

DIGITAL TRANSFORMATION OF THE JUDICIARY: ETHICAL AND LEGAL IMPLICATIONS OF THE USE OF AI IN THE INDONESIAN CRIMINAL JUSTICE SYSTEM

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Abstract

This article analyses the digital transformation of the judiciary through the use of Artificial Intelligence (AI) in the Indonesian criminal justice system, with a focus on its ethical and legal implications. This qualitative literature review identifies ethical risks such as algorithmic bias, a lack of transparency (the 'black box' problem), the dehumanisation of processes, and threats to human rights such as the presumption of innocence and the right to a fair trial. From a legal perspective, inconsistencies were found between the human-centred Criminal Procedure Code and the logic of AI, particularly regarding the admissibility of digital evidence, legal liability for system errors, and the absence of specific regulations for judicial AI. This study recommends a National AI Ethics Framework, PERMA AI for the judiciary, digital literacy training for legal officials, and periodic independent audits to realise digital justice that is fair, accountable, and humane in accordance with the values of Pancasila.

Keywords: Artificial Intelligence, criminal justice, digital transformation, AI ethics, algorithmic bias, Criminal Procedure Code, e-court, digital justice, human oversight, AI fairness

Introduction

Digital transformation has become a global phenomenon affecting almost every sector of life, including the criminal justice system. Developments in information technology, particularly Artificial Intelligence (AI), present significant opportunities to enhance the efficiency, accuracy, and accessibility of legal processes. In this context, the judiciary is no longer understood as a wholly conventional institution, but rather as a system that is beginning to integrate with digital technology at various stages of its processes (Susskind, 2019).

In Indonesia, digital transformation within the judicial sector is beginning to take shape through the implementation of e-court and e-litigation systems, as well as the use of information technology in case administration. The Supreme Court is actively promoting digitalisation as part of bureaucratic reform and the improvement of public services in the legal field. However, the integration of more advanced technologies such as AI is still in its early stages and requires in-depth study, particularly from ethical and legal perspectives (Supreme Court of the Republic of Indonesia, 2020).

Artificial Intelligence within the criminal justice system has various forms of application, ranging from crime data analysis and recidivism risk prediction to supporting judicial decision-making. In some developed countries, the use of AI has even been implemented in defendant risk assessment systems to assist in determining detention or conditional release. This demonstrates that AI has significant potential to transform the paradigm of law enforcement substantially (Wu et al., 2022) . However, the use of AI in the criminal justice system is not without complex ethical issues. One of the main concerns is the potential for algorithmic bias, which can lead to discriminatory decisions. This bias often arises because the data used to train AI systems reflects pre-existing social inequalities. Consequently, decisions generated by AI risk reinforcing injustice rather than reducing it (Rahman et al., 2024) .

Furthermore, transparency within AI systems poses a serious challenge in the context of criminal justice. Many AI algorithms are 'black box' in nature, making it difficult to understand how a decision is reached. This runs counter to the principle of accountability within the legal system, which requires that every decision must be rationally explainable and justifiable (Wu et al., 2022) .

From a human rights perspective, the use of AI also raises concerns regarding the protection of the accused's rights, such as the right to a fair trial and the presumption of innocence. When legal decisions are influenced by automated systems, there is a risk that the assessment process fails to adequately consider the human aspects and individual context of each case (Darmayanti & Subiyanto, 2026) .

In the Indonesian legal context, the use of AI in the criminal justice system raises questions regarding its compatibility with the applicable legal framework, particularly the Criminal Procedure Code (KUHAP). The KUHAP is still based on a conventional approach that emphasises the role of humans at every stage of the legal process; consequently, the integration of AI requires careful normative adjustments (Tomalili, 2019) . Furthermore, the issue of technology-based evidence is also relevant to this discussion. Digital evidence generated or analysed by AI requires clear standards of validity and reliability to be admissible in judicial proceedings. Without adequate regulation, the use of this technology has the potential to give rise to legal disputes regarding the validity of evidence (Khan & Ahmed, 2024) .

Legal liability for errors generated by AI systems also remains an issue lacking clarity. Should errors occur in recommendations or analyses carried out by AI, the question of who should be held responsible—whether the developer, the user, or the institution—becomes highly complex. This highlights an urgent need to formulate a legal framework that is adaptive to technological developments (Schaerer et al., 2009).

