

## Legal, Ethical, and Regulatory Challenges of AI Integration in the Judicial System: Between Efficiency and Fairness

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### Abstract

*The integration of AI into judicial systems represents a consequential and underregulated transformation in modern governance. This study is anchored in the accountability gap framework, which argues that autonomous systems create a gap between human agency and legal responsibility, and in the principle of due process, which requires procedural compliance and protection of fundamental rights in AI-mediated decisions. The study evaluates the opportunities and risks associated with AI in legal document automation, case management, predictive analytics, and decision-making. The study analyzes the ethical, legal, and practical challenges AI poses to judicial systems, including bias, accountability, transparency, and data protection. A qualitative methodology, including doctrinal analysis and document review, examined legislation, case law, and institutional frameworks, supported by empirical illustrations. The findings highlight efficiency gains, improved access to justice, and enhanced analytical capabilities. In response to the identified risks, the research recommends establishing ethical oversight boards, maintaining AI transparency logs, developing hybrid human-AI decision-making frameworks, and implementing robust legislative mechanisms. AI offers unprecedented advances in case management, improved legal research, and more consistent analytical support for judicial decision-making. Its deployment must be carefully and strictly regulated. The paper concludes that efficiency and fairness are not inherently opposed, but that realizing both requires moving beyond technical fixes toward structural legal reform.*

**Keywords:** AI governance, Judicial decision-making, Algorithmic bias



## INTRODUCTION

What happens when machines begin to make decisions that affect human rights, livelihoods, or access to justice? This is no longer hypothetical but an urgent challenge arising from AI integration into critical sectors. As AI systems are deployed in recruitment, healthcare, judicial decision-making, and governance, they create both opportunities and legal risks.<sup>1</sup> COMPAS (Correctional Offender Management Profiling for Alternative Sanctions) algorithm in US court has been criticized for racially skewed risk assessments. Similarly, the Dutch SyRI (System Risk Indication) surveillance tool in 2020 was struck down for violating privacy rights under Article 8 of the European Convention on Human Rights.<sup>2</sup> Without adequate legal frameworks, AI may exacerbate inequality, undermine procedural fairness, and erode public trust.<sup>3</sup> AI integration has exposed a critical deficiency: legal systems remain ill-equipped to regulate autonomous technologies obligations.<sup>4</sup> The root of the problem is the legal framework, rooted in human intent, error, and predictability, which now faces the unprecedented challenge of governing algorithmic agents that make decisions based on data rather than conscience.<sup>5</sup> The EU AI Act provides the most comprehensive contemporary definition of AI systems.<sup>6</sup> For the purposes of this study, AI refers to algorithmic systems, including machine learning models, natural language processing tools, and predictive analytics, that are deployed in judicial, prosecutorial, or legal administrative processes to produce legal outcomes.<sup>7</sup> This mismatch has created a

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<sup>1</sup> Adib Bin Rashid and Md Ashfakul Karim Kausik, 'AI Revolutionizing Industries Worldwide: A Comprehensive Overview of Its Diverse Applications', *Hybrid Advances* 7, no. 100277 (2024): 1–34, <https://doi.org/10.1016/j.hybadv.2024.100277>.

<sup>2</sup> Duncan Purves and Jeremy Davis, 'Should Algorithms That Predict Recidivism Have Access to Race?', *American Philosophical Quarterly* 60, no. 2 (2023): 205–20, <https://doi.org/10.5406/21521123.60.2.07>.

<sup>3</sup> Muthukuda Arachchige Dona Shiroma Jeeva Shirajanie Niriella, 'Artificial Intelligence and Sentencing Practices: Challenges and Opportunities for Fairness and Justice in the Criminal Justice System in Sri Lanka', *International Annals of Criminology* 62, nos 3–4 (2024): 492–542, <https://doi.org/10.1017/cri.2024.24>.

<sup>4</sup> Zheng Sophia Tang, *Smart Court: The Court of the Future*, 1st edn (Cambridge University Press, 2025), 26.

<sup>5</sup> Muhammad Azil Maskur et al., 'Reimagining Criminal Liability in the Age of Artificial Intelligence: Toward a Comparative and Reform-Oriented Legal Framework', *Journal of Law and Legal Reform* 6, no. 4 (2025): 1805–38, <https://doi.org/10.15294/jllr.v6i4.35540>.

<sup>6</sup> Miguel Ángel Presno Linera and Anne Meuwese, 'Regulating AI from Europe: A Joint Analysis of the AI Act and the Framework Convention on AI', *The Theory and Practice of Legislation* 13, no. 3 (2025): 292–311, <https://doi.org/10.1080/20508840.2025.2492524>.

<sup>7</sup> Vanita Mohod et al., 'Harnessing Predictive Analytics and AI in Judicial Decisions', in *Advances in Electronic Government, Digital Divide, and Regional Development*, ed. Halim Bajraktari (IGI Global, 2025), 190, <https://doi.org/10.4018/979-8-3693-7205-0.ch010>.

legal vacuum where accountability is ambiguous, rights are unprotected, and harms go unremedied. The problem is particularly acute in developing digital economies where AI deployment often exceeds regulatory capacity.

