Original Article

AI and Children: Challenges and Protection Strategies

Imelda Martinelli[1✉], Tesalonika Valerie Limmartin[2], Priscilla Angelia Daya[3], Alberta Alva Debora Kambuno[4], Meilody Patricia[5]
[1,2,3,4,5]Faculty of Law, Universitas Tarumanagara, Jakarta, Indonesia
Correspondence Author: imeldam@fh.untar.ac.id[✉]

Abstract:

The development of artificial intelligence (AI) has brought about major changes in the field of law, including child protection in the context of civil and matrimonial law. The use of AI has the potential to improve the effectiveness of protection through early detection and more accurate data management. However, its application also poses new challenges related to privacy, ethics, and inadequate legal regulations. The purpose of this study is to analyze the implications of AI implementation in child legal protection, particularly in the context of civil and matrimonial law, and to identify various challenges that arise in its implementation. This study uses a normative legal research method. Two types of legal materials are used in this study, namely primary legal materials and secondary legal materials. The data collection techniques used in this study are library research and online research of various relevant legal sources. The data obtained is then analyzed using qualitative descriptive analysis. The results of the study show that the application of AI has implications for the legal protection of children in civil and marriage law. AI helps with the early detection of child marriage and violence, but raises issues of legal responsibility, privacy violations, and regulatory gaps. Legal reforms, increased digital literacy, and the application of child-centered AI principles are needed to strengthen child protection in the digital age.

Keywords: Civil Law, Artificial Intelligence, Child Protection, Digital Technology

Introduction

Since the beginning of the 21st century, technological developments have accelerated significantly and brought about major changes in various aspects of human life. One of the most monumental leaps in the history of modern civilization is the emergence of artificial intelligence (hereinafter referred to as "AI") and its application in everyday life. AI can generally be defined as the ability of a computer system or machine to mimic human intelligence processes, such as learning from experience, reasoning to solve problems, and adapting to new situations (Wahyudi, 2025). According to John McCarthy (1956), known as the "Father of Artificial Intelligence," AI is "the science and engineering of making intelligent

machines, especially computer programs that can perform tasks that, if performed by humans, require intelligence" (Rodrigue, 2000).

The presence of AI has had a significant and widespread impact on various sectors, including industry and manufacturing, health, education, economics and business, transportation, and even law. In industry, AI is used for production process automation and operational efficiency; in the health sector, AI assists in disease diagnosis and medical data analysis; while in the legal world, AI is beginning to be utilized for jurisprudence analysis, verdict prediction, and even digital legal data management (Zahrasadat et al., 2025). The success of AI in influencing various sectors of human life from the early 2000s to the present has been driven by three main factors, namely: (1) increased computing power; (2) abundant data availability; and (3) advances in algorithms (Ashya, 2024). In the digital age, the development of AI technology has experienced significant growth worldwide, including in the Republic of Indonesia.

The application of AI has changed the way humans interact with technology, bringing capabilities such as advanced data analysis, natural language processing, and automatic machine learning. Artificial intelligence is a form of programming on a computer device to perform careful data processing and/or processing (Amboro & Komarhana, 2021). In the legal sector, the emergence of Artificial Intelligence (AI) not only opens up opportunities for increased efficiency and accuracy in law enforcement, but also presents a variety of new challenges, particularly related to the protection of the rights of vulnerable individuals, such as children. As AI-based technology becomes increasingly integrated into modern life, its potential impact on children's rights has become an issue that requires serious attention (Pongtambing et al., 2023). This is particularly relevant given the high vulnerability of children amid rapid technological developments and the growing role of AI in various aspects of the lives of the generation born and raised in the 21st century (Nsude, 2025).

Children are individuals within an age range who are still in the stage of physical, emotional, and cognitive growth and development, and therefore do not yet have the full mental capacity to act and make complex decisions (Ramadhani & Rustam, 2025). The definition of a child according to Law of the Republic of Indonesia Number 35 of 2014 concerning Amendments to Law Number 23 of 2002 concerning Child Protection (hereinafter referred to as the "Child Protection Law") is written in Article 1 paragraph 1, which reads: "A child is a person who has not yet reached the age of 18 (eighteen), including a child who is still in the womb." Article 6 of the Child Protection Law also implies that a child is a human being who is not yet fully capable of understanding his or her actions, and therefore a child continuously needs formal and informal educational guidance so that his or her physical (and mental) growth and development can proceed optimally. Thus, children are legal subjects who have a special status because they are not yet able to protect their own interests. Through the Child Protection Law, the Indonesian state affirms that child protection encompasses all activities to ensure and protect children so that they can live, grow, develop, and participate optimally in accordance with human dignity, and receive protection from violence and discrimination (Nurjanah & Liyus, 2025).