At the global level, various countries and international organisations have begun to formulate ethical guidelines and regulations regarding the use of AI in the public sector, including the judiciary. Principles such as fairness, accountability, transparency, and explainability (FATE) form the main foundation for the responsible development and implementation of AI. Indonesia needs to adopt and adapt these

principles to the local context (Memarian & Doleck, 2023) . Digital transformation within the criminal justice system is also inseparable from the readiness of human resources and technological infrastructure. Law enforcement officials need to possess adequate digital literacy to effectively understand and oversee the use of AI. Without this readiness, the implementation of technology could instead lead to a risky reliance on systems that are not fully understood (Wu et al., 2022) .

Based on the above, it is evident that the use of AI within Indonesia's criminal justice system is a phenomenon fraught with both opportunities and challenges. Consequently, research into the ethical and legal implications is crucial to ensure that the ongoing digital transformation remains aligned with the principles of justice, legal certainty, and the protection of human rights. This article aims to analyse both aspects in depth within the context of the Indonesian criminal justice system.

Research Methodology

This study employs a literature review (library research) using a qualitative approach to analyse the ethical and legal implications of the use of Artificial Intelligence (AI) within the criminal justice system in Indonesia. The data used consists of secondary data obtained from various sources, such as national journals, international journals, books, legislation, and other documents. Data collection was carried out through documentary research, whilst data analysis employed a descriptive-analytical method by examining, comparing, and interpreting various concepts, theories, and regulations relating to AI and the criminal justice system. This approach aims to produce a comprehensive understanding of the issues under study and to formulate a systematic, literature-based argument (Eliyah & Aslan, 2025) ; (Snyder, 2019)

Results and Discussion

Ethical Implications of AI Use in the Criminal Justice System

The use of Artificial Intelligence (AI) in the criminal justice system promises to improve the efficiency and consistency of decision-making through massive and objective data analysis. However, underlying this potential are fundamental ethical risks, particularly regarding the potential for algorithmic bias that could reinforce structural injustices in society. This bias often stems from training data that reflects historical social disparities, thereby generating recommendations that discriminate against minority or vulnerable groups (Blount, 2024) .

One of the most evident manifestations of algorithmic bias is in recidivism risk assessment systems, where individuals from certain backgrounds are disproportionately assessed as being at higher risk of reoffending. The COMPAS case in the United States demonstrates that the algorithm is twice as likely to misclassify Black individuals as potentially dangerous compared to White individuals with similar criminal profiles (Act, 2024) . This phenomenon raises a fundamental ethical question: do systems designed for justice actually reproduce systemic injustice?

Transparency is the second crucial ethical issue in the implementation of AI in the judiciary. Many AI algorithms are 'black box' in nature, meaning that the internal decision-making processes cannot be understood even by their own developers. In the context of criminal justice, this lack of transparency conflicts with the principle of legal accountability, as judges, defendants and the public cannot verify the logical basis of the AI's recommendations. Without transparency, public trust in the judicial system will be significantly eroded. Ethical accountability also becomes a challenge when errors occur in AI systems (Ganesan, 2025). If algorithms provide incorrect detention recommendations or disproportionate sentencing assessments, a fundamental question arises: who is responsible—the AI developers, the judicial institutions, or the system operators? The lack of clear accountability mechanisms can erode the principle of due process of law and undermine the legitimacy of judicial decisions (Lapshin et al., 2020).

The protection of human rights constitutes another major ethical challenge. The principle of the presumption of innocence and the right to a fair trial are potentially undermined when automated decisions dominate the process. The use of AI in pre-trial stages, such as predicting flight risk or recidivism, can lead to unfounded preventive detention, violating an individual's right to liberty. Legal ethics demand that technology must not sacrifice fundamental rights for the sake of efficiency (Sushina & Sobenin, 2020).

The dehumanisation of the judicial process poses a deeper ethical risk. When AI takes over the analysis of evidence, the assessment of motives, or the social context of a case, the human aspects of the defendant—such as a history of trauma, rehabilitation factors, or personal considerations—risk being overlooked. A fully data-driven judiciary tends to reduce humans to mere statistical patterns, disregarding the essence of restorative justice centred on human dignity (Ganesan, 2025).

In Indonesia, the local context exacerbates these ethical issues due to disparities in access to technology and digital literacy among law enforcement officials. Police or prosecutors in remote areas may rely blindly on AI recommendations without the ability to validate them, whilst training data is often dominated by unrepresentative urban cases. This risks undermining justice for victims and convicted offenders in marginalised regions (Lapshin et al., 2020). Digital literacy among law enforcement officers is an ethical prerequisite for the responsible use of AI. Without a deep understanding of algorithmic limitations, law enforcement officers risk treating AI as an unquestionable 'oracle', sacrificing their professional judgement. Comprehensive ethical training is required to ensure that humans remain the primary decision-makers, rather than merely passive validators (Sushina & Sobenin, 2020).