Research on AI in legal systems has expanded significantly over the past decade, yet conceptual and institutional gaps remain. Early scholarship predicted the shift from bespoke legal services to increasingly automated legal solutions.<sup>8</sup> Subsequent research examined the regulatory challenges posed by autonomous decision-making.<sup>9</sup> Scholars have also highlighted concerns regarding accountability and transparency, particularly in criminal justice.<sup>10</sup>

More recent studies show how systems such as COMPAS can reproduce historical discrimination.<sup>11</sup> Despite this literature, technical and legal analyses often remain disconnected.<sup>12</sup> AI decision-making is unclear and possibly conflicts with fairness and due process rights. The concerns are bias in these systems and the challenge of holding someone responsible when automated systems make mistakes.<sup>13</sup> Questions remain about who is legally responsible for AI-assisted decisions. The main critique is that these systems don't meet the transparency requirements our legal system demand.<sup>14</sup> More critically, there is a lack of research on the normative, procedural, and infrastructural challenges faced by legal professionals.<sup>15</sup>

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<sup>8</sup> Drew Simshaw, *Access to A.I. Justice: Avoiding an Inequitable Two-Tiered System of Legal Services*, 24 (2022): 150–226, [https://yjolt.org/sites/default/files/simshaw\\_-\\_access\\_to\\_a.i.\\_justice.pdf](https://yjolt.org/sites/default/files/simshaw_-_access_to_a.i._justice.pdf).

<sup>9</sup> Eleonora Catena, 'AI and Human Autonomy: A Literature Review', sect. 126, *AI and Ethics* 6, no. 1 (2026): 1–28, <https://doi.org/10.1007/s43681-025-00958-4>.

<sup>10</sup> Saleh Afroogh et al., 'Trust in AI: Progress, Challenges, and Future Directions', sect. 1358, *Humanities and Social Sciences Communications* 11, no. 1 (2024): 1–30, <https://doi.org/10.1057/s41599-024-04044-8>.

<sup>11</sup> Yucheng Cao et al., 'Ethical Challenges in the Algorithmic Era: A Systematic Rapid Review of Risk Insights and Governance Pathways for Nursing Predictive Analytics and Early Warning Systems', sect. 151, *BMC Medical Ethics* 26, no. 1 (2025): 1–21, <https://doi.org/10.1186/s12910-025-01308-z>.

<sup>12</sup> David Uriel Socol De La Osa and Nydia Remolina, 'Artificial Intelligence at the Bench: Legal and Ethical Challenges of Informing or Misinforming Judicial Decision-Making Through Generative AI', *Data & Policy* 6 (2024): 1–30, <https://doi.org/10.1017/dap.2024.53>.

<sup>13</sup> Markus Kattnig et al., 'Assessing Trustworthy AI: Technical and Legal Perspectives of Fairness in AI', *Computer Law & Security Review* 55 (2024): 1–18, <https://doi.org/10.1016/j.clsr.2024.106053>.

<sup>14</sup> Ahmed Oudah Mohammed Al-Dulaimi and Mohammed Abd-Al Wahab Mohammed, 'Legal Responsibility for Errors Caused by Artificial Intelligence (AI) in the Public Sector', *International Journal of Law and Management* 68, no. 4 (2026): 695–722, <https://doi.org/10.1108/IJLMA-08-2024-0295>.

<sup>15</sup> Petar Radanliev, 'AI Ethics: Integrating Transparency, Fairness, and Privacy in AI Development', *Applied Artificial Intelligence* 39, no. 1 (2025): 1–41, <https://doi.org/10.1080/08839514.2025.2463722>.

This study examines the ethical, legal, and practical challenges of AI integration within legal institutions. It explores how AI can be introduced into legal processes without undermining rights, due process, or institutional integrity. By examining professional preparedness, normative frameworks, and socio-technical dynamics, the study identifies gaps and proposes recommendations for policy and legislative reform. The study hypothesizes that while AI may improve judicial efficiency and access to justice, it may also exacerbate legal uncertainty and ethical risks where regulatory foundations are weak.

This study addresses three research questions: (1) What are the structural legal and ethical risks posed by the integration of AI into judicial and administrative decision-making processes? (2) To what extent do existing international legal frameworks adequately govern AI-assisted legal decisions, especially in environments with evolving regulatory infrastructures? (3) How can hybrid human-AI governance models be designed to protect procedural fairness, accountability, and access to justice without prejudicing the efficiency benefits of AI?

While states are experimenting with AI-based tools in courts and legal services, the normative and regulatory frameworks governing their use remain underdeveloped.<sup>16</sup> This study provides an interdisciplinary framework for addressing the legal and ethical uncertainties surrounding AI adoption. It reinforces the imperative that innovation in the justice sector must enhance rather than compromise human dignity, fairness, and rights.<sup>17</sup>

If citizens cannot understand, contest, or meaningfully participate in AI-mediated legal decisions, then the fundamental principles of the rule of law, in which the law should be knowable, predictable, and contestable, are undermined.<sup>18</sup> Habermas's theory of communicative rationality reinforces this point: legal legitimacy depends

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<sup>16</sup> Ammar Zafar, 'Balancing the Scale: Navigating Ethical and Practical Challenges of Artificial Intelligence (AI) Integration in Legal Practices', *Discover Artificial Intelligence* 4, no. 1 (2024): 1–18, <https://doi.org/10.1007/s44163-024-00121-8>.

<sup>17</sup> Kashif Javed and Jianxin Li, 'Bias in Adjudication: Investigating the Impact of Artificial Intelligence, Media, Financial and Legal Institutions in Pursuit of Social Justice', *Plos One* 20, no. 1 (2025): 1–39, <https://doi.org/10.1371/journal.pone.0315270>.

