The Validity of Artificial Intelligence Evidence in the Judicial System: A Juridical Analysis

Nur Sari Dewi. M[1]

Institut Agama Islam Negeri Lhokseumawe, Aceh, Indonesia

nursaridewi@iainlhokseumawe.ac.id

Muslem

Institut Agama Islam Negeri Langsa, Aceh, Indonesia

muslem.ibnu@iainlangsa.ac.id

Abstract

The advancement of Artificial Intelligence (AI) technology ideally strengthens the criminal justice system by enhancing effectiveness, efficiency, and accuracy in the process of evidence examination. AI can process large volumes of data and assist law enforcement in systematically identifying crime patterns. However, in reality, Indonesia's legal system still adheres to conventional evidentiary paradigms as stipulated in the Criminal Procedure Code (KUHAP) and the Electronic Information and Transactions Law (UU ITE), which have not yet explicitly recognized AI-based evidence. This condition raises issues of validity, accountability, and legal fairness, particularly because AI-generated outputs lack legal subjects that can be held responsible and are vulnerable to algorithmic bias. This study aims to analyze the validity of AI-based evidence within Indonesia's criminal justice system through a normative legal study employing statutory, conceptual, and comparative approaches. The findings reveal a significant legal vacuum in the regulation of AI evidence, resulting in uncertainty and potential human rights violations. Therefore, legal reform is necessary through amendments to the UU ITE, the formulation of technical guidelines via Supreme Court Regulations (PERMA), and the strengthening of law enforcement capacity to ensure that AI utilization aligns with the principles of justice, transparency, and due process of law in a modern judicial system.

Keywords: *Validity, Artificial Intelligence, Judicial System*

---

[1] Corresponding Author

Abstrak

Kemajuan teknologi kecerdasan buatan (Artificial Intelligence/AI) idealnya dapat memperkuat sistem peradilan pidana melalui peningkatan efektivitas, efisiensi, dan akurasi dalam proses pembuktian. AI mampu mengolah data dalam jumlah besar dan membantu aparat hukum menemukan pola kejahatan secara sistematis. Namun, realitasnya menunjukkan bahwa sistem hukum Indonesia masih berpegang pada paradigma pembuktian konvensional sebagaimana diatur dalam KUHAP dan UU ITE, yang belum mengakui bukti berbasis AI secara eksplisit. Kondisi ini menimbulkan persoalan validitas, akuntabilitas, dan keadilan hukum, terutama karena hasil keluaran AI tidak memiliki subjek hukum yang dapat dimintai pertanggungjawaban serta rentan terhadap bias algoritmik. Penelitian ini bertujuan untuk menganalisis validitas bukti AI dalam sistem peradilan pidana Indonesia melalui studi hukum normatif dengan pendekatan perundang-undangan, konseptual, dan komparatif. Hasil penelitian menunjukkan adanya kekosongan hukum yang signifikan dalam pengaturan bukti AI, yang berdampak pada ketidakpastian dan potensi pelanggaran hak asasi manusia. Oleh karena itu, diperlukan reformasi hukum berupa revisi UU ITE, penyusunan pedoman teknis melalui PERMA, serta penguatan kapasitas aparat hukum agar pemanfaatan AI dapat berjalan sesuai prinsip keadilan, transparansi, dan due process of law dalam sistem peradilan modern.

Kata Kunci: Validitas, Artificial Intelligence, Sistem Peradilan

Introduction

The advancement of Artificial Intelligence (AI) technology has brought major changes to various aspects of human life, including the legal system and criminal justice. In an era of rapid digitalization, AI plays an essential role in accelerating data analysis, increasing the efficiency of investigations, and assisting law enforcement in systematically tracing evidence and crime patterns (Simanjuntak & Firmansyah, 2024). This technology enables the processing of large volumes of data quickly and accurately, theoretically supporting the principles of effectiveness and efficiency in law enforcement. In a global context, the use of AI in the legal sector has become a new trend that not only strengthens evidentiary mechanisms but also broadens the legal perspective in addressing the complexity of modern crimes that are cross-border and multidimensional in nature.

In Indonesia, the application of AI has begun to be implemented in several law enforcement sectors, particularly in digital forensics and crime analysis. This technology contributes positively to improving the effectiveness of investigations, such as in digital footprint tracking and facial recognition of offenders. However, on the other hand, this development also presents new challenges (Alfani, 2025). AI is not only used as a supporting instrument in evidence gathering but also becomes both an instrument and an object of crime itself. Cases of video manipulation and facial data forgery for fake account openings revealed by the Jakarta Metropolitan Police illustrate that AI has two sides: it can strengthen law

enforcement while simultaneously creating new, complex, and difficult-to-trace criminal methods (Putri et al., 2024). Therefore, the urgency of regulating and ensuring the validity of AI-based evidence has become increasingly relevant in the national legal system.

