



Utilization of artificial intelligence (AI) technology in the judicial system

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ABSTRACT

The utilization of Artificial Intelligence (AI) technology in the Supreme Court represents an innovative step toward modernizing Indonesia's judicial system. AI offers advantages in efficiently processing legal data, analyzing jurisprudence, and providing legal recommendations to assist judges in decision-making. However, AI implementation in the legal system presents challenges, including regulatory issues, ethical considerations, and AI's limitations in understanding the humanistic dimensions of legal rulings. This study employs a normative juridical method with a doctrinal approach to analyze the role, benefits, and legal implications of AI usage in Indonesia's judicial system. The findings indicate that while AI can enhance judicial efficiency, strict regulations are necessary to ensure transparency, accountability, and legal compliance in its application.

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1. Introduction

The judicial system in Indonesia is classified under what is known as the "continental system," characterized by the presence of a cassation mechanism by the highest court. The judiciary is a process carried out in courts related to the tasks of examining, adjudicating, and resolving cases. Meanwhile, a court is an official body or institution that implements the judicial system by examining, adjudicating, and deciding cases (Teweh, 2022).

A system, based on its concrete definition, is interpreted as a plan, method, or procedure for accomplishing something, or a system as a type of unit with a specific order. This specific order refers to a structure composed of various parts of the system. A system is an arrangement or a unified whole consisting of interconnected parts or elements, which are norms or statements about what should be. Therefore, a legal framework is considered a system based on norms. Essentially, it consists of various components that collaborate and coordinate to achieve a shared objective (Subekti, 1983 in Ginting & Christian, 2021).

The legal system consists of a complex whole of elements, namely regulations, court decisions, institutions or organizations, and values (Nabilasari Lesmana & Yustiawan, 2023). The entire national legal order can be referred to as the national legal system, and there are also other legal systems such as criminal law, civil law systems, environmental law systems, and so on. There are systems, subsystems, and even sub-subsystems, and so forth. In every part of the law, there are essentially always general characteristics of legal rules, which are usually not explicitly regulated in legislation (Hutabarat et al., 2022). Through systematization, the complexity of reality, which is in principle unlimited, can be more easily managed. Systematization provides motivation for legal solutions, such as the systematic interpretation method in legal discovery.

The judiciary refers to everything or a process carried out in courts related to the tasks of examining, adjudicating, and resolving cases by applying the law and/or discovering the law "*in concreto*." This means that judges apply legal rules to concrete matters presented before them for adjudication and decision-making, with the aim of upholding and ensuring compliance with substantive law. This is done using procedural methods established by formal law.

The direction of legal policy aims to provide protection for the rights of citizens and ensure a sustainable future. As such, the legal system undergoes modernization every year (Simatupang, 2024). Paul Scholten introduced the theoretical concept of an open legal system, which offers an approach to addressing the puzzles posed by new developments in human life (Jansen, 2023).

According to Scholten, the law should be adaptable to the ever-changing nature of human life, ensuring its continued relevance to the evolving society it governs. In light of Scholten's concept, it is intriguing to witness the progression in the utilization and integration of AI. In 1943, Warren McCulloch and Walter Pitts wrote an article titled "A Logical Calculus of Ideas Immanent in Nervous Activity." Artificial Intelligence (AI) is actually not a new concept; it has been introduced and has evolved in human life since the late first half of the 20th century (Zhang & Lu, 2021).

The advancement of Artificial Intelligence (AI) technology has significantly influenced criminal justice systems across the globe. One notable instance of this influence can be seen in the implementation of AI in criminal courts in the United States, where a tool known as COMPAS is utilized. COMPAS relies on sophisticated algorithms to forecast the likelihood of reoffending, offering valuable insights for judges when determining pre-trial detention arrangements (Contini, 2020). Given this reality, the question arises: can Artificial Intelligence (AI) assist or even replace judges in rendering verdicts in criminal courts in Indonesia in the future?

Primarily, the goal of criminal procedural law is to strive for material truth or the actual truth (Hiariej, 2022). Based on this foundation, the panel of judges, in rendering a verdict, has the obligation to seek and discover the actual truth while upholding the principle of "For the Sake of Justice Based on the Almighty God." This ensures that the decision is accountable to fellow human beings and, most importantly, to the Almighty God.