<sup>18</sup> Stanley Greenstein, 'Preserving the Rule of Law in the Era of Artificial Intelligence (AI)', *Artificial Intelligence and Law* 30, no. 3 (2022): 291–323, <https://doi.org/10.1007/s10506-021-09294-4>.

not only on outcomes but also on the process by which decisions are reached.<sup>19</sup> An AI system that makes correct but unexplainable decisions can satisfy utilitarian standards while violating deontological standards of respect for individuals as rational agents entitled to reasons.<sup>20</sup>

## METHODOLOGY

This study employs a qualitative methodology to examine AI integration into legal system. The study analyses legal frameworks, ethical implications, and AI applications in judicial and administrative processes. It distinguishes between technical and ethical-legal AI risks. Technical risks include model errors, flawed training data, adversarial manipulation, and AI hallucinations.<sup>21</sup> These risks are generally measurable and addressable through engineering solutions. Ethical and legal risks include algorithmic bias, opaque decision-making, erosion of due process, accountability deficits, and threats to human dignity.<sup>22</sup> These risks require institutional, regulatory, and philosophical responses beyond technical remedies. Treating ethical issues as technical problems obscures the normative choices underlying AI deployment.<sup>23</sup> Doctrinal analysis is used to interpret legal principles governing AI in the justice system. Peer-reviewed literature indexed in Scopus is analyzed to examine AI implementation in legal workflows and judicial decision-making. A limitation is the rapidly evolving nature of AI regulation, which may affect the long-term applicability of the findings.

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<sup>19</sup> Malte Frøslee Ibsen, 'Jürgen Habermas and the Communicative Paradigm of Critical Theory', in *A Critical Theory of Global Justice*, 1st edn, by Malte Frøslee Ibsen (Oxford University Press, 2023), <https://doi.org/10.1093/oso/9780192864123.003.0006>.

<sup>20</sup> Abeer Dyoub et al., 'Towards Practical Ethics for AI', *Intelligenza Artificiale* 20, no. 1 (2026): 145–76, <https://doi.org/10.1177/17248035251392741>.

<sup>21</sup> National Institute of Standards and Technology (US), *Artificial Intelligence Risk Management Framework: Generative Artificial Intelligence Profile*, 6, no. 2 (2024): 564–99, <https://doi.org/10.6028/NIST.AI.600-1>.

<sup>22</sup> Carsten Orwat et al., 'Normative Challenges of Risk Regulation of Artificial Intelligence', *NanoEthics* 18, no. 2 (2024): 1–29, <https://doi.org/10.1007/s11569-024-00454-9>.

<sup>23</sup> Ermelinda Rodilloso, 'Epistemic Vs. Moral: A Differentiated Approach to Human-Centered AI Ethics', *Topoi* 25, no. 5 (2025), <https://doi.org/10.1007/s11245-025-10324-y>.

## RESULT AND DISCUSSION

### Applications of AI in the Legal System

The integration of AI into the legal domain has transformed legal service delivery.<sup>24</sup> AI technologies now support documentation, research, decision prediction, and judicial administration, making legal practice increasingly data-driven.<sup>25</sup> One of the most widespread applications of AI is automated document generation and review, reducing labor-intensive and error-prone work.<sup>26</sup> Tools such as IronClad, Genie AI, and Clarilis generate legal documents using statutes, precedents, and contractual templates with minimal human intervention.<sup>27</sup>

Platforms such as Luminance and Elicit review documents in litigation and due diligence, extracting key risks, clauses, and red flags.<sup>28</sup> Large language models such as ChatGPT assist through real-time drafting and summarization in corporate law and litigation support.<sup>29</sup> Historically, identifying relevant case law required extensive manual research.<sup>30</sup> Today, AI-driven tools such as ROSS, CARA, and Casetext use natural language processing to retrieve relevant legal materials. These tools enable precedent mapping across jurisdictions and timeframes.<sup>31</sup>

Platforms such as Lex Machina and Blue J. Legal provide predictive insights by analyzing litigation histories, judicial behavior, and party strategies. They project likely legal outcomes from historical data. In criminal justice, predictive analytics and

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<sup>24</sup> Eljas Linna and Tuula Linna, 'Challenges for Generative AI in Legal Reasoning', *AI & Society: Knowledge, Culture and Communication* 2, no. 4 (2025): 1–20, <https://doi.org/10.48550/ATRIV.2508.18880>.

<sup>25</sup> Alfonso Renato Vargas-Murillo et al., 'Transforming Justice: Implications of Artificial Intelligence in Legal Systems', *Academic Journal of Interdisciplinary Studies* 13, no. 2 (2024): 433–43, <https://doi.org/10.36941/ajis-2024-0059>.

<sup>26</sup> Meera Patel, 'Navigating the Future: AI-Driven Expert Systems in the Legal Landscape of USA, Canada, Australia, and India', *Educational Administration: Theory and Practice* 30, no. 1 (2024): 6222–30, <https://doi.org/10.53555/kuey.v30i1.9627>.

<sup>27</sup> Ping Han, 'AI-Powered Digital Arbitration Framework Leveraging Smart Contracts and Electronic Evidence Authentication', *Scientific Reports* 15, no. 1 (2025): 1–24, <https://doi.org/10.1038/s41598-025-21313-x>.

<sup>28</sup> Vitaliy Shpachuk et al., 'AI-Driven Financial Fraud: Key Risks and Legal Protections for Financial Institutions', *Journal of Banking Regulation* 27, no. 1 (2026): 1–19, <https://doi.org/10.1057/s41261-025-00304-y>.

<sup>29</sup> Joshua Kelsall et al., 'A Rapid Evidence Review of Evaluation Techniques for Large Language Models in Legal Use Cases: Trends, Gaps, and Recommendations for Future Research', *AI and Society: Knowledge, Culture and Communication* 41, no. 4 (2026): 4025–43, <https://doi.org/10.1007/s00146-025-02741-9>.

<sup>30</sup> Chay Brooks et al., 'Artificial Intelligence in the Legal Sector: Pressures and Challenges of Transformation', *Cambridge Journal of Regions, Economy and Society* 13, no. 1 (2020): 135–52, <https://doi.org/10.1093/cjres/rsz026>.