Ideally, Indonesia's criminal justice system should be able to adapt to these technological advancements through regulatory reforms that are responsive to contemporary needs. The principles of due process of law, accountability, and substantive justice should serve as the foundation for accepting new forms of evidence, including those based on AI (Wisnubroto & Tegnan, 2025). In an ideal perspective, criminal procedural law should not merely function as a formal mechanism of proof but also as an adaptive instrument capable of accommodating technological innovation while ensuring justice and legal certainty. However, the existing reality shows that Indonesia's legal system, particularly in the realm of criminal procedural law, remains rigid and tied to the conventional evidentiary paradigm as regulated in Article 184(1) of the Criminal Procedure Code (KUHAP) and the Electronic Information and Transactions Law (UU ITE). Both regulations have yet to explicitly recognize evidence generated by AI systems, leaving its existence in a legal gray area.

This gap between ideality and reality raises several crucial legal issues. First, the absence of a clear legal basis means that AI-generated evidence cannot be legitimately included within the categories of evidence stipulated in KUHAP, which recognizes only five types: witness testimony, expert testimony, documents, indications, and defendant statements. Second, issues of accountability and legal responsibility for AI-generated outputs remain unresolved, as AI systems lack legal consciousness and cannot be held responsible like human legal subjects. Third, algorithmic bias arising from unrepresentative training data can produce discriminatory outcomes that harm one of the parties. Without clear regulations regarding algorithm auditability and transparency, the use of AI-based evidence risks violating the principles of justice and human rights and may create legal uncertainty that undermines the integrity of the judicial system.

Based on these conditions, this study aims to analyze the validity of AI-based evidence in the Indonesian judicial system from the perspective of criminal procedural law. The focus of this research lies in evaluating existing normative frameworks, identifying legal gaps, and conducting comparative analyses with jurisdictions that have already regulated the use of AI in judicial processes, such as the European Union and the United States (Pasaribu, 2024). This comparative approach is essential to understanding how developed countries have responded to similar issues by establishing new legal norms that classify AI risks and define accountability mechanisms for algorithmic outputs.

This research is expected to make a substantive contribution to the development of Indonesia's criminal procedural law, particularly in the area of technology-based evidence. Theoretically, the findings aim to enrich legal literature on the relationship between law and technology, while expanding discourse on the legality of digital evidence in the context of AI. Practically, this study may serve as a reference for policymakers in formulating new regulations that accommodate AI evidence while upholding the principles of justice, legal certainty, and human rights protection. Consequently, Indonesia's judicial system

can transform into a more adaptive, modern, and equitable legal framework in the digital era.

Literature Review

Several previous studies have addressed the topic of artificial intelligence in the context of law, particularly regarding its use as an auxiliary tool in judicial proceedings. Juwita Putri Simanjuntak and Hery Firmansyah, in their work entitled; *"Kompleksitas Penerapan Kecerdasan Buatan (AI) dalam Pembuktian Di Pengadilan Pidana,"* highlight how the use of AI in criminal courts can pose challenges to the principles of justice and the protection of human rights (Simanjuntak & Firmansyah, 2024). The intersection with this research lies in the focus on the validity of AI-based evidence. However, their study focuses more on policy aspects and regulatory frameworks that need to be developed to prevent the misuse of AI and ensure adequate legal protection for defendants. The study generally discusses ethical and legal challenges but does not specifically analyze the juridical aspects of each type of AI-generated evidence or how such evidence should be accommodated within the existing criminal procedural law framework.

Masinton Pasaribu, in his journal article entitled; *"Penerapan Kecerdasan Buatan (Artificial Intelligence) dalam Proses Legislasi dan Sistem Peradilan di Indonesia,"* views AI from a broader perspective, encompassing both the legislative process and the judicial system as a whole. Although it discusses the application of AI in court proceedings, the study does not thoroughly examine the legal status of AI-generated evidence and instead focuses on national legal system reforms at the macro level, rather than the validity of evidence in criminal proceedings. This journal emphasizes how AI can assist in lawmaking or judicial bureaucratic efficiency rather than addressing the substantive legal aspects that govern evidence itself (Pasaribu, 2024). This research, by contrast, specifically conducts an analysis of criminal procedural law to examine whether AI-based evidence meets the requirements of admissible evidence under the Indonesian Criminal Procedure Code (KUHAP), and why the ITE Law remains inadequate to regulate the complexity of AI-generated digital evidence such as deepfakes or predictive data. This is crucial because AI not only serves as a tool for law enforcement but also as an object and instrument of crime, thus requiring comprehensive regulation that covers both its utilization and evidentiary use in court.

I Ketut Sukewati Lanang Putra Perbawa, in his journal article entitled; *"The Application of Artificial Intelligence as Evidence in the Court,"* addresses a similar issue regarding the absence of an explicit legal framework recognizing AI as a legitimate source of evidence within the judicial system. The similarity lies in its focus on the use of AI as evidence (Perbawa, 2021), but his study emphasizes the need for a comprehensive legal framework to accommodate AI in evidentiary processes. Although it provides a solid foundation, it lacks an in-depth exploration of criminal procedural implications and comparative perspectives with legal approaches in other jurisdictions. This study intends to fill that gap by offering a more detailed comparative framework, such as analyzing how the EU AI Act and regulations in the United States classify AI-based evidence according to risk levels, which could serve as a model for Indonesia.