In the effort to discover material truth, judges have an additional obligation to consider various aspects, including sociological aspects, customary law, and applicable positive law. Furthermore, the judge's conviction must also be based on a sense of justice that is balanced with the facts of the case (Jayadi, 2018 in Hermawan (2024). The reason for this is that the Indonesian criminal justice system follows the negative legal proof system (*negatief wettelijk bewijstheorie*), which forms the basis of proof according to the judge's conviction derived from evidence stipulated by law. This evidence is proven negatively, as regulated in Article 183 of the Indonesian Criminal Procedure Code (KUHAP) (Hiariej, 2019).

Artificial Intelligence (AI) makes decisions by using logic, processing information through programmed algorithms to reach a specific result (Zhou, 2024). The source of the input information comes from legal databases that have been processed using natural language processing methods to assist in searching for legal materials and jurisprudence. With this data,

Artificial Intelligence (AI) will filter relevant data according to the ongoing case. The results of this filtering serve as legal sources that form the basis for consideration when deciding.

Based on the explanation outlined in the background, there is another side to decisions made by Artificial Intelligence (AI) as a judge, which would tend to be rigid and fail to consider other humanitarian factors. Moreover, in a verdict, there is an obligation to include the considerations taken by the Panel of Judges. The results of Artificial Intelligence (AI) analysis also have an inherent risk in the form of a black box effect, where the Artificial Intelligence (AI) cannot demonstrate how it processes data from the beginning until a conclusion can be formulated.

Law enforcement plays a crucial role in maintaining order in society. In today's era of rapidly advancing digital technology, the traditional roles within law enforcement, such as police officers, prosecutors, judges, and lawyers, are undergoing significant changes. The technological advancements in the Fourth Industrial Revolution have revolutionized how people in the digital age engage with the legal system. This transformation not only necessitates regulatory adjustments but also demands that legal professionals and law enforcement personnel be flexible in their approach. Judge Aedit Abdullah from the Supreme Court of Singapore highlighted three important factors: the emergence of Artificial Intelligence (AI), the commercialization of law, and the enhanced ease of communication (Elnizar, 2018).

The advancement of Big data technology will make legal processes easier, eliminating the need for human intervention by law enforcement agencies. This means that human involvement in law enforcement may be jeopardized by the rise of digital technology.

Artificial Intelligence (AI) operates through a meticulously crafted system. AI is intricately designed with complex structures to carry out tasks that imitate the functions of the human brain, such as data analysis, problem solving, and decision-making. For instance, in auditing, AI is programmed to efficiently gather and analyze data to identify fraud more quickly and accurately than human auditors.

One of the Artificial Intelligence (AI) systems created for conducting audit procedures, such as those elaborated upon, is known as Watson. Developed by Klynveld Peat Marwick Goerdeler (KPMG) and International Business Machines (IBM), Watson functions as a cognitive system in the form of a supercomputer. This advanced system can meticulously analyze an extensive amount of documents, contracts, and debit and credit data, before synthesizing this information efficiently. Additionally, there exists a fuzzy approach that allows Artificial Intelligence (AI) to produce conclusions alongside its assessments or viewpoints, derived from analyzed data through the use of report formats similar to the manual audit report criteria set by auditors (Bhagaskara et al., 2022). One of the important projects influencing legal aid provision is the emergence of DoNotPay chat in England, which currently provides legal aid services covering more than 1,000 (one thousand) areas of law (Mannes, 2017 in Nada et al. 2024).

From a worldwide perspective, digital technology has been fully embraced to enhance the enforcement of regulations in a more efficient and effective way. In Indonesia, digital technology is playing an increasingly important role in various aspects of public services, including the establishment of legal entities, e-court services, and online legal assistance. Artificial Intelligence (AI) is essentially a tool used to assist humans in their tasks, making them quicker, more precise, and more efficient. AI functions as an electronic assistant, which is a key part of an electronic system that carries out tasks automatically following human instructions. This is in line with the definition of Artificial Intelligence (AI) in "Article 1, Point 8 of the Electronic Information and Transactions Law."

The implementation of artificial intelligence (AI) in the justice system has been a focus in various countries, including Indonesia, China, and the United States. Comparative studies show that while AI can improve efficiency and reduce bias in the judicial process, the level of integration as well as the regulations governing its use differ across countries. In Indonesia, AI is used primarily to digitize administrative processes and support judges in decision-making,

especially in assessing recidivism (Jacey & Yuniarti, 2023). The main focus of its implementation is to improve time and cost efficiency in the justice system. However, the lack of adequate regulation remains a challenge that potentially poses risks to users (Jacey & Yuniarti, 2023).