<sup>31</sup> Farid Ariai et al., 'Natural Language Processing for the Legal Domain: A Survey of Tasks, Datasets, Models, and Challenges', *AI & Society: Knowledge, Culture and Communication* 23, no. 3 (2024): 1–35, <https://doi.org/10.48550/ATRIV2410.21306>.

risk-assessment systems have gained traction.<sup>32</sup> Tools such as COMPAS assess recidivism risk and influence bail, sentencing, and parole decisions. Predictive policing technologies forecast crime-prone locations and times, improving resource allocation.<sup>33</sup> In overloaded courts, AI platforms assist administrative triage.<sup>34</sup> Brazil's SUPACE system filters and summarizes case files, allowing judges to focus on substantive deliberation. The PACER system automates docket and scheduling management, improving document handling. Advanced AI systems automate hearing scheduling, priorities urgent cases, and flag workflow anomalies, reducing delays and enhancing transparency.<sup>35</sup>

### Impact on Efficiency and Justices

The incorporation of AI into the legal system is redefining efficiency and justice in practice. AI reduces the administrative and analytical burdens in legal procedures.<sup>36</sup> It also promotes fairness by expanding access to legal services and improving consistency. These developments create a faster and potentially more inclusive system.<sup>37</sup> AI enhances efficiency by automating time-intensive and error-prone tasks.<sup>38</sup> Legal research, document review, and contract analysis are increasingly automated. Traditional legal research requires reviewing large volumes of legal material.<sup>39</sup> AI systems can rapidly identify precedents, extract legal principles, and

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<sup>32</sup> Carolyn McKay, 'Predicting Risk in Criminal Procedure: Actuarial Tools, Algorithms, AI and Judicial Decision-Making', *Current Issues in Criminal Justice* 32, no. 1 (2020): 22–39, <https://doi.org/10.1080/10345329.2019.1658694>.

<sup>33</sup> Litska Strikwerda, 'Predictive Policing: The Risks Associated with Risk Assessment', *The Police Journal: Theory, Practice and Principles* 94, no. 3 (2021): 422–36, <https://doi.org/10.1177/0032258X20947749>.

<sup>34</sup> Kwan Yiu Cheng, 'Human-Centered AI in the Judiciary', in *Handbook of Human-Centered Artificial Intelligence*, ed. Wei Xu (Springer Nature Singapore, 2026), 35, [https://doi.org/10.1007/978-981-97-8440-0\\_113-1](https://doi.org/10.1007/978-981-97-8440-0_113-1).

<sup>35</sup> Yi Chen, 'Artificial Intelligence and Adjudication: A New Pathway to Justice in China?', *Computer Law and Security Review* 60 (2026): 1–28, <https://doi.org/10.1016/j.clsr.2026.106260>.

<sup>36</sup> Victor Costa et al., 'Artificial Intelligence for Impact Assessment of Administrative Burdens', *Emerging Science Journal* 8, no. 1 (2024): 270–82, <https://doi.org/10.28991/ESJ-2024-08-01-019>.

<sup>37</sup> Ichiro Kobayashi, 'Institutional Silence and LegalTech in Japan: A Comparative Inquiry into Access to Justice and the Practice of Law', *Law, Innovation and Technology*, 25 February 2026, 1–32, <https://doi.org/10.1080/17579961.2026.2633676>.

<sup>38</sup> Crispin Coombs et al., 'The Strategic Impacts of Intelligent Automation for Knowledge and Service Work: An Interdisciplinary Review', *The Journal of Strategic Information Systems* 29, no. 4 (2020): 1–30, <https://doi.org/10.1016/j.jsis.2020.101600>.

<sup>39</sup> Julien Breton et al., 'Leveraging LLMs for Legal Terms Extraction with Limited Annotated Data', *Artificial Intelligence and Law* 8, no. 25 (2025): 20–29, <https://doi.org/10.1007/s10506-025-09448-8>.

suggest arguments for legal filings.<sup>40</sup> In contract analysis, AI algorithms interpret legal language, flag inconsistencies, and assess risk.<sup>41</sup> By cross-referencing clauses with legal standards, these tools help prevent oversights. This capability shortens review cycles and improves reliability. In e-discovery, AI identifies relevant litigation data, accelerating pre-trial processes and reducing costs.<sup>42</sup>

AI can also enhance accuracy and consistency in legal processes. Unlike human reviewers, AI systems apply a consistent analytical process.<sup>43</sup> Due diligence platforms analyze records and contracts for anomalies, reducing missed issues. AI tools generate and verify references in accordance with citation standards.<sup>44</sup> AI improves productivity within law firms, courts, and public institutions. Lawyers can focus on reasoning, negotiation, and judgment. An AI complements legal professionals by increasing capacity and reducing backlogs.<sup>45</sup> Beyond efficiency, AI may also advance justice. One important benefit is expanded access to legal services. AI-driven legal assistants and chatbots provide affordable guidance for underserved populations.<sup>46</sup> Initiatives such as “Free Legal Answers” program in the United States connect low-income individuals with legal assistance that might otherwise be inaccessible.<sup>47</sup>

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<sup>40</sup> Paul J. McLaughlin, ‘AI and Law Librarians: Introducing the Idea of Creating a Legal Information Research Team to Prepare Students for the Practice of Law’, *Legal Reference Services Quarterly* 44, no. 1 (2025): 2–21, <https://doi.org/10.1080/0270319X.2025.2444747>.

<sup>41</sup> Dominik Stefer and Victoria Fricke, ‘From Algorithms to Awards: Exploring the Technological and Legal Boundaries of AI’s Contributions to the Work of Arbitrators’, *Arbitration International* 41, no. 1 (2025): 49–70, <https://doi.org/10.1093/arbint/aiae046>.