This research positions itself as a complement and development of previous studies. The novelty of this study lies in its sharp focus on the juridical analysis of the legal validity of evidence obtained or produced by artificial intelligence, viewed from the principles of due process of law and the defendant's human rights. Moreover, it enriches national legal discourse by providing an in-depth comparison of other countries' approaches that have already adopted AI in their judicial systems, offering alternative regulatory models that Indonesia can adopt. This comparison is crucial because those legal approaches can serve as benchmarks for Indonesia. For instance, the EU AI Act classifies AI systems according to their risk levels, which could serve as a model for developing an adaptive and proactive legal framework.

Research Methodology

This research is a normative legal study aimed at analyzing the validity of artificial intelligence (AI)-based evidence within Indonesia's criminal justice system. The approaches employed include the statute approach, to examine relevant regulations such as the Criminal Procedure Code (KUHAP) and the Law on Electronic Information and Transactions (ITE Law); the conceptual approach, to understand the principles and theories underlying the validity of evidence in law; and the comparative approach, to review juridical practices in other countries that have previously integrated AI technology into their judicial systems (Muhaimin, 2020). The data for this research were obtained through library research, collecting primary legal materials in the form of legislation, and secondary legal materials in the form of books, scholarly articles, and research reports related to the application of AI in criminal procedural law.

Data processing was carried out using qualitative analysis and a descriptive-analytical approach (Peter Mahmud Marzuki, 2017). Each legal material was categorized based on its relevance to the issue of AI evidence validity, and then analyzed systematically to assess the compatibility between positive legal norms and developments in artificial intelligence technology. Data validation was conducted through source triangulation, by verifying the consistency between legal documents, academic theories, and relevant judicial practices. The validity test involved cross-referencing authoritative legal sources, while data verification was carried out through interpretative analysis to ensure contextual accuracy and the proper application of legal norms. The structure of the research is organized in an analytical-progressive pattern, combining legal theory and empirical practice regarding the use of AI as legal evidence, so that the results of this study can contribute to strengthening the regulatory and epistemological framework within Indonesia's modern judicial system.

Definition and Development of AI in the Judicial System

Artificial Intelligence (AI) is one of the most significant technological advancements that has brought profound changes across various sectors, including the judicial system. Conceptually, AI can be understood as a branch of computer science designed to replicate human intelligence in performing cognitive tasks

such as reasoning, learning, pattern recognition, decision-making, and natural language processing. With these capabilities, AI functions not only as an analytical tool but also as a digital entity capable of providing legal recommendations, predicting case outcomes, and assisting in administrative and evidentiary processes in court (Masoudi & Yarahmadi, 2024). In the context of modern legal systems, AI is viewed as an innovation that enhances the principles of efficiency, accuracy, and justice, while simultaneously challenging traditional paradigms of evidentiary procedures and judicial processes that have long relied solely on human intervention.

In practice, AI is utilized within judicial environments for various strategic purposes. One of its primary functions is to assist in the analysis of large volumes of legal documents and digital evidence. AI can process thousands of legal documents and court rulings to identify precedents relevant to a particular case, thereby accelerating legal research and minimizing human error (Soraya & Fernando, 2024). Furthermore, AI is used in case outcome prediction systems, enabling algorithms to assess the probable direction of a ruling based on previous case data and a judge's decision-making tendencies. In administrative functions, AI helps schedule hearings, manage judicial calendars, and optimize the distribution of cases among judges to ensure proportionality and objectivity. Yukadhirza and Muslem emphasize that AI can serve as a crucial instrument in improving the efficiency of modern judicial processes due to its ability to identify patterns and anomalies within highly complex legal data (Yukadhirza & Muslem, 2023).

Moreover, the development of AI technology has expanded its role within investigation and evidentiary processes. Various AI applications have been implemented, including pattern recognition to detect suspicious financial transactions, predictive analytics to forecast potential crimes or recidivism risks, and facial recognition to identify suspects through surveillance footage. Additionally, Natural Language Processing (NLP) allows AI to analyze digital communications, legal documents, and even electronic conversations relevant to a case. Through these technologies, AI functions as a tool that accelerates fact-finding, reduces the likelihood of manual analytical errors, and supports law enforcement in collecting and evaluating digital evidence.

However, the use of AI in legal systems has not been without criticism. One of the most well-known examples is the COMPAS (Correctional Offender Management Profiling for Alternative Sanctions) system used in the United States. COMPAS was designed to assess the risk of recidivism among offenders and assist judges in determining parole decisions. Although theoretically efficient, numerous studies have revealed significant racial bias within its algorithms, disproportionately classifying minority defendants as high-risk. The COMPAS case sparked extensive debate on the importance of transparency, accuracy, and accountability in algorithmic decision-making within the judiciary (Judge Noel L. Hillman, 2019). This phenomenon underscores that AI is not a neutral entity—its performance and fairness are deeply influenced by the data used to train it. If training data contain biases, AI's outcomes will also be biased, potentially generating new forms of injustice that contradict the very goals of its implementation.