Meanwhile, the United States has developed more sophisticated AI applications, such as MyOpenCOURT, which provides legal advice and has an accuracy rate of over 90% in case classification (Cohen et al., 2023). This reflects how AI has been widely integrated in their legal systems. In China, the use of AI in the judicial system is also quite advanced, with a focus on document analysis and efficiency of the judicial process. Despite similarities with Indonesia in terms of administrative digitization, China has implemented stricter regulations regarding the use of AI in their legal system (Jacey & Yuniarti, 2023).

The implementation of AI in various countries has shown that this technology can reduce case backlogs and enhance fairness in court rulings. However, in Indonesia, the lack of comprehensive regulations may hinder the optimization of AI compared to the more structured approaches in the United States and China (Jacey & Yuniarti, 2023; Siani, 2024). Therefore, while AI has great potential to improve the efficiency of the justice system, it is important to ensure a balance between innovation and legal protection to create sustainable and fair implementation for all parties.

A system integrated into an application will always need human interaction to function properly. The application itself is not capable of generating conclusions on its own without human input. The Electronic Information and Transactions Law defines Artificial Intelligence (AI) as an electronic system and agent, indicating that all AI actions are ultimately controlled by humans. According to the law, these instructions come from the operators of the electronic system, who are legal entities. Therefore, AI cannot be seen as a separate legal entity and should not be treated as such (Haris & Tantimin, 2022).

The operational system of Artificial Intelligence (AI) is not an independent entity, as AI is essentially a tool applied by humans with the intention of accelerating the process of human tasks. As an application, its existence significantly aids human work.

Darshan Bhora and Kuldeep Shravan, citing Minsky's perspective, assert that Artificial Intelligence (AI) is a machine that mimics human intelligence by performing a range of tasks. The author believes Minsky's view may be an overstatement. AI is created to imitate human characteristics like planning, solving problems, reasoning, understanding concepts, stimulating thought processes, and facilitating fast and effective work (Bhora & Shravan, 2019). Created and designed for specific needs in the legal field, Artificial Intelligence (AI) outperforms humans in speed and accuracy but lacks human emotions and will. Its problem-solving approach goes beyond just technical aspects, making it more efficient than robots. When used for administrative tasks, document processing, and legal consultations, AI significantly speeds up processes like contract drafting and document preparation, thereby assisting humans. Hence, this article will delve into the application of AI technology in the legal system. This research contributes to the modernization of the law while upholding justice, honesty and human rights.

2. Method

The research used in this study is doctrinal/normative legal research. Normative legal research is a scientific research procedure that aims to find the truth based on scientific logic seen from a normative perspective. This type of research focuses on analyzing legal norms, principles, and doctrines applied to the issue under study (Ali, 2021). This research is descriptive-analytical, meaning it systematically describes existing regulations and connects them with legal theory for practical application. The research approach used is the normative juridical method, which involves examining legal norms within national legislation to analyze their consistency and implementation. This normative juridical method aligns with the statute approach and the conceptual approach. The statute approach focuses on analyzing legal regulations and

provisions within legislation, while the conceptual approach explores legal doctrines and principles to understand the underlying legal concepts (Nurhayati et al., 2021).

This study does not involve interviews or surveys with stakeholders such as judges, lawyers, and legal scholars. It adopts a normative juridical (doctrinal research) approach, relying on secondary data sources such as legislation, legal doctrines, and court decisions rather than empirical data from direct respondents. The research process is carried out systematically through the following stages. First, a literature review and legal material collection are conducted by identifying and gathering primary legal sources, including legislation, court decisions, and legal doctrines. Additionally, secondary legal sources such as legal commentaries, academic papers, and legal textbooks are examined, along with tertiary legal sources such as legal dictionaries and encyclopedias to support the understanding of legal terms and concepts. Second, a systematic analysis of legal materials is performed to assess the coherence between legal norms, principles, and doctrines. This analysis includes a study of the legal system both vertically and horizontally to ensure consistency and avoid contradictions. Furthermore, a comparative legal study is conducted to identify similarities and differences between legal systems. Third, legal interpretation is carried out using various methods such as grammatical, systematic, and teleological interpretation to derive the meaning of legal texts. The interpretation results are then synthesized into legal arguments and research findings. Fourth, the findings are summarized into conclusions and recommendations based on doctrinal analysis and legal reasoning.