<sup>42</sup> David Canning and Lise Jaillant, ‘AI to Review Government Records: New Work to Unlock Historically Significant Digital Records’, *AI and Society: Knowledge, Culture and Communication* 40, no. 6 (2025): 4433–45, <https://doi.org/10.1007/s00146-025-02221-0>.

<sup>43</sup> Matthew L. Ginsberg, ‘Multivalued Logics: A Uniform Approach to Reasoning in Artificial Intelligence’, *Computational Intelligence* 4, no. 3 (1988): 265–316, <https://doi.org/10.1111/j.1467-8640.1988.tb00280.x>.

<sup>44</sup> Kalliopi Terzidou, ‘Generative AI Systems in Legal Practice Offering Quality Legal Services While Upholding Legal Ethics’, *International Journal of Law in Context* 21, no. 3 (2025): 431–52, <https://doi.org/10.1017/S1744552325000047>.

<sup>45</sup> Younis Okleh Almahasneh, ‘The Use of Artificial Intelligence in Legal Work’, in *Tech Fusion in Business and Society*, by Reem Khamis Hamdan (Springer Nature Switzerland, 2025), 689, [https://doi.org/10.1007/978-3-031-84636-6\\_60](https://doi.org/10.1007/978-3-031-84636-6_60).

<sup>46</sup> Rajesh Kanna Rajendran et al., ‘The Role of AI in Enhancing Access to Justice and Legal Services’, in *Advances in Electronic Government, Digital Divide, and Regional Development*, ed. Halim Bajraktari (IGI Global, 2025), <https://doi.org/10.4018/979-8-3693-7205-0.ch008>.

<sup>47</sup> Brenda Simon, ‘Artificial Intelligence and the Self-Represented Inventor’, *Loyola of Los Angeles Law Review* 58, no. 1 (2025): 1–42.

AI may also support judicial impartiality. By analyzing past decisions, AI can identify systemic inconsistencies and extralegal influences.<sup>48</sup> These insights can inform judicial education and bias-mitigation tools.<sup>49</sup> When used transparently, AI may promote greater consistency in sentencing and parole decisions.<sup>50</sup> AI can also help identify institutional discrimination. Data-mining tools can identify patterns of racial and gender disparity in court and law-enforcement records.<sup>51</sup>

Algorithmic systems can reproduce structural inequalities embedded in historical data.<sup>52</sup> AI systems may predict recidivism in bail, sentencing, and parole decisions. If an algorithm relies on proxy indicators such as neighborhood, employment history, or prior police contact, it may reproduce historical inequalities. As a result, it may assign higher risk scores to certain groups even when race is not explicitly included.<sup>53</sup>

AI may also prioritize cases or allocate resources based on predicted complexity or urgency. If such systems rely on proxies such as representation quality or geographic location, they may disadvantage underrepresented communities.<sup>54</sup> One study found that COMPAS predictions were no more accurate than those of laypersons, raising doubts about its judicial use.<sup>55</sup>

The pursuit of algorithmic fairness presents significant mathematical constraints. Under most conditions, multiple fairness criteria cannot be satisfied simultaneously

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<sup>48</sup> Kashif Javed and Jianxin Li, ‘Artificial Intelligence in Judicial Adjudication: Semantic Biasness Classification and Identification in Legal Judgement (SBCILJ)’, *Heliyon* 10, no. 9 (2024): 1–17, <https://doi.org/10.1016/j.heliyon.2024.e30184>.

<sup>49</sup> Joseph Erickson and Michael Gregory, ‘Against Algorithmic Clarity: Law Beyond Specification’, *International Journal for the Semiotics of Law - Revue Internationale de Sémiotique Juridique* 4, no. 1 (2025): 1–27, <https://doi.org/10.1007/s11196-025-10379-5>.

<sup>50</sup> Erion Murati, ‘Decoding Public and Private AI Legal Tech: Autonomy, Liability, Legal and Ethical Risks’, in *Liquid Legal – Sustaining the Rule of Law*, ed. Kai Jacob et al., Law for Professionals (Springer Nature Switzerland, 2025), [https://doi.org/10.1007/978-3-031-78596-2\\_8](https://doi.org/10.1007/978-3-031-78596-2_8).

<sup>51</sup> Anna Fine et al., ‘Public Perceptions of Judges’ Use of AI Tools in Courtroom Decision-Making: An Examination of Legitimacy, Fairness, Trust, and Procedural Justice’, *Behavioral Sciences* 15, no. 4 (2025): 1–21, <https://doi.org/10.3390/bs15040476>.

<sup>52</sup> Titus Oloruntoba Ebo et al., ‘Automating Inequity: How Artificial Intelligence Reproduces Systemic Failures in Patient Safety for Marginalized Communities’, *AI and Society: Knowledge, Culture and Communication* 4, no. 1 (2026): 1–29, <https://doi.org/10.1007/s00146-026-02930-0>.

<sup>53</sup> Tzu-Wei Hung and Chun-Ping Yen, ‘Predictive Policing and Algorithmic Fairness’, *Synthese* 201, no. 6 (2023): 1–29, <https://doi.org/10.1007/s11229-023-04189-0>.

<sup>54</sup> Felicity Bell et al., *AI Decision-Making and the Courts: A Guide for Judges, Tribunal Members and Court Administrators*, with Australasian Institute on Judicial Administration and UNSW Sydney (UNSW Sydney, 2022), 29–39, <https://doi.org/10.26190/UNSWORKS/28357>.