In Indonesia, the utilization of AI in the judicial system is still in its early stages but shows promising potential. The Supreme Court, for instance, has developed an AI-based system to assist in assigning judicial panels proportionally, considering workload, experience, and the qualifications of each judge. This initiative aims to enhance administrative efficiency and reduce the potential for abuse of authority in case distribution (Fitri & Taufiqurrahman, 2024). Nevertheless, AI application in Indonesia has yet to extend to complex evidentiary and juridical analysis as seen in more technologically advanced countries. Existing national regulations, such as the Criminal Procedure Code (KUHAP), do not explicitly address evidence obtained or generated through AI technology. Even though Law No. 11 of 2008 on Electronic Information and Transactions (ITE Law) recognizes electronic information and documents as legitimate legal evidence, it does not specifically regulate the validity of evidence produced by AI systems. To date, there is no Supreme Court Regulation (PERMA) that directly governs the admissibility of AI-generated evidence in court, creating a significant legal vacuum in practice.

Internationally, developed countries have begun addressing these challenges through the establishment of comprehensive regulations. The European Union has proposed the Artificial Intelligence Act, which classifies AI systems based on risk levels and imposes varying legal obligations on developers and users depending on their potential impact on human rights and justice. Meanwhile, the United States faces ongoing debates regarding accuracy standards and data protection, and China has gone a step further by establishing "internet courts" that incorporate AI into decision drafting and jurisprudential analysis (Shi et al., 2021). These applications demonstrate that AI is not merely used as an administrative aid but also as a substantive instrument in judicial decision-making, although human oversight remains an essential element in maintaining the legitimacy of legal rulings.

Indonesia, with its legal system rooted in the principle of legality, faces more complex challenges in accommodating AI's use. The legality principle requires that every judicial action and decision must have a clear and written legal basis. Since AI is not explicitly regulated in either the KUHAP or the ITE Law, evidence generated by AI may be subject to validity disputes in court. Additionally, there are serious concerns regarding accountability and transparency. AI systems are often viewed as a "black box," meaning their internal algorithmic processes are inaccessible or incomprehensible to external parties. This poses challenges in ensuring that AI-generated evidence or decisions are truly objective, auditable, and unbiased (Banung et al., 2025). Without a clear legal mechanism to assess, verify, and validate AI outputs, the potential for errors or injustice increases—particularly for economically or legally disadvantaged parties.

Concept and Legal Basis of AI Evidence in the Judicial System

The concept of evidence in Indonesian criminal law originates from a normative understanding that anything connected to a criminal act and capable of establishing the judge's conviction may be categorized and assessed as valid evidence. Under the framework of the Indonesian Criminal Procedure Code

(KUHAP), Article 184(1) formally recognizes five types of evidence: witness testimony, expert testimony, documents, indications, and the defendant's statement. This provision is not merely a technical listing—it forms the core of criminal evidentiary principles, where the judge's conviction serves as the ultimate determinant (Helmiranita & Delmiati, 2025). The recognition of these evidentiary types reflects a deliberate policy choice to balance the need for objective proof with procedural legal certainty. Therefore, before discussing Artificial Intelligence (AI) as a potential source of evidence, it is essential to understand that Indonesia's evidentiary system is rooted in these conventional categories and in the principle that only evidence recognized by law—or lawfully categorized within an existing evidentiary type—possesses full legitimacy before the court.

The principle of legality and the principle of evidentiary validity impose boundaries on the admissibility of evidence. The legality principle dictates that courts may not accept or rule based on evidence not provided for or prohibited by law, while the validity principle requires that evidence must not be obtained unlawfully—since illegally obtained evidence may be excluded or given no weight (Al-Billeh et al., 2024). This makes the process of obtaining evidence—including electronic or technology-based evidence—as important as the substance of the evidence itself. Here lies the crux of the AI issue: beyond determining whether AI outputs can be categorized under existing evidentiary types, procedural questions arise regarding how AI data, models, inference processes, and audit trails should be recognized, authenticated, and safeguarded against contamination or manipulation throughout the chain of custody.

The evolution of information technology has blurred the boundaries of traditional evidence. Law No. 11 of 2008 on Electronic Information and Transactions (ITE Law) introduced a crucial acknowledgment: electronic information and/or electronic documents and their printed results are legally admissible as valid evidence, as stipulated in Article 5(1) of the ITE Law. This provision opened the door for non-physical forms of evidence—an advancement enabling the presentation of digital recordings, server logs, metadata, and other electronic records as formal evidence. However, this normative recognition does not automatically resolve challenges of authentication, data integrity, and accountability for outputs produced by more complex systems such as AI (Hutapea et al., 2025). In other words, while the ITE Law provides a normative umbrella for electronic evidence, it does not specifically regulate evidence derived from autonomous or semi-autonomous machine inference processes that weigh data and models to produce conclusions.

Introducing AI into evidentiary procedures compels a redefinition and reassessment of existing evidentiary categories. AI outputs can appear in various forms: printed text (such as automated reports), analytical logs (like risk probability scores), visualizations (e.g., heatmaps), or decision-support suggestions (e.g., sentencing recommendations or risk assessments). Formally, some of these outputs may fit within the "document" or "electronic document" categories under the ITE Law. On the other hand, if an AI system functions analogously to an expert—processing data, modeling outcomes, and offering judgments—there is an argument that its output could be treated as expert testimony. However, this analogy is problematic: traditional expert testimony

comes from a person who can be examined, whose credibility can be tested, and who can be cross-examined in court, while AI "products" depend on understanding model architecture, training data, statistical assumptions, and inference processes that are not always transparent. Hence, courts face both theoretical and practical dilemmas: how should they assess the evidentiary weight of AI-generated outputs when the source is algorithmic, possibly opaque (a "black box"), and reliant on datasets that may contain historical biases?