3. Analysis and Results

The rapid advancement of digital technology has prompted various countries to begin implementing Artificial Intelligence (AI) for judicial tasks. For instance, the European Union, in its utilization of AI within judicial institutions, has established regulations and ethical guidelines as a primary foundation, alongside developing AI-based digital platforms for courts. The application of AI in courts is undoubtedly distinct and possesses unique characteristics (Gatra, 2024).

First, to implement AI in courts, it is essential to understand the specific needs of the judicial system. If courts are faced with a backlog of cases, a limited number of judges and clerks, and strict case resolution timelines, then AI will undoubtedly become a necessity and a solution. This differs from non-litigative adjudication institutions, such as arbitration bodies, where the volume of cases may not be as high due to limitations in their absolute jurisdiction and the closed nature of their proceedings. For example, despite the use of AI in places like Guangzhou, China, arbitration institutions in Indonesia currently require digital infrastructure, such as online courtrooms, voice-to-text conversion, and online translation tools, rather than AI-powered chatbots.

Second, regarding which technology is most appropriate to use. It must be understood that not all digital platforms are AI-powered or AI-based. For courts handling numerous cases like the Constitutional Court and Supreme Court, the presence of AI-based technology becomes relevant. For these courts, the required AI platform models are not just limited to AI platforms for management, administration, and courtroom facilitation, such as online trial processes, voice-to-text conversion, and online translation. Going forward, GenAI chatbots will also be needed to facilitate judges and clerks in handling case substances.

Third, the AI used must be user-friendly. It should be easy to use and not burden its users. As understood, Generative AI like chatbots heavily depends on proper instructions and questions. AI hallucination is often triggered by miscommunication between AI and its human users.

Fourth, Legal Compliance is non-negotiable. This is especially true when AI is implemented in Judicial institutions that are full of legal issues. Guidelines and criteria need to be established regarding which areas can be covered by AI implementation and which areas are permissible and impermissible. Matters of ethics and propriety must also be included in implementation

regulations and internal guidelines of court institutions in this domain. To maintain consistency and compliance, institutions like the Constitutional Court and Supreme Court need to create special regulations about AI and Personal Data Protection if they want to implement AI.

Fifth, what is also important is good governance and user acceptance. Good governance, including transparency and accountability, is a necessity. If this is fulfilled, there will be no room for users to reject AI performance (Gatra, 2024).

As a rule-of-law state, Indonesia guarantees its citizens the right to justice in accordance with applicable laws through the judicial power exercised by the courts. Article 24 paragraph (1) of the 1945 Constitution of the Republic of Indonesia affirms that judicial power is an independent authority responsible for administering justice to uphold law and justice. The spirit of Article 24 paragraph (1) of the 1945 Constitution is further elaborated in Law Number 48 of 2009 concerning Judicial Power in the Republic of Indonesia.

The utilization of Artificial Intelligence (AI) in the judicial system has become part of legal modernization in various countries, including Indonesia. AI offers speed and accuracy in legal data analysis, assists in document processing, and provides recommendations for legal decision-making. This technology can enhance the efficiency of judicial institutions by automating administrative tasks and helping judges access and review jurisprudence more quickly and systematically. Thus, AI has significant potential to optimize the judicial system, making it more effective and responsive to the demands of justice.

Nevertheless, the implementation of AI in the judicial system is not without challenges. One of the main issues is the limitation of AI in understanding social, cultural, and humanistic contexts, which are often critical considerations in legal decision-making. Law is not only normative but also takes into account moral, ethical, and substantive justice aspects. Therefore, while AI can assist in analyzing cases, the final decision must remain in the hands of judges, who possess the ability to evaluate various factors holistically.

Decision making in AI is highly dependent on data/big data input. The data that is input is obtained from recordings of human activity, meaning that decision making in AI is highly influenced by human activity including in the justice system.

The judicial system is the backbone of maintaining justice in society. With technological advancements, Artificial Intelligence (AI) has begun to be applied in various aspects of life, including in the judicial system. The judicial system plays a crucial role in upholding justice by ensuring that every individual receives fair and proportional treatment in accordance with applicable laws. However, human judicial systems often have shortcomings, such as tendencies toward subjectivity, inaccuracies, or human fatigue, which can influence final decisions.

Artificial Intelligence (AI) offers the potential to enhance efficiency and objectivity in the judicial system through the use of advanced algorithms and data analysis. AI can assist in information processing, evidence analysis, and even in providing decision recommendations to judges.