<sup>55</sup> Ido Hefetz, ‘Evaluating Bias in Forensic Evidence: From Expert Analysis to AI-Based Decision Tools’, *Forensic Science International: Synergy* 11, no. 2 (2025): 1–10, <https://doi.org/10.1016/j.fsisyn.2025.100645>.

across demographic groups, a phenomenon known as the “fairness impossibility theorem.” This means that algorithmic risk-assessment systems inevitably involve normative trade-offs between competing conceptions of justice and equality.<sup>56</sup> Training data also plays a significant role in discriminatory outcomes. The Gender Shades study found that facial-recognition systems trained primarily on images of white males produced substantially higher error rates for darker-skinned women, illustrating how biased datasets can generate discriminatory outcomes.<sup>57</sup> These findings suggest that algorithmic bias is not merely a technical defect but a structural characteristic of systems trained on historically unequal data.<sup>58</sup> When trained on representative datasets, AI models can advance systemic equity rather than perpetuate injustice.<sup>59</sup>

### Ethical and Legal Considerations

This research argues that AI accountability should be distributed rather than singular. Accountability should not lie solely with software developers, legal professionals, or institutions.<sup>60</sup> Instead, the law should establish a chain-of-responsibility model covering design, training, deployment, monitoring, and decision validation.<sup>61</sup> This position is consistent with the Ethics Guidelines for Trustworthy AI and emerging tort-law principles that beneficiaries of AI systems bear responsibility for resulting harms.<sup>62</sup>

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<sup>56</sup> Otto Sahlgren, ‘What’s Impossible About Algorithmic Fairness?’, *Philosophy and Technology* 37, no. 4 (2024): 1–29, <https://doi.org/10.1007/s13347-024-00814-z>.

<sup>57</sup> Michael Gentzel, ‘Biased Face Recognition Technology Used by Government: A Problem for Liberal Democracy’, *Philosophy and Technology* 34, no. 4 (2021): 1639–63, <https://doi.org/10.1007/s13347-021-00478-z>.

<sup>58</sup> Lorenzo Belenguer, ‘AI Bias: Exploring Discriminatory Algorithmic Decision-Making Models and the Application of Possible Machine-Centric Solutions Adapted from the Pharmaceutical Industry’, *AI and Ethics* 2, no. 4 (2022): 771–87, <https://doi.org/10.1007/s43681-022-00138-8>.

<sup>59</sup> Tal Zarsky, ‘Data Mining as Search: Theoretical Insights and Policy Responses’, in *Discrimination and Privacy in the Information Society*, vol. 3, ed. Bart Custers et al. (Springer Berlin Heidelberg, 2013), 330, [https://doi.org/10.1007/978-3-642-30487-3\\_18](https://doi.org/10.1007/978-3-642-30487-3_18).

<sup>60</sup> Lorna McGregor et al., ‘International Human Rights Law as a Framework for Algorithmic Accountability’, *International and Comparative Law Quarterly* 68, no. 2 (2019): 309–43, <https://doi.org/10.1017/S0020589319000046>.

<sup>61</sup> NaKyung Lee, ‘Development of AI Ethics Guidelines Model Based on AI Life Cycle’, *AI and Ethics* 6, no. 1 (2026): 9, <https://doi.org/10.1007/s43681-025-00851-0>.

<sup>62</sup> Barry Solaiman, ‘The European Union’s Artificial Intelligence Act and Trust: Towards an AI Bill of Rights in Healthcare?’, *Law, Innovation and Technology* 17, no. 1 (2025): 318–34, <https://doi.org/10.1080/17579961.2025.2469986>.

One of the most pressing concerns is data privacy and security.<sup>63</sup> Legal processes rely on sensitive data, including criminal histories, financial transactions, and confidential communications. Because AI systems require large datasets, risks of breaches and unauthorized access increase. International instruments establish principles of data minimization, purpose limitation, and informed consent as safeguards for AI-assisted legal processes. Spain's digital justice initiative demonstrates how pseudonymization and anonymization can enhance data protection.<sup>64</sup>

Another foundational concern is transparency, particularly given the opacity of many AI systems. Legal reasoning must be understandable and traceable, yet many AI tools operate as "black boxes."<sup>65</sup> The lack of explainability contradicts legal norms requiring decisions to be reasoned, challengeable, and subject to appeal.<sup>66</sup> The EU AI Act addresses this concern by classifying certain applications as "high-risk" and requiring testing, documentation, and accountability. Similarly, the U.S. Algorithmic Accountability Act 2023 encourages impact assessments of AI effects on rights, opportunities, and access.

Transparency is closely linked to accountability and liability in AI-assisted decision-making.<sup>67</sup> As AI systems influence legal decisions, determining responsibility for errors becomes increasingly complex. Errors such as misinterpreted statutes, biased risk assessments, or flawed legal briefs may result in wrongful convictions or financial loss. Liability may rest with the software developer, legal professional, or institution responsible for deploying the system.<sup>68</sup> The Ethics Guidelines for Trustworthy AI advocate robust human oversight mechanisms. These include the "human-in-the-loop" principle, which requires AI-assisted decisions to remain reviewable and under

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<sup>63</sup> Mohamed Chawki, 'Legal Foundations and Future Directions of AI-Enabled Cybersecurity: A Cross-Jurisdictional Analysis', *Cogent Social Sciences* 12, no. 1 (2026): 1–34, <https://doi.org/10.1080/23311886.2026.2614015>.

<sup>64</sup> Renata M. De Carvalho et al., 'Protecting Citizens' Personal Data and Privacy: Joint Effort from GDPR EU Cluster Research Projects', *SN Computer Science* 1, no. 4 (2020): 217, <https://doi.org/10.1007/s42979-020-00218-8>.

<sup>65</sup> Bell et al., *AI Decision-Making and the Courts*.