Technical aspects of AI—such as accuracy, false positive/negative rates, generalization, overfitting, and susceptibility to manipulation—directly affect its legal validity. Judges, as free yet responsible assessors of evidence, must be equipped to understand these technical limitations to evaluate the probative value proportionally. For example, AI outputs that assign probabilities rather than certainties regarding a defendant's involvement in a crime must be interpreted carefully: such probabilities do not constitute absolute proof but rather elements requiring contextualization alongside other evidence. Additionally, audit logs and data chain of custody are essential. Without auditable records of data sources, model versions, parameters, and operators, it becomes difficult for opposing parties or judges to determine whether the AI output results from a legitimate and unmanipulated process (Soenyoto et al., 2023). Research findings indicate that without guarantees of integrity and independence from undetected human interference, AI evidence's probative value remains highly questionable.

Another crucial legal dimension involves accountability, the right to defense, and data protection/confidentiality. If AI-generated conclusions or inferences form the basis of indictments or judicial reasoning, defendants must retain the right to challenge the accuracy and methodology behind those outputs. However, demanding disclosure of source codes, training data, or model parameters often clashes with intellectual property rights, trade secrecy, or complex technical considerations. In this regard, independent expert testimony becomes vital—digital forensic experts can evaluate AI systems, reconstruct inference processes, and present findings in ways understandable to judges. Nevertheless, this introduces cost and accessibility disparities—developing countries or economically disadvantaged defendants may be prejudiced if access to independent technical examination is unavailable.

A further normative question arises regarding whether AI outputs should be treated as independent evidence or merely corroborative evidence. In judicial practice, cautious tendencies often place AI evidence as supplementary proof requiring confirmation through other sources—such as documents, witnesses, or traditional forensic results—to mitigate error risks (Rosyadi & Hoesein, 2025). This aligns with evidentiary theories prioritizing judicial conviction through multiple convergent proofs. However, if AI systems become more reliable, standardized, and supervised through technical accreditation, their probative standing could conceptually increase. Achieving this would require the adoption of standardized technical and procedural frameworks: algorithm certification, forensic audit standards, documented model updates, and training data management protocols to minimize bias.

For policymakers and legal drafters in Indonesia, this entails the urgent need for harmonization between the KUHAP, the ITE Law, and implementing

regulations or technical judicial guidelines. Without normative clarity on how AI evidence should be authenticated, presented, and contested in court, judges risk issuing inconsistent rulings vulnerable to repeated legal challenges. Pragmatic legal recommendations include: issuing technical regulations or Supreme Court guidelines (PERMA) for AI evidence verification; mandating detailed metadata documentation and preservation; establishing limited disclosure procedures for AI producers in evidentiary contexts; and creating publicly accessible digital forensic laboratories for independent evaluation (Rosyadi & Hoesein, 2025). All these measures must adhere to the principle of legality, affirming that the recognition and use of evidence must rest upon clear and promulgated legal provisions.

Finally, ethical and human rights challenges must not be overlooked in adapting legal systems to AI. AI applications that disregard data privacy or produce discriminatory outcomes can violate defendants' and victims' fundamental rights while eroding the judiciary's legitimacy. Therefore, AI evidentiary procedures must incorporate safeguards against privacy violations, mechanisms to mitigate bias, and assurances of meaningful human oversight (human-in-the-loop). A balanced integration of technical standardization and procedural protection will help ensure that the efficiency and accuracy promised by AI do not come at the expense of the fundamental principles of a fair and just trial.

Validity of AI Evidence in the Perspective of Criminal Law

In Indonesia's criminal justice system, the position of evidence holds a fundamental role in determining the material truth of a case. Based on Article 184 paragraph (1) of the Criminal Procedure Code (KUHAP), legally recognized types of evidence include witness testimony, expert testimony, documents, indications, and the defendant's statement. These five categories form the binding legal foundation for judges in evaluating and determining the validity of a criminal act. The principle of legality in evidence asserts that only evidence explicitly stipulated by law may be used as a basis for judicial decisions (Hutapea et al., 2025). Consequently, if a form of evidence does not fall within the categories listed in the KUHAP, it is legally deemed to lack probative value. Furthermore, the validity of evidence also depends on the manner of its acquisition; any evidence obtained through unlawful procedures may be declared invalid and must be excluded from judicial consideration.

The rapid development of information technology has prompted Indonesian law to adapt to modern forms of evidence, particularly electronic evidence. Through Law Number 11 of 2008 concerning Electronic Information and Transactions (UU ITE), electronic evidence has been formally recognized within the national legal framework. Article 5 paragraph (1) of the UU ITE stipulates that electronic information, electronic documents, and their printouts constitute valid legal evidence (Ikawati et al., 2024). This provision expands the traditional scope of evidence under the KUHAP, marking a significant step toward integrating technology-based proof into court proceedings. However, while the UU ITE provides a legal foundation for recognizing electronic evidence, it does not yet address the legal complexities arising from the use of Artificial Intelligence (AI), which operates through algorithmic mechanisms that are often opaque.

