Intelligence Act), arts. 13-4, <https://eur-lex.europa.eu/eli/reg/2024/1689/oj/eng>; OECD, AI Principles (2024), <https://www.oecd.org/en/topics/ai-principles.html> (stating that trustworthy AI should respect human rights and democratic values and include appropriate human oversight).

50 Verheij, *supra* note 45.

51 Wachter et al., *supra* note 44, at 97-8. See also Government of Canada, Algorithmic Impact Assessment tool, <https://www.canada.ca/en/government/system/digital-government/digital-government-innovations/responsible-use-ai/algorithmic-impact-assessment.html>; EUROPEAN DATA PROTECTION SUPERVISOR, TECH DISPATCH: EXPLAINABLE ARTIFICIAL INTELLIGENCE 1-23 (2023), https://www.edps.europa.eu/system/files/2023-11/23-11-16_techdispatch_xai_en.pdf.

oversight is, however, required to prevent the reproduction of social injustice. Efforts to develop legal knowledge graphs or multimodal AI promise to enhance the processing of legal data and context, but must be validated to avoid adding complexity without delivering real value.⁵²

3. Ethical and Social Orientation: Keeping Humanity in Justice

Legal reasoning cannot be separated from the human element such as intuition, experience, and sensitivity to individual's living circumstances. As AI becomes more involved, the question arises: can a "mechanized" judiciary maintain the humanity that is the soul of justice? Additionally, the issue of legal liability must be redefined. When AI makes serious mistakes, the traditional concept of fault may not apply. A system of cascading or collective liability may be required to ensure that no party is exempt from legal consequences. Ultimately, the model of AI in the judiciary should be clearly defined either as a tool that enhances the capacity of judges and lawyers or as an independent decision-making entity. The answer will determine the future of public trust in the legal system and the rule of law in digital society.⁵³

III. Legal AI in International Aspects

A. Solutions for the Development of New Research Fields Based on Practical Demands

The digitalization is exerting a profound impact on all aspects of human society, including the legal domain. The issues related to global security, international protection of human rights, and sustainable development are of paramount importance. Consequently, the effective integration of technological advancements into legal activities, as well as the establishment of an appropriate legal framework governing these technological questions require thorough and systematic examination.

52 Surden, *supra* note 15. See also UNESCO, Recommendation on the Ethics of Artificial Intelligence (2021), <https://www.unesco.org/en/artificial-intelligence/recommendation-ethics> (emphasizing human oversight, accountability, and protection of human dignity); PASQUALE, *supra* note 42; European Parliament, Resolution of 20 October 2020 with recommendations to the Commission on a civil liability regime for artificial intelligence (2020/2014(INL), https://www.europarl.europa.eu/doceo/document/TA-9-2020-0276_EN.html).

53 Heng Zheng & Bart Verheij, *Rules, cases and arguments in artificial intelligence and law*, in RESEARCH HANDBOOK ON BIG DATA LAW 374-88 (2021).

The application of AI in international legal practice entails developing cognitive and evaluative capacities closely linked to legal reasoning frameworks. In this regard, we should focus on three principal functions. First, AI may be used to provide legal services in the global world. Second, it may be applied in international judicial and adjudicative practices. Third, it may be utilized in transnational legislative and law-making activities.⁵⁴

When providing legal service in the global aspects, automation tools may reduce time and efforts.⁵⁵ For example, AI supports information retrieval, data analysis, contract drafting, preparation of petitions and applications based on standardized templates; in this case, the use of electronic signatures constitute some of the most basic functions.⁵⁶ More advanced algorithms can process vast legal datasets of, e.g., international organizations like the UN to deliver results more rapidly and, in some respects, more precisely than human professionals.⁵⁷