<sup>66</sup> João Figueiredo Nobre Brito Cortese et al., 'Should Explainability Be a Fifth Ethical Principle in AI Ethics?', *AI and Ethics* 3, no. 1 (2023): 123–34, <https://doi.org/10.1007/s43681-022-00152-w>.

<sup>67</sup> Claudio Novelli et al., 'Accountability in Artificial Intelligence: What It Is and How It Works', *AI & SOCIETY* 39, no. 4 (2024): 1871–82, <https://doi.org/10.1007/s00146-023-01635-y>.

<sup>68</sup> Miriam Buiten et al., 'The Law and Economics of AI Liability', *Computer Law & Security Review* 48 (2023): 12–28, <https://doi.org/10.1016/j.clsr.2023.105794>.

human control.<sup>69</sup> In jurisdictions using AI-assisted judicial tools, judges retain authority to override algorithmic recommendations.<sup>70</sup> This demonstrates how AI can support, rather than replace, human decision-making.

A further ethical and legal concerns are algorithmic bias and discrimination. AI systems trained on historical data may reproduce biases related to race, gender, socioeconomic status, or geography.<sup>71</sup> Such biases may manifest in uneven sentencing, prejudicial risk assessments, or unequal access to legal remedies. Ethical design should include bias audits, representative datasets, and safeguards against discriminatory outcomes. Projects such as AI4People advocate normative frameworks centred on fairness, justice, and accountability, encouraging proactive measures to mitigate harm.<sup>72</sup>

## AI Challenges

Although transformative, AI presents significant ethical, legal, and operational challenges. These challenges are shaping AI use in contexts requiring fairness, integrity, and accountability. As AI becomes embedded in legal workflows, addressing these limitations is essential to safeguarding the rule of law. Despite advances, AI remains limited in addressing the complexity and ambiguity of legal processes.<sup>73</sup> AI systems may struggle to interpret legal context, ethical reasoning, and social values. When trained on biased or incomplete data, AI may reproduce existing inequalities. COMPAS has been criticized for disproportionately classifying Black

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<sup>69</sup> Johann Laux, 'Institutionalised Distrust and Human Oversight of Artificial Intelligence: Towards a Democratic Design of AI Governance under the European Union AI Act', *AI & Society* 39, no. 6 (2024): 2853–66, <https://doi.org/10.1007/s00146-023-01777-z>.

<sup>70</sup> Caroline Gans-Combe, 'Automated Justice: Issues, Benefits and Risks in the Use of Artificial Intelligence and Its Algorithms in Access to Justice and Law Enforcement', in *Ethics, Integrity and Policymaking*, vol. 9, ed. Dónal O'Mathúna and Ron Iphofen, Research Ethics Forum (Springer International Publishing, 2022) 82 - 99, [https://doi.org/10.1007/978-3-031-15746-2\\_14](https://doi.org/10.1007/978-3-031-15746-2_14).

<sup>71</sup> Maryam Ghasemaghaei and Nima Kordzadeh, 'Understanding How Algorithmic Injustice Leads to Making Discriminatory Decisions: An Obedience to Authority Perspective', *Information and Management* 61, no. 2 (2024): 1–14, <https://doi.org/10.1016/j.im.2024.103921>.

<sup>72</sup> Luciano Floridi et al., 'AI4People—An Ethical Framework for a Good AI Society: Opportunities, Risks, Principles, and Recommendations', *Minds and Machines* 28, no. 4 (2018): 689–707, <https://doi.org/10.1007/s11023-018-9482-5>.

<sup>73</sup> Sj Bennett, 'Artificial Intelligence and the Ethics of Navigating Ambiguity', *Big Data and Society* 12, no. 2 (2025): 1–13, <https://doi.org/10.1177/20539517251347594>.

defendants as high risk for reoffending.<sup>74</sup> Amazon similarly abandoned an AI recruitment tool that disadvantaged female applicants.<sup>75</sup>

Outside the legal domain, examples such as a U.S. healthcare algorithm that disadvantaged Black patients and Microsoft's Tay chatbot illustrate AI's vulnerability to embedded discrimination.<sup>76</sup> Another challenge is the "black box" nature of many AI models. Foundation models such as GPT-4 and PaLM 2 often provide no clear rationale for their outputs. A 2023 Stanford's Center for Research on Foundation Models (CRFM) report found that major foundation-model developers failed to meet minimum transparency thresholds.<sup>77</sup> As their influence grows, transparency regarding training, validation, and deployment diminishes. In legal systems, opaque AI outputs may erode trust and undermine due process.<sup>78</sup> If legal professionals cannot explain AI recommendations, the principle of reasoned decision-making is compromised.<sup>79</sup>

AI creates uncertainty regarding legal liability in high-stakes legal environments.<sup>80</sup> This issue was highlighted in *Mata v. Avianca, Inc.* The plaintiff's attorneys relied on ChatGPT-generated citations that were later found to be fictitious. The attorneys were sanctioned, and the case has become a cautionary example for legal practitioners. The conservatism of legal institutions presents another barrier to AI adoption. Legal systems are grounded in precedent, discretion, and formal procedure.<sup>81</sup> Judges and lawyers may view AI with scepticism, fearing that it could undermine professional

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<sup>74</sup> Francesca Lagioia et al., 'Algorithmic Fairness Through Group Parities? The Case of COMPAS-SAPMOC', *AI and Society: Knowledge, Culture and Communication* 38, no. 2 (2023): 459–78, <https://doi.org/10.1007/s00146-022-01441-y>.

<sup>75</sup> Natalie Sheard, 'Algorithm-facilitated Discrimination: A Socio-legal Study of the Use by Employers of Artificial Intelligence Hiring Systems', *Journal of Law and Society* 52, no. 2 (2025): 269–91, <https://doi.org/10.1111/jols.12535>.