The main challenge in assessing the validity of AI-generated evidence lies in issues of accuracy and reliability. AI systems rely entirely on the data and algorithms that train them; if such data contain errors or biases, the resulting outcomes are likely to be misleading. In the context of criminal law, this poses a serious risk of injustice, particularly when AI-based findings are used as primary evidence in trials. Studies have shown that algorithms trained on biased historical data can produce discriminatory risk assessments against certain social groups (Putra & Silaban, 2024). Such outcomes not only violate the principle of justice but also undermine the principles of non-discrimination and due process of law within the criminal justice system.

Beyond accuracy concerns, the absence of a clear legal framework presents another barrier to ensuring the objectivity of AI evidence. Without independent verification or audit mechanisms for the systems and data employed, AI-generated results cannot be adequately examined in court. This contradicts the adversarial system's requirement that every piece of evidence must be testable and open to challenge. The lack of explicit legal provisions governing validation, transparency, and algorithmic accountability renders the acceptance of AI-based evidence discretionary and heavily reliant on the subjective judgment of the presiding judge. Consequently, defendants' rights to challenge or scrutinize AI-derived evidence become severely constrained, especially when the AI system functions as a "black box" whose operations cannot be logically or scientifically explained.

Therefore, legal reform is urgently needed to establish clear and binding regulations on the use and validity of AI-generated evidence in criminal proceedings. Although AI is increasingly employed in electronic evidence analysis—such as facial recognition, voice matching, or crime pattern analysis—there remains no explicit legal provision in either the KUHAP or the UU ITE that grants juridical legitimacy to AI-generated outputs. This legal vacuum creates significant debate regarding the evidentiary status of AI within Indonesia's criminal justice system. Hence, comprehensive legal reform is essential to ensure that the evidentiary framework accommodates technological advancements while upholding the principles of justice, accountability, and human rights protection (Simanjuntak & Firmansyah, 2024). Such reform should include establishing minimum standards for AI use in judicial processes, mechanisms for independent oversight of algorithmic accuracy, and clear regulations on legal liability in cases of evidentiary errors involving AI.

In-Depth Juridical Analysis of the KUHAP and UU ITE: Normative Limitations in Accommodating AI-Based Evidence

Indonesia's criminal procedure system stands upon a strict and formal principle of legality, where the recognition of evidence must conform to the normative provisions explicitly established by legislation. Article 184 paragraph (1) of the Criminal Procedure Code (KUHAP) serves as the principal reference in determining valid forms of evidence—namely witness testimony, expert testimony, documents, indications, and the defendant's statement. This formulation is *limitative* and leaves no room for additional forms of proof beyond those enumerated. Juridically, this means that evidence falling outside these five

categories lacks probative force in the eyes of the law, even if it may carry factual significance (Putra & Silaban, 2024). While this principle safeguards legal certainty, it simultaneously generates normative stagnation, hindering the legal system's ability to adapt to modern technological developments—particularly when the evidence originates from Artificial Intelligence (AI) systems that do not neatly fit within traditional legal constructions.

A fundamental challenge arises when the legal system attempts to situate AI-generated analytical outputs within the framework of Article 184 of the KUHAP. Each category of evidence has distinct definitions and characteristics that do not easily align with AI outputs. For example, the "document" category under KUHAP presupposes the existence of a human creator or signatory who bears legal responsibility for the document's content. AI-generated evidence—though it may take the form of written reports or digital files—lacks a direct human author who can be held accountable for its conclusions. AI operates through algorithms executed automatically by computational systems, not through conscious human will or intent (Gaffar, 2024). The absence of a legal subject capable of assuming responsibility makes it difficult to categorize AI-based results within conventional evidentiary classes. Practically, this creates a legal dilemma: on one hand, AI-generated data may serve as an objective source of information, but on the other, it cannot be formally recognized as valid because it fails to satisfy procedural requirements within criminal law.

Similar obstacles arise when attempting to classify AI-generated results as "expert testimony." Under Indonesian criminal procedure, expert testimony must come from an individual with specialized competence in a given field, capable of explaining matters beyond the general understanding of the public. Experts must appear in court, provide live testimony, and be subject to cross-examination. While AI can process data and deliver high-accuracy analyses, it lacks consciousness, legal personality, and the ability to answer questions posed by judges. Consequently, AI-generated analysis can only serve as an auxiliary tool for a human expert who interprets and explains its results in court. Thus, the actual evidence remains the human expert's testimony, not the AI output itself. This distinction raises complex issues of *liability*: if the AI's analysis proves to be erroneous or biased, who bears responsibility—the expert presenting it, the institution employing the AI, or the algorithm's developer, who is absent from court proceedings?