According to the United Nations Children's Fund (hereinafter referred to as "UNICEF") in its Policy Guidance on AI for Children, principles are outlined that provide an ethical and normative framework that is highly relevant when considering the implications of AI on the legal protection of children. Based on the Convention on the Rights of the Child, UNICEF emphasizes that every AI-based innovation must be oriented towards the best interests of the child, which guarantees the safety, privacy, and welfare of children (Unicef, 2021).

In civil and matrimonial law, child protection issues are often related to custody, child origin, and the prevention of child marriage. With advances in technology, the application of AI can help strengthen oversight and the effectiveness of policies in this area. For example, AI can be used for early detection of child marriage, population data analysis, and digital identity verification systems that can reduce administrative manipulation. However, AI also poses legal and ethical risks, such as misuse of children's personal data, digital privacy violations, and algorithmic bias that can lead to discrimination in legal proceedings (Rizal et al., 2025). These risks are further complicated by the absence of specific regulations governing the use of AI in Indonesia's legal system, even though the use of children's personal data by digital systems touches on aspects of legal protection as stipulated in Law No. 27 of 2022 on Personal Data Protection, which emphasizes that children's personal data must be treated with special care and cannot be used without valid consent. In this context, the state must ensure that AI technology innovation does not sacrifice the principle of the best interests of the child, which has also become a mandate in the Convention on the Rights of the Child and has been ratified through Presidential Decree No. 36 of 1990.

The purpose of this study is to analyze the implications of applying artificial intelligence (AI) in the legal protection of children, particularly in the context of civil and matrimonial law, and to identify various challenges that arise in its implementation. In addition, this study also aims to formulate effective protection strategies to minimize risks while maximizing the benefits of using AI in the legal field.

Method

This study uses a normative legal research method, which is a research method that focuses on the study of legislation, legal doctrines, and legal principles relevant to the topic being studied. According to Marzuki (2019), normative legal research aims to find coherence, namely the conformity between applicable legal norms and legal actions or events that are the object of research. This study uses primary and secondary legal materials. Primary legal materials include legislation related to child protection issues, civil law, and the use of AI technology. Meanwhile, secondary legal materials include legal literature, scientific journals, research results, and the views of legal experts who provide interpretations of primary legal materials.

Data collection techniques were carried out through library research and online research of various relevant legal sources. The data obtained was then analyzed descriptively and qualitatively, by grouping and examining legal materials based on their relevance to the issues under review, then interpreted using theory and positive law to obtain systematic conclusions. This study also used two main approaches, namely the statute approach and the conceptual approach. The statute approach was used to examine regulations related to the application of AI and child protection, while the conceptual approach was used to examine the views and doctrines that have developed in legal science regarding the relationship between legal competence, legal responsibility, and the use of technology.

Through these methods and approaches, this study aims to analyze the relationship between the application of artificial intelligence and the legal protection of children, particularly in the areas of civil and matrimonial law, and to provide a conceptual basis for the development of a legal system that is adaptive to technological advances and social changes in the digital age.

Result

The development of AI technology has had a profound impact on various sectors of life, including the legal field (Putri & Gorda, 2025). In the context of civil law and marriage law, the implications of AI are closely related to the issue of legal protection for children. This is mainly influenced by the fact that children are legal subjects who have civil rights but are not yet fully capable of acting according to the law. Based on the provisions of Article 1 paragraph (1) of Law Number 23 of 2002 concerning Child Protection in conjunction with Law Number 35 of 2014, a child is defined as a person who is under 18 years of age. Furthermore, Article 2 paragraph (1) of the Civil Code states: "A child in a woman's womb is considered to have been born whenever the interests of the child so require." This definition implies that children have legal standing, as they can be assigned rights and obligations that are protected by the state. In civil law, the principle of protecting vulnerable parties is fundamental, and children fall into this category due to their immaturity, which results in their inability to act legally (Cahya et al., 2024).

Children are recognized as legal subjects who have civil rights from birth, as stated in Article 2 of the Civil Code, but they do not yet have the legal capacity to perform legal actions independently. Therefore, all legal actions involving children require representation or consent from their parents or legal guardians. This lack of legal capacity is the basis for ensuring that all forms of legal interaction, including those involving AI systems, must be directed towards protecting the best interests of the child. The presence of AI in the legal system has great potential to strengthen child protection. In the field of marriage law, AI systems can be used to detect child marriage practices through the analysis of digital population data and civil administration reporting patterns.