<sup>76</sup> Kadija Ferryman et al., 'Racism Is an Ethical Issue for Healthcare Artificial Intelligence', *Cell Reports Medicine* 5, no. 6 (2024): 1–3, <https://doi.org/10.1016/j.xcrm.2024.101617>.

<sup>77</sup> Rishi Bommasani et al., *The Foundation Model Transparency Index*, 2, no. 1 (2023): 1–12, <https://doi.org/10.48550/ATRIV2310.12941>.

<sup>78</sup> OECD, *Governing with Artificial Intelligence: The State of Play and Way Forward in Core Government Functions* (OECD Publishing, 2025), 80, <https://doi.org/10.1787/795de142-en>.

<sup>79</sup> Willem H. Gravett, 'Judicial Decision-Making in the Age of Artificial Intelligence', in *Multidisciplinary Perspectives on Artificial Intelligence and the Law*, vol. 58, ed. Henrique Sousa Antunes et al., Law, Governance and Technology Series (Springer International Publishing, 2024), 13–19, [https://doi.org/10.1007/978-3-031-41264-6\\_15](https://doi.org/10.1007/978-3-031-41264-6_15).

<sup>80</sup> Claudio Novelli et al., 'Generative AI in EU Law: Liability, Privacy, Intellectual Property, and Cybersecurity', *Computer Law and Security Review* 55 (2024): 110–18, <https://doi.org/10.1016/j.clsr.2024.106066>.

<sup>81</sup> Sihyun Kim et al., 'Prioritizing Challenges in AI Adoption for the Legal Domain: A Systematic Review and Expert-Driven AHP Analysis', *Plos One* 20, no. 6 (2025): 1–23, <https://doi.org/10.1371/journal.pone.0326028>.

judgment.<sup>82</sup> This resistance is compounded by limited technological literacy and the costs of AI adoption.

Jurisdictions with limited budgets, outdated IT systems, or regulatory constraints may struggle to adopt AI. Such disparities risk creating a two-tiered justice system in which well-resourced courts benefit from AI while others continue to face delays and backlogs.<sup>83</sup> Another challenge is ensuring that human judgment remains central to legal decisions. Although AI can process data and identify patterns, it lacks empathy, contextual understanding, and moral reasoning.<sup>84</sup> In complex scenarios such as family law, asylum cases, or criminal sentencing, human qualities are indispensable.

Generative AI introduces new threats to the integrity of legal proceedings. AI tools can generate convincing but fabricated legal content, including fictitious citations and misinterpretations of legal principles. Without verification, generative AI can mislead even experienced attorneys.<sup>85</sup> Such incidents have prompted calls for updated ethical guidelines, verification protocols, and legal education on responsible AI use. As generative AI becomes more accessible, the risks of misinformation and procedural misconduct increase unless effective safeguards are implemented.

## CONCLUSION

Reconciling algorithmic systems with liberal legality is one of the most significant jurisprudential challenges of our time. This study demonstrates that deploying AI within judicial and administrative processes goes beyond technological modernization. It is a structural transformation of legal accountability. First, algorithmic tools such as COMPAS do not merely reflect historical inequalities. They may institutionalize and amplify these inequalities, creating a misleading appearance

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<sup>82</sup> Paul Grimm et al., 'AI in the Courts: How Worried Should We Be?', *SSRN Electronic Journal* 2, no. 4 (2024): 54–74, <https://doi.org/10.2139/ssrn.5049139>.

<sup>83</sup> Tuana Yazici, 'Toward a Global Standard for Ethical AI Regulation: Addressing Gaps in AI-Driven Biometric and High-Resolution Satellite Imaging in the EU AI Act', *Law, Innovation and Technology* 17, no. 1 (2025): 366–94, <https://doi.org/10.1080/17579961.2025.2470589>.

<sup>84</sup> Soha Rawas, 'AI: The Future of Humanity', *Discover Artificial Intelligence* 4, no. 1 (2024): 25, <https://doi.org/10.1007/s44163-024-00118-3>.

<sup>85</sup> Rebecca Kite, 'Generative AI Prompt Design and a Proactive Approach to Teaching Its Use in Legal Research', *Legal Reference Services Quarterly* 45, no. 1 (2026): 20–53, <https://doi.org/10.1080/0270319X.2026.2612834>.

of objectivity. Second, the opacity of machine-learning systems is incompatible with reasoned adjudication. This principle is central to both the common law and the rule of law. Although efficiency gains may be realized, they cannot justify the erosion of constitutional rights. The challenge for legislators, judges, and legal scholars is how to govern AI while preserving human dignity and institutional legitimacy.

This constitutes a framework for responsible AI integration in justice systems. First, accountability must be distributed across a chain of responsibility. This chain extends across design, deployment, monitoring, and adjudication. It should not be concentrated in developers, practitioners, or institutions alone. Second, procedural legitimacy requires more than accuracy. It requires transparency, contestability, and meaningful human oversight. These principles align with both due process and Habermas's deliberative ideal. Third, efficiency and fairness need not be treated as competing values. Well-designed hybrid human-AI models can achieve both. The EU AI Act's risk-classification framework and algorithmic impact assessments are promising innovations. Their effectiveness depends on robust enforcement and judicial oversight.

Significant questions remain unresolved. No major legal tradition has resolved questions of AI legal personality or civil and criminal liability for algorithmic harm. Jurisdictional fragmentation raises a further problem: without harmonized international standards, regulatory arbitrage may enable deployment in permissive jurisdictions and export risk to vulnerable populations. The path forward requires not only technical refinement, but also legal reform guided by a commitment to the rule of law as both a procedural and substantive ideal.

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