The current advancements in technology enable the use of Artificial Intelligence (AI) in various aspects of human life, such as banking, healthcare, and even law. French Tech Indonesia states that AI helps automate routine tasks, detect fraudulent activities, and provide valuable insights for risk assessment in the banking industry. Meanwhile, in the healthcare sector, AI aids in early disease detection, treatment planning, and telemedicine, thereby improving healthcare services.

A concrete example of the application of Artificial Intelligence (AI) technology in law enforcement, particularly in traffic management, is the use of electronic ticketing (e-ticketing). E-ticketing is an electronic system for traffic monitoring and enforcement that utilizes CCTV and replaces the manual ticketing system that relies on physical ticket forms.

Some groups hope that AI can play a role in decision-making for law enforcement in Indonesia. This is because AI can process legal documents, conduct risk analysis, perform information searches, assist in decision-making, manage cases, and prevent fraud.

However, there are concerns regarding the accountability and transparency of decisions made by AI. In some cases, AI algorithms can exhibit bias due to the data used for training not being entirely neutral or reflective of diverse legal contexts. The "black box" effect in AI, where the decision-making process is difficult to explain in detail, also poses a challenge that needs to be addressed. Therefore, strict regulations and robust oversight systems are necessary to ensure that AI in the judiciary operates in accordance with the principles of justice and the rule of law.

From a legal perspective, clear regulations are needed regarding the limitations and responsibilities of using AI in the judicial system. These regulations must encompass ethical standards, the protection of human rights, and compliance with applicable laws. Developed countries, such as those in the European Union, have already established ethical guidelines for the use of AI in the legal field, which can serve as a reference for Indonesia in formulating policies tailored to national needs. With proper regulations, AI can become a tool that assists, rather than replaces, the roles of judges and other law enforcement officials.

On the other side, the readiness of human resources to adopt AI is also a critical factor in the successful implementation of this technology. Judges, prosecutors, lawyers, and court administrative staff must be equipped with a solid understanding of how AI works and how to utilize it optimally. Continuous training and education on legal technology are essential to ensure that the judicial system can integrate AI without compromising the principles of justice and human rights.

The judiciary can be identified as part of the legal institution designed to fulfill the needs of law enforcement and justice. Meanwhile, courts are organizations responsible for administering law enforcement and justice as an implementation of a portion of state power, namely judicial authority.

The judiciary is a component of the legal institution, while law itself can be considered part of social institutions. As noted by Sumner, states that institutions consist of concepts and structures, and law is one such institution (Boonstra, 2021). Law is based on the principles of justice and propriety. These principles are constructed and encompass courts, statutory provisions, and related elements. Consequently, the judiciary can be recognized as a social institution. In practice, the judiciary is mutually interconnected and even interdependent with other legal institutions, including statutory provisions (both written and unwritten), the penal system, legal policies, and legal values. Furthermore, it is also linked to legal education and public legal awareness initiatives.

This interconnection is reflected in the People's Consultative Assembly (MPR) Decree No. II of 1993 concerning the Guidelines of State Policy (GBHN), specifically in the section on Legal Development, which broadly includes legal materials, legal apparatus, and legal facilities and infrastructure. Legal development is an integral part of national development, encompassing various aspects of societal and national life that are mutually interrelated. This principle is also explicitly stated in Article 27, Paragraph (1) of Law No. 14 of 1970 in conjunction with Law No. 35 of 1999, which affirms that "Judges, as enforcers of law and justice, are obligated to explore, adhere to, and comprehend the legal values prevailing in society."

Similarly, legal institutions are interdependent with other social institutions. Law is influenced by the conditions of power and political authority, which in turn are shaped by various social, cultural, and economic forces. When these conditions change, the law also undergoes transformation. The legislative process, which serves as a mechanism for resolving conflicts among different political forces both visible and concealed also can be understood through this perspective. A concrete example is the enactment of Law No. 1 of 1974 on Marriage and Law No. 7 of 1989 on Religious Courts.

This phenomenon illustrates that the growth and development of the judiciary, and law in general, are heavily dependent on political institutions, which are rooted in social structures, cultural patterns, and economic developments. Likewise, judicial processes function as an active mechanism for enforcing law and justice in accordance with the values upheld by society. In other words, the judiciary, as a social institution, does not operate autonomously; rather, it engages in a dynamic exchange with its surrounding environment. Therefore, the evolution of the judiciary is determined by society's capacity for political articulation in allocating and integrating its cultural values into legal institutions that reflect its needs. In this regard, two fundamental questions arise: First, why does society require law and judicial institutions? Second, how do judicial growth and development align with the need for law enforcement and justice based on the beliefs and values of its constituents?