Article 7 paragraph (1) of Law of the Republic of Indonesia Number 16 of 2019 concerning Amendments to Law Number 1 of 1974 concerning Marriage (hereinafter referred to as the "Marriage Law") states: "Marriage is only permitted if the man and woman have reached the age of 19 years." By utilizing intelligent algorithms, AI can identify discrepancies between age and marital status records, enabling the government to take preventive measures to prevent violations of Article 7 paragraph (1) of the Marriage Law, which has changed and set the minimum age for marriage at 19 years for both men and women. This shows that AI can be an effective instrument to support the implementation of national legal policies in order to reduce the number of child marriages.

The development of AI used to verify age through biometrics or face analysis could be a new breakthrough in the field of marriage law (Perc et al., 2019). Although it can be used to prevent underage marriage, this method carries the risk of errors such as bias regarding race or gender and privacy violations that could worsen the legal position of children if decisions are made solely based on the results of AI analysis. In addition, AI also has a strategic role in increasing the effectiveness of monitoring violations of children's rights, such as gender-based violence, child exploitation in the digital world, and neglect. Through the implementation of data-driven child protection systems, the government can detect risks to children early on. UNICEF's 2021 Policy Guidance on AI for Children states that AI systems designed with child-centered principles must be able to: support children's well-being, ensure inclusivity, uphold justice, protect children's data and privacy, and create a safe digital environment (Unicef, 2021).

As explained earlier, AI has many advantages, especially regarding child protection. However, the application of AI in the context of child law raises various challenges, both normatively and ethically. One of the fundamental issues is the protection of children's

personal data, which is often the target of abuse in digital systems. The Personal Data Protection Law emphasizes that children's personal data is a specific and special category of personal data that must receive special protection. However, in practice, there is still a legal vacuum (rechtsvacuum) regarding the mechanism of legal accountability if children's data is misused by AI systems that are operated automatically without human intervention.

In the context of civil law, this raises the question of who should be held accountable, namely the system developer, the user, or the institution utilizing AI. Furthermore, there is the potential for algorithmic bias that can lead to discrimination against children based on their social, economic, or gender background. This contradicts the principle of non-discrimination as stated in Article 2 of the 1989 Convention on the Rights of the Child (CRC), which Indonesia ratified through Presidential Decree No. 36 of 1990. Bias in AI can lead to legal injustice if algorithm-based decisions are used as a basis in administrative or judicial processes involving children, for example, in cases of custody or social protection (Anggita, 2024). In Indonesia itself, there are no specific regulations governing AI and its use, but only Law No. 1 of 2024 concerning the Second Amendment to Law No. 11 of 2008 concerning Electronic Information and Transactions. Law No. 1 of 2024 only accommodates the protection of personal data and individual privacy rights and serves as a legal framework for digital aspects. However, with the rapid development of AI, new and specific legal regulations on AI are needed (Mufti et al., 2024).

From a marriage law perspective, AI can also raise new issues related to the legal status of children and the validity of population administration data. Technical errors in AI systems, such as incorrect input or biometric identification, can have a direct impact on the registration of parents' marriages, which in turn has implications for the civil status of children (legitimacy, inheritance rights, and identity rights) (Berson et al., 2025). In this context, the application of AI without human oversight has the potential to conflict with the principle of prudence and legal protection as stipulated in Article 28D paragraph (1) of the 1945 Constitution of the Republic of Indonesia concerning the right to fair legal certainty, which states: "Every person shall have the right to recognition, guarantee, protection, and certainty of fair law and equal treatment before the law."

To minimize these risks and ensure that AI is used in the best interests of children, a comprehensive legal protection strategy that is adaptive to technological developments is needed. First, there needs to be sectoral regulations that explicitly regulate the use of AI in child protection, including aspects of legal responsibility, ethics, and personal data protection. Second, strengthening legal digital literacy among law enforcement officials, academics, and the public is crucial so that all parties understand the potential and risks of AI to children's rights. Given that the level of digital literacy in Indonesia is still relatively low, both among professionals and the general public, the government should encourage the public to start improving their literacy and learning about the ins and outs of AI, especially for law enforcement officials and parents. The government can create a training program to understand AI models, their limitations, risks, and potential. If the public understands AI and how to deal with its misuse, AI will become easier to test, interpret, and understand (Solihah et al., 2024).

Third, the principles of algorithmic transparency and accountability need to be applied, namely ensuring that every process and decision produced by AI systems can be explained, monitored, and held