Thus, AI facilitates automating the tasks traditionally performed by legal practitioners, optimizing the delivery of legal services to individuals, organizations, and businesses. For example, chatbots may assist citizens in resolving relatively simple legal matters, such as disputes concerning parking fines. Such situations create demand for legal support without the direct involvement of international lawyers or diplomats. Consequently, several online dispute resolution (ODR) platforms have gained prominence.⁵⁸

In the US, the legal technology startup Modria provides such services by enabling the resolution of low-complexity consumer complaints on platforms such as eBay and PayPal without recourse to judicial intervention.⁵⁹ Automated legal tools such as Modria and DoNotPay reflect the broader trend of digitalization in legal services, although their functions remain largely confined to procedural assistance.⁶⁰ By contrast, the substantive legal reasoning capacity of AI remains largely aspirational and requires further development.⁶¹ Similarly, well-known automated legal reference systems currently in use include LEXIS, WESTLAW, JURIS, ITALGUIRE, LEXinform, Finlex, and the Bundestag Information System (DIP), and the German Parliament's information system. These systems

⁵⁴ *Id.*

⁵⁵ Surden, *supra* note 15, at 1305-35.

⁵⁶ RICHARD SUSSKIND, *ONLINE COURTS AND THE FUTURE OF JUSTICE* 27 (2019).

⁵⁷ ASHLEY, *supra* note 1, at 50.

⁵⁸ ETHAN KATSH & ORNA RABINOVICH-EINY, *DIGITAL JUSTICE: TECHNOLOGY AND THE INTERNET OF DISPUTES* 70 (2017).

⁵⁹ *Id.* at 75-90.

⁶⁰ Surden, *supra* note 15, at 1305-35.

⁶¹ ASHLEY, *supra* note 1, at 35.

primarily function as electronic legal reference databases. However, they are not yet regarded as AI in a strict sense, as their core capabilities are limited to the retrieval, search, and cross-referencing of legal texts. Today, developers are increasingly seeking to transform these systems into genuine AI-based tools, but it requires establishing a robust foundation for legal reasoning.⁶²

Recently, Legal Informatics (also referred to as AI and Law) is under development to combine research in computer science with legal logic. Legal Informatics does not seek to replace judges or lawyers; instead, it analyzes the application of law to concrete cases to translate legal reasoning into executable computational models. In this research, law is understood as a system comprising a multitude of complex norms where the interpretation of legal rules, the assessment of facts, and the formulation of arguments play a central role. The most challenging aspect of this discipline lies in modeling and automating reasoning processes, namely legal reasoning itself.⁶³

This, in turn, requires that programmers, researchers and students solidly understand the three principal models of legal reasoning as follows:⁶⁴ (1) the rule-based legal reasoning which derives legal outcomes when predefined conditions are satisfied; (2) case-based reasoning which simulates the reasoning style of common law systems by resolving new cases through comparison with previously adjudicated ones; and (3) argument-based reasoning, which focuses on the construction, evaluation, and contestation of legal arguments.⁶⁵ In this regard, the concept of legal reasoning addressed in this study must be incorporated into AI systems through an integrated approach that draws on all three models. Such an approach is of critical importance not only for the application of AI in judicial decision-making but also for its use in legislative and law-making processes.⁶⁶

B. Developing and Improving Policies and Legal Frameworks on AI

The rapid development of science and technology has led to the increasingly pervasive impact of AI across all sectors. AI poses numerous risks to security and social order raising latent ethical and legal challenges. Therefore, the development

62 *Id.* at 45.

63 Daniel Katz, *AI + Law*, in *LEGAL INFORMATICS* 87-93 (Daniel Katz et al. eds., 2021); Zheng & Verheij, *supra* note 51.

64 Surden, *supra* note 15, at 1310-5.

65 Trevor Bench-Capon & Giovanni Sartor, *A Model of Legal Reasoning with Cases Incorporating Theories and Values*, 26(1-2) *A.I.* 1-45 (2003); Zheng & Verheij, *supra* note 51.