The principle of fairness in AI ethics demands continuous testing for bias, yet in Indonesia there are no national standards for judicial algorithm audits. Without regular fairness audits, AI systems risk reinforcing discrimination based on ethnicity, gender, or economic status that is already embedded in historical crime data (Vo &

Plachkinova, 2023) . Ethics demand methodological transparency and public involvement in testing. Explainable AI (XAI) offers a potential ethical solution to the 'black box' problem. Systems capable of explaining the rationale behind their recommendations in language comprehensible to judges would enhance accountability. However, the implementation of XAI involves a trade-off with predictive accuracy, creating an ethical dilemma between clarity and effectiveness (Spalević et al., 2024) .

Data privacy is an ethical dimension that is often overlooked amidst the euphoria surrounding technology. The collection of a defendant's personal data to train AI—including criminal records, biometric data and social profiles—has the potential to infringe upon privacy rights if not strictly regulated. In Indonesia, the lack of specific data regulations for the judicial system increases the risk of misuse. The use of AI in predictive policing also raises ethical concerns regarding over-policing in certain communities. Algorithms that predict crime hotspots based on historical data may direct police patrols in a discriminatory manner, creating a cycle of unfair surveillance. Ethics require a community impact assessment prior to deployment (Vo & Plachkinova, 2023) .

From a legal philosophy perspective, AI challenges the concepts of retribution and rehabilitation. If sentences are recommended based solely on the probability of recidivism, does this still reflect the principles of Indonesian retributive justice? Ethics demands a balance between data-driven approaches and the values of Pancasila (Blount, 2024) .

Overall, the ethical implications of AI use in Indonesia's criminal justice system highlight the need for a national ethical framework that integrates the FATE principles (Fairness, Accountability, Transparency, Explainability). Without robust ethical regulation, digital transformation risks sacrificing the spirit of justice for the sake of technological efficiency.

Legal Implications of AI Use in the Indonesian Criminal Justice System

The use of Artificial Intelligence (AI) in Indonesia's criminal justice system raises fundamental legal challenges regarding its compatibility with the Criminal Procedure Code (KUHAP), which remains oriented towards manual processes and the dominant role of humans. The KUHAP does not explicitly regulate advanced technological tools such as AI, thereby creating a legal vacuum regarding the validation of algorithmic recommendations during the investigation, prosecution, and trial stages (Putra, 2025) . These implications necessitate a reinterpretation of Article 184 of the KUHAP regarding evidence to include digital evidence generated by AI. The legality of AI-based evidence has become a central legal issue, particularly in digital forensics and crime pattern analysis. Evidence generated by machine learning algorithms must meet the criteria of relevance, admissibility, and reliability as stipulated in Article 184 of the Criminal Procedure Code; however, there are currently no standards for testing the

reliability of AI in Indonesian courts. Without forensic certification, AI evidence risks being rejected as weak evidence (Judijanto et al., 2024) .

Legal liability for AI errors has not been comprehensively regulated in Indonesia, creating ambiguity regarding the vicarious liability of operators and manufacturers. The new Criminal Code (Law No. 1 of 2023) does not yet recognise AI as a legal entity, meaning liability falls on humans or corporations through a strict liability model or a chain of responsibility. This necessitates the development of new legal doctrines for cases of AI-induced errors (Kamila, 2025) . The principle of the judge as the final decision-maker (human-in-command) has been affirmed by the Supreme Court through Smart Majelis, an AI application for the automatic assignment of judges, whilst maintaining human supremacy. This implementation is in line with Article 5(1) of Law No. 48 of 2009 on Judicial Power, but requires a legal clarification that AI recommendations must be included in the judgement to ensure transparency (Rizana & Utama, 2025) .

The regulatory vacuum regarding AI in the criminal justice system is evident from the absence of a national *lex specialis*, although the ITE Law (Law No. 1 of 2024) regulates digital transactions in general. The legal implication is a reliance on the interpretation of sectoral regulations such as PERMA No. 3 of 2018 on E-Court, which does not yet cover predictive AI in the assessment of recidivism risk (Putra, 2025) . At the pre-trial stage, the use of AI for predictive policing must comply with Article 77 of the Criminal Procedure Code regarding detention, where decisions must still be based on concrete evidence rather than algorithmic probabilities. Legally, AI recommendations may only serve as supporting evidence, not as the sole basis, to avoid violating the constitutional rights under Article 28D of the 1945 Constitution (Judijanto et al., 2024) .