In human society, from small, simple communities to international relations, social structures consist of individuals and groups (families, clans, ethnicities, and nations) with diverse personalities, traditions, skills, professions, and interests. Even in interactions between nations, individuals and groups are governed and bound by the legal systems of their respective countries. In the context of Indonesia, this diversity reflects a pluralistic society, both vertically and horizontally, which in turn results in a pluralistic legal system.

To regulate relationships among members of society, a set of agreed-upon behavioral norms is required, rooted in cultural values that are upheld and binding on all parties. In its more concrete form, these behavioral norms are recognized as law, functioning as a social control mechanism to maintain order and harmony. However, given the diversity of personalities, traditions, skills, professions, and interests, conflicts, disputes, and legal violations inevitably arise. These may include one party infringing upon the rights of another, causing harm whether physical or material or unlawfully seizing another's authority. Additionally, intergroup conflicts, both physical and political, are often unavoidable.

With the rapid advancement of artificial intelligence (AI), new legal challenges have emerged, necessitating deep reflection and adjustments to existing regulatory frameworks. These challenges are not merely technical but extend into ethical, privacy, security, and broader social dimensions (Kurniawijaya et al., 2021).

Artificial intelligence seeks to recognize that its technology goes beyond just creating tools and systems that can do tasks once done by humans. It is now venturing into areas with significant legal considerations due to its immense capacity for data processing and analysis. This raises various legal issues such as privacy, security, liability, and more (Anshori, 2022).

In the age of fast-paced advancements in Artificial Intelligence (AI) Technology, there is a need for thorough and comprehensive responses to the legal issues that arise. Regulation plays a key role in tackling these issues effectively. Creating precise and meaningful regulations is crucial in safeguarding privacy, maintaining system security, and establishing a suitable liability structure. Regulations should also be geared towards fostering innovation sustainability while upholding ethical principles and justice (Ravizki & Lintang Yudhantaka, 2022).

Protecting individual rights and maintaining ethical data management in the face of privacy and data protection challenges necessitates a stringent legal strategy. The establishment of clear codes of conduct and professional standards is essential for the ethical development and utilization of artificial intelligence, as ethics serves as the cornerstone for these endeavors. The security of AI systems requires adequate regulations and laws to counter the threat of cyberattacks and protect the integrity of the technology. Responsibility and accountability, both at the developer and user levels, require the establishment of a clear and enforceable legal framework (Jaya et al., 2021). The importance of international regulation and global collaboration in addressing cross-border challenges has been highlighted. This cooperation is essential to create universally acceptable standards and address the global impact of AI development (Sihombing & Adi Syaputra, 2020).

4. Conclusion

The utilization of Artificial Intelligence (AI) technology in the judicial system offers great potential for improving efficiency, objectivity, and accuracy in legal decision-making. The implementation of AI in the Supreme Court and other judicial institutions can assist in case management, legal document analysis, and decision support. However, there are challenges in its implementation, particularly regarding aspects of ethics, accountability, transparency, and legal limitations concerning AI's role in judicial proceedings. Hence, AI must remain positioned as a tool, not as a replacement for judges, thus maintaining the values of justice and humanity in law. Clear regulations and the establishment of ethical guidelines are important steps in ensuring effective and responsible use of AI in the judicial system.

The implementation of AI in Indonesia's judicial system must be adapted to the characteristics of each court, including general, religious, military, and administrative courts. AI can enhance efficiency in case management and legal analysis while maintaining the judge's role as the primary decision-maker. Ethical challenges, transparency, and accountability must be addressed through clear regulations and ethical guidelines to ensure AI functions as a supporting tool that upholds justice without compromising human values in law.

This study has several limitations. First, as a normative legal study, it primarily relies on legal sources, doctrines, and existing regulations without empirical validation through direct case studies or interviews with stakeholders. Second, this research focuses more on the legal framework of AI in the judicial system but does not deeply analyze the technical aspects or implementation challenges in specific jurisdictions. Third, the rapid advancement of AI technology may lead to regulatory changes, making some findings in this study subject to future updates.

For further research, empirical studies involving judicial practitioners, legal experts, and technology specialists are recommended to provide practical insights into AI implementation in courts. Additionally, comparative legal studies between jurisdictions with different levels of AI adoption can enrich the understanding of best practices and potential challenges. Future research may also explore the technical feasibility of AI models in legal decision-making while ensuring compliance with legal and ethical standards.

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