66 SUSSKIND, *supra* note 56, at 50-5.

and refinement of legal and policy frameworks governing AI in each country have become urgent task, particularly those who have already achieved or are actively pursuing advanced levels of scientific and technological development and innovation. Simultaneously, The establishment of a regulatory framework for AI demands a preemptive methodology, ensuring that legal norms can accommodate future developments in the field.⁶⁷ It is essential to set up liability frameworks for complex cases involving unforeseen AI behaviors, alongside clear regulations governing the use of AI within judicial proceedings.⁶⁸ At present, a considerable number of cases demonstrate the negative impacts of AI on privacy rights, personal data security, cybersecurity, autonomous vehicles,⁶⁹ and the insufficient regulation of AI applications on social media platforms.⁷⁰

To date, a number of international instruments have emerged which serve as foundational references for developing legal frameworks on AI at the national level in order to foster a shared and unified understanding.⁷¹ For example, a UNESCO report identifies four principal characteristics of modern robots: mobility, interactivity, communicative capacity, and autonomy, which enable robots to analyze situations, make independent decisions, and perform actions without human intervention or control.⁷² In addition, the European Parliament Resolution P8_TA-PROV (2017) 0051 proposes that AI be understood as a non-biological, autonomous cyber-physical system, capable of interacting with other similar systems, learning autonomously, making decisions, and acting under the conditions determined by its surrounding environment.⁷³

Legal and policy frameworks of AI should be developed and refined under the guidance of several key principles.⁷⁴ First, legislators must be equipped with

67 European Commission, White Paper on Artificial Intelligence: A European Approach to Excellence and Trust (2020), at 9, https://commission.europa.eu/system/files/2020-02/commission-white-paper-artificial-intelligence-feb2020_en.pdf.

68 European Parliament, Report with Recommendations to the Commission on a Civil Liability Regime for Artificial Intelligence (2020/2014(INL) (2020), at 20, https://www.europarl.europa.eu/doceo/document/TA-9-2020-0276_EN.html.

69 Gary Marchant & Rachel Lindor, *The Coming Collision Between Autonomous Vehicles and the Liability System*, 52(4) SANTA CLARA L. REV. 1321-40 (2012).

70 Wachter, *supra* note 44, at 76-99.

71 OECD, AI Principles, <https://www.oecd.org/en/topics/ai-principles.html>; Recommendation of the Council on Artificial Intelligence (2019), <https://oecd.ai/en/assets/files/OECD-LEGAL-0449-en.pdf>.

72 UNESCO, Report of COMEST on Robotics Ethics (2017), at 14-6, <https://unesdoc.unesco.org/ark:/48223/pf0000253952>.

73 European Parliament, Resolution of 16 February 2017 with Recommendations to the Commission on Civil Law Rules on Robotics (2015/2103: INL), https://www.europarl.europa.eu/doceo/document/TA-8-2017-0051_EN.html.

74 European Commission, *supra* note 67, at 9.

adequate AI science knowledge and expertise.⁷⁵ When designing algorithms based on models of legal reasoning—the foundation of legal argumentation in AI development—unified guiding principles are necessary such as the deployment of high-quality, safe, and human-centered AI.⁷⁶ It is essential to ensure the protection of privacy, information, and personal data; safeguard human rights; and prevent and mitigate violations of human values and social ethics.⁷⁷ Second, in the research, application, and development of AI, detailed regulations concerning the legal liabilities of enterprises, organizations, and individuals should be established.⁷⁸

Such regulations should address administrative, civil, and criminal liabilities arising from the research and deployment of AI.⁷⁹ In civil law and intellectual property law, for example, there is a pressing need to codify and refine the rules concerning the proprietary rights of AI-generated content.⁸⁰ Numerous controversial cases have emerged concerning the ownership of outputs resulting from the combined creative efforts of humans and AI. Regarding criminal law, regulations should be formulated to determine legal liability in cases of AI, depending on the degree of fault, severity of violation, and level of risk posed by AI products. These provisions must serve to deter and preempt criminal activities involving the misuse of AI.⁸¹