AI-based electronic evidence requires strict digital validation procedures in accordance with PERMA No. 4 of 2023, including audit trails and traceability to ensure data integrity. Without this, AI evidence is vulnerable to allegations of manipulation, undermining the evidentiary process in criminal courts. Criminal liability for AI-developing corporations is governed by Article 46 of the old Criminal Code, but the new Criminal Code extends this to AI-related crimes through multi-level liability. The legal implication is the need for a traceability mechanism to track errors from developers to users within the judicial chain (Kamila, 2025) .

The transformation of the judicial system requires harmonisation with the targets of the 2025–2029 National Medium-Term Development Plan (RPJMN), which aims for digital justice; however, this is hindered by a lack of regulatory frameworks for AI accountability. The Supreme Court needs a specific Supreme Court Regulation (PERMA) on AI to establish standards for development, testing, and oversight. In the context of juvenile criminal justice (the Juvenile Justice Act), post-sentencing AI monitoring could enhance the effectiveness of Bapas supervision, but must comply with Articles 54–55 of the Criminal Code by ensuring that rehabilitation is not merely

surveillance. Legally, children's data must be specifically protected (Rizana & Utama, 2025).

The use of AI in the analysis of witnesses and motives requires adaptation of Articles 160–163 of the Criminal Procedure Code (KUHP) regarding the examination of witnesses, whereby algorithmic interpretation must not replace the judge's assessment of credibility. The legal implication is the risk of interpretative bias that violates the principle of free evaluation of evidence (Syahirah & Prasetyo, 2025). International regulations such as the EU AI Act could serve as a benchmark for Indonesia, classifying judicial AI as a high-risk system subject to mandatory annual audits. Legally, the adoption of this principle through a national AI Bill would fill the current legal vacuum. Harmonisation with Pancasila as a source of law demands AI that upholds social justice, not merely efficiency. The legal implication is a reinterpretation of Article 27 of the 1945 Constitution to ensure AI is not discriminatory towards marginalised groups (Sebayang et al., 2024).

Overall, the legal implications emphasise the urgency of comprehensive regulation that balances innovation with legal certainty, with the principle of human oversight at its core. Without this, the transformation of AI risks undermining the integrity of Indonesia's criminal justice system.

Conclusion

The digital transformation of the judiciary through the use of Artificial Intelligence (AI) in Indonesia's criminal justice system offers extraordinary opportunities to enhance the efficiency, consistency and accessibility of legal processes, yet it also raises complex ethical and legal challenges. From an ethical perspective, the use of AI has the potential to reinforce historical algorithmic biases, reduce transparency in decision-making, and lead to the dehumanisation of judicial processes, thereby undermining human rights such as the presumption of innocence and the right to a fair trial. Meanwhile, the legal implications highlight a fundamental mismatch between the human-centred framework of the Criminal Procedure Code and the logic of automated algorithms, particularly regarding the admissibility of digital evidence, legal liability for system errors, and the absence of specific AI regulations within the judicial sphere.

Ethical and legal integration in the implementation of AI in criminal justice demands a holistic approach that places the principle of human oversight at the core of technological control. Indonesia requires a national regulatory framework that adopts international standards such as the FATE principles (Fairness, Accountability, Transparency, Explainability) with local contextual adaptations, including harmonisation with the values of Pancasila and the 1945 Constitution. The gap between the ambitions for digital justice in the 2025–2029 National Medium-Term Development Plan (RPJMN) and the current state of regulatory readiness underscores the urgency of establishing a PERMA on AI in the Judiciary and a comprehensive

Artificial Intelligence Bill to fill the legal vacuum and ensure the supremacy of judges as the final decision-makers.

Overall, the digital transformation of the judiciary is not merely the adoption of technology, but a redefinition of the paradigm of justice in the algorithmic era, which must remain grounded in human dignity and legal certainty. Strategic recommendations include: (1) the development of a National AI Ethics Framework for the judiciary, (2) mandatory digital literacy training for law enforcement officials, (3) periodic independent audits of high-risk algorithms, and (4) public participation in AI fairness testing. With this responsible approach, Indonesia can realise a modern judiciary that is just, accountable, and humane amidst the 4.0 technological revolution.

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