As technology evolves, Law Number 11 of 2008 concerning Electronic Information and Transactions (UU ITE) seeks to broaden evidentiary scope by recognizing the validity of electronic information and documents as lawful evidence. Article 5 paragraph (1) of the UU ITE affirms that electronic information and documents hold equal legal standing to other forms of evidence recognized under the KUHAP. Initially, this was viewed as a progressive move toward accommodating digital proof in modern trials. However, upon closer examination, the UU ITE merely validates the *form* or *format* of electronic evidence rather than the *substantive process* behind its creation. The UU ITE does not address issues of algorithmic transparency, data auditability, or bias mitigation mechanisms inherent to AI systems (Gaffar, 2024). Hence, while electronic evidence is legally acknowledged, the reliability of AI-generated evidence—produced through

complex algorithmic processes—remains normatively unregulated within Indonesia's legal framework.

The absence of specific regulations governing AI as a form of evidence gives rise to significant juridical risks. AI operates on statistical models and machine learning frameworks often described as "black boxes," meaning that while their outputs are observable, their internal decision-making processes are difficult to explain—even for their developers. In evidentiary terms, this contradicts fundamental criminal law principles requiring accountability and clarity for every piece of evidence. Without the ability to explain how AI conclusions are derived, such evidence risks violating the principles of *fair trial* and *due process of law*. A relevant example is the COMPAS case in the United States, where an algorithm used to assess recidivism risk demonstrated racial bias (Krištofík, 2025). Though the contexts differ, this case illustrates the potential dangers of employing AI-generated results without stringent normative oversight. In Indonesia, law enforcement agencies have begun applying AI technologies such as facial recognition and digital forensics, yet without a clear legal framework—posing risks of human rights violations and future legal uncertainty.

Thus, a juridical analysis of the KUHAP and the UU ITE reveals a substantial gap between technological advancement and legal adaptation. The KUHAP remains grounded in an anthropocentric paradigm—centering on humans as legal actors and bearers of responsibility—while the UU ITE regulates only the technological dimension superficially, without addressing the substantive reliability of AI systems. Reformulation of criminal procedural law is therefore necessary to respond to technological progress while preserving the principles of justice, legality, and human rights protection. Recognition of AI-based evidence demands not only a normative revision of Article 184 of the KUHAP but also the establishment of new legal standards governing algorithmic transparency, system auditing, and legal accountability for entities utilizing or developing AI. Without such reform, Indonesia's judicial system will continue to face an ongoing dilemma between technological modernity and stagnant legal certainty.

Conclusion

This study demonstrates that artificial intelligence (AI) presents significant juridical challenges to Indonesia's criminal justice system. This is primarily due to the mismatch between the rapid advancement of technology and the existing legal framework, which remains conventional in nature. An analysis of the *Kitab Undang-Undang Hukum Acara Pidana* (KUHAP) and the *Law on Electronic Information and Transactions* (UU ITE) reveals a fundamental legal vacuum. KUHAP, with its five enumerated forms of admissible evidence—witness testimony, expert testimony, documents, indications, and defendant statements—lacks an explicit category to accommodate AI-generated evidence. Although the UU ITE recognizes electronic evidence, its scope focuses merely on the *format* rather than the *substance* or *process* behind algorithmically generated data. This raises concerns regarding validity, reliability, and accountability, especially since many AI systems operate as "black boxes" and are prone to algorithmic bias, which can lead to discriminatory judgments.

In addressing these challenges, legal reform becomes imperative. Such reform must be comprehensive, encompassing regulatory amendments and capacity-building initiatives. Indonesia can learn from other jurisdictions, such as the European Union with its *Artificial Intelligence Act*, which classifies AI systems based on risk levels to ensure transparency, reliability, and oversight. The proposed roadmap for legal reform includes three key elements: revising the UU ITE to incorporate standards of algorithmic reliability and transparency; establishing a *Supreme Court Regulation (PERMA)* to provide technical guidelines for judges; and enhancing the capacity of law enforcement officials through in-depth technical training on AI. The ultimate goal is to develop a new legal framework that explicitly safeguards defendants' rights and ensures that the use of AI within the judicial system promotes justice—rather than undermining it.

References

Al-Billeh, T., Al-Hammouri, A., Khashashneh, T., Makhmari, M. A., & Kalbani, H. A. (2024). Digital Evidence in Human Rights Violations and International Criminal Justice. *Journal of Human Rights, Culture and Legal System*, *4*(3), 842–871. https://doi.org/10.53955/jhcls.v4i3.446

Alfani, I. N. (2025). The Utilizing AI in Forensic Audit: A Solution to Detect & Prevent Financial Fraud. *Sultan Agung Management Journal*, *1*(4), 267–270.