In practice, international regulation of AI remains fragmented and incomplete. Although AI governance has advanced rapidly, significant normative gaps persist across jurisdictions, especially with respect to legal personhood, the instrumental status of AI, liability for AI-caused harm, and the ownership of AI-generated outputs. The authors' position is that AI should not be treated as an autonomous legal actor equivalent to a human subject of law; rather, it should be regulated as a powerful socio-technical instrument whose design, deployment, and consequences must remain traceable to human and institutional responsibility. From an international legal perspective, this approach better preserves

75 UNESCO, *supra* note 72, at 9-10.

76 OECD, *supra* note 71, at 4-6.

77 *Id.* at 13-5.

78 European Parliament, *supra* note 73, at 5-7.

79 European Commission, *supra* note 67, at 14-7.

80 WIPO, WIPO Conversation on Intellectual Property and Artificial Intelligence (2020), at 13-20, https://www.wipo.int/meetings/en/doc_details.jsp?doc_id=499504.

81 See, e.g., UNESCO, *supra* note 72; OECD, *supra* note 72. European Parliament resolution of 20 October 2020 on a civil liability regime for artificial intelligence (2020/2014(INL), all of which support risk-based governance and responsibility for harmful or unlawful AI uses.

accountability, protects fundamental rights, and avoids diluting the rule-of-law principle that legal responsibility must ultimately attach to identifiable natural or legal persons.

Establishing the elements of fault in AI-related litigation is significantly more complex than in traditional cases, as it necessitates a multidisciplinary approach combining legal doctrine with computer science.⁸² Globally, the majority of AI-related legal issues are attributed to systemic vulnerabilities, specifically regarding algorithmic flaws or the inherent incompleteness of the systems.⁸³ Accordingly, the designer and manufacturer of AI systems should bear primary responsibility for addressing system the deficiencies, as these actors are best positioned to foresee potential errors and implement preventive measures.⁸⁴ However, the inherent capacity of AI for autonomous learning – often transcending the original intentions of developers and users – introduces risks that can undermine human safety and public order.⁸⁵

In the United States, Executive Order 14110 of 30 October 2023 represented an important policy effort to promote safe, secure, and trustworthy AI, even though it was later rescinded in January 2025. In the European Union, Regulation (EU) 2024/1689 (EU AI Act), published in the Official Journal on 12 July 2024, marks a major milestone in AI governance. As the first comprehensive binding framework of its kind, the EU AI Act seeks to ensure that AI systems are developed and used in a manner consistent with human oversight, safety, transparency, privacy, non-discrimination, and the protection of fundamental rights.

Furthermore, specific provisions of the EU AI Act offer a concrete regulatory template for other jurisdictions, particularly the transparency obligations requiring disclosure when users interact with certain AI systems or when they are exposed to AI-generated or manipulated content such as deepfakes. Effective governance, however, also depends on enforcement. For that reason, market-surveillance mechanisms and proportionate sanctions are indispensable. Under Article 99 of the AI Act, serious non-compliance may trigger administrative fines of up to EUR 35 million or 7% of worldwide annual turnover, depending on the nature of the breach. This combination of *ex ante* obligations and *ex post* enforcement gives the Act broader comparative significance.

82 Ryan Calo, *Robotics and the Lessons of Cyberlaw*, 103(3) CAL. L. REV. 513-63 (2015).

83 Marchant, *supra* note 69, at 1321-40.

84 European Commission, *supra* note 67, at 14-7.

85 UNESCO, *supra* note 72, at 7-8.

C. Reconceptualizing AI Application Research

Today, states commonly pursue the application of AI in judicial activities along the following trajectory: investing resources in system development; populating systems with vast datasets – including statutory texts, case law, and international treaties; conducting scenario testing; and evaluating outcomes based on collected data. However, it may be still questioned whether this approach could be reoriented toward a parallel operational model, in which human adjudication is conducted concurrently with AI acting as an independent validation mechanism. Such an approach would enable direct data collection and facilitate the identification of emergent reasoning patterns that develop beyond the initial expectations of AI developers. As a result, researchers can derive robust technical assessments and empirical data concerning the AI systems currently under development. Furthermore, The cross-jurisdictional exchange of empirical findings enriches the global knowledge base and significantly accelerates the research and development lifecycle for AI-driven judicial systems.

IV. Conclusion

The integration of AI into judicial systems poses a profound challenge to traditional legal reasoning. While AI has the potential to enhance efficiency and support decision-making, it risks undermining the humanistic foundations of justice if left unchecked. The question is not merely whether AI can process laws and precedents, but whether it can grasp the values and contextual nuances that define fair adjudication. Securing the future of justice requires clearly defined ethical and legal boundaries. Proactive governance is crucial for ensuring that AI serves as a tool for human judgment rather than a substitute for human decision-making. Without such measures, algorithms can inadvertently reshape justice into a process devoid of empathy and accountability. In the digital age, safeguarding a justice system in a technologically advanced and deeply humane manner requires sustained dialogue, interdisciplinary collaboration, and a steadfast commitment to the principles of the rule of law.

This study has employed a doctrinal legal research methodology supplemented by comparative analysis. Although this approach provides a solid foundation to examine the normative, technological, and ethical dimensions of AI in legal reasoning, it has several limitations. First, the study does not include empirical

investigations, such as, surveys, interviews, or case studies to evaluate the practical implementation of AI in judicial systems or legal professionals' perception toward AI-assisted decision-making. Such data could enrich the analysis by providing insights into real-world challenges and user acceptance. Second, the comparative perspective is limited. While this study references to both civil and common law systems, it does not conduct an in-depth, systematic comparison of how different legal traditions might shape or constrain the integration of AI into legal reasoning. Third, the discussion of technological solutions such as Explainable AI (XAI) and legal knowledge graphs, remains conceptual and lacks technical evaluation regarding their feasibility in diverse legal environments. Finally, while highlighting key concerns, the ethical analysis does not address culturally specific values or jurisdictional variations in the perception of justice. These limitations underscore the need for future interdisciplinary research that combines legal theory, empirical studies, and technical assessments to develop context-sensitive and actionable recommendations.

In the future, research on AI in legal reasoning should advance across multiple dimensions to address the existing limitations. First, empirical investigations are essential to complement the theoretical analysis. Surveys, interviews, and case studies with judges, lawyers, and litigants can provide valuable insights into how AI tools are perceived, accepted, and utilized within diverse judicial systems. Such research would reveal real-world barriers to – and facilitators of – AI adoption and help assess its impact on access to justice, public trust, and procedural fairness.

Second, a comparative study of legal traditions should be conducted. Future work could systematically examine how civil and common law systems differ in their institutional readiness, normative frameworks, and cultural attitudes toward AI integration. Such an approach would allow for tailored recommendations that reflect jurisdictional specificities. Third, interdisciplinary collaboration among legal scholars, computer scientists, ethicists, and policymakers is crucial for developing AI governance models. These models should address transparency, accountability, and the protection of fundamental rights while balancing efficiency and ethical imperatives. Furthermore, exploring the technical feasibility and regulatory alignment of Explainable AI (XAI) and legal knowledge graphs across various legal contexts will significantly enrich the discourse. Finally, broader philosophical inquiries are required. How much automation can a justice system tolerate before losing its humanistic essence? Will future justice reflect a genuine collaboration between human reasoning and algorithmic processing, or herald

the gradual surrender of conscience to machines? Addressing these questions is vital to ensure that technological innovation serves, rather than subverts, the ideals of justice.

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