Banung, F. L., Sogen, M. M. B., Ndao, A. F. D., Tunu, S. G., & Koa, A. D. (2025). The Effect of Using Black Box Ai to Improve Web Programming Skills of Informatics Education Students. *JUPE: Jurnal Pendidikan Mandala*, *10*(2), 672–678. https://doi.org/10.58258/jupe.v10i2.8852

Fitri, A. A., & Taufiqurrahman, R. A. (2024). The Use of Artificial Intelligence in Assigning and Appointing Judicial Panels in Indonesian Courts. *Pena Justisia: Media Komunikasi Dan Kajian Hukum*, *23*(002), 1961–1974. https://doi.org/10.31941/pj.v23i3.5162

Gaffar, H. (2024). Implications of Digitalization and AI in the Justice System: A Glance at the Socio-legal Angle. *Law and World*, *10*(31), 154–177. https://doi.org/10.36475/10.3.14

Helmiranita, S., & Delmiati, S. (2025). Penggunaan Alat Bukti Keterangan Ahli dalam Penghentian Penyidikan Tindak Pidana Pembunuhan yang Dilakukan Tersangka Dengan Dugaan Gangguan Kejiwaan. *Ekasakti Legal Science Journal*, *2*(2), 178–187. https://doi.org/10.60034/kyhk4m75

Hutapea, N. M. S., Sitepu, D. K. C., Damanik, J., & Sianipar, S. K. L. (2025). Artificial Intelligence and Criminal Liability: A Preliminary Study within the Indonesian Legal System. *JIHK: Jurnal Ilmu Hukum Keadilan*, *7*(2), 688–704. https://doi.org/10.46924/jihk.v7i2.330

Ikawati, L., Sulaiman, S., & Huseini, M. F. (2024). Masa Depan Penegakan Hukum Indonesia: Sistem Peradilan Pidana Berbasis Kecerdasan Buatan (AI). *Prosiding Seminar Nasional Ilmu Hukum*, *1*(1), 01–18. https://doi.org/10.62383/prosemnashuk.v1i1.19

Krištofík, A. (2025). Bias in AI (Supported) Decision Making: Old Problems, New Technologies. *International Association for Court Administration*, *16*(1), 1–30. https://doi.org/10.36745/ijca.598

Masoudi, R., & Yarahmadi, H. (2024). The Role of Artificial Intelligence in the Judicial Process. *Legal Studies in Digital Age*, *3*(4), 195–206. https://doi.org/10.61838/kman.lsda.3.4.18

Pasaribu, M. (2024). Penerapan Kecerdasan Buatan (Artificial Intelligence) dalam Proses Legislasi dan Sistem Peradilan di Indonesia. *Selisik: Jurnal Hukum Dan Bisnis*, *10*(2), 163–181.

Perbawa, I. K. S. L. P. (2021). Application of Artificial Intelligence as Evidence in Indonesian Courts. *International Journal of Social Science and Business*, *5*(2), 180–184. https://doi.org/10.23887/ijssb.v5i2.36185

Putra, I. N. G. A., & Silaban, J. K. P. (2024). Penerapan Kecerdasan Artifisial dalam Pengawasan Kekuasaan Kehakiman sebagai Upaya Mereduksi Disparitas Putusan Pidana di Indonesia. *Ma'mal: Jurnal Laboratorium Syariah Dan Hukum*, *5*(4), 297–320. https://doi.org/10.15642/mal.v5i4.382

Putri, S. M. I., Salsabila, N., & Hosnah, A. U. (2024). Kriminalisasi Penggunaan Deepfake dalam Tindak Pidana Penipuan dan Pencemaran Nama Baik: Tantangan dan Solusi Hukum. *Jurnal Hukum Legalita*, *6*(2), 83–90. https://doi.org/10.47637/legalita.v6i2.1453

Rosyadi, S. Y., & Hoesein, Z. A. (2025). Pembaruan Hukum di Era Digital: Aspek Hukum terhadap Validitas Hasil Analisis Artificial Intelligence Sebagai Alat Bukti Dalam Penegakan Hukum Pidana Pertambangan. *Judge: Jurnal Hukum*, *6*(03), 563–577. https://doi.org/10.54209/judge.v6i03.1569

Shi, C., Sourdin, T., & Li, B. (2021). The Smart Court – A New Pathway to Justice in China? *International Journal for Court Administration*, *12*(1), 1–19. https://doi.org/10.36745/ijca.367

Simanjuntak, J. P., & Firmansyah, H. (2024). Kompleksitas Penerapan Kecerdasan Buatan (AI) dalam Pembuktian di Pengadilan Pidana. *Kertha Semaya: Journal Ilmu Hukum*, *12*(12), 3097–3112. https://doi.org/10.24843/KS.2024.v12.i12.p01

Soenyoto, R., Soerodjo, I., Sidarta, D. D., & Borman, M. S. (2023). Legalitas Pembuktian Elektronik pada Proses Hukum. *Court Review: Jurnal Penelitian Hukum*, *3*(06), 15–22. https://doi.org/10.69957/cr.v3i06.1514

Soraya, J., & Fernando, Z. J. (2024). AI Judges and the Future Revolution of the Judicial Profession in Indonesia. *The Indonesian Journal of International Clinical Legal Education*, *6*(3), 393–426. https://doi.org/10.15294/iccle.v6i3.15358

Wisnubroto, A., & Tegnan, H. (2025). Preventing AI Crime Towards A New Legal Paradigm: Lessons from United States. *Journal of Human Rights, Culture and Legal System*, *5*(2), 630–658. https://doi.org/10.53955/jhcls.v5i2.606

Yukadhirza, V., & Muslem, M. (2023). Utilisation of Chat GPT in Improving Learning of Islamic Communication and Broadcasting Students at State Islamic University of Langsa. *Tasamuh: Jurnal Studi Islam*, *21*(2), 235–248. https://doi.org/10.20414/tasamuh.v21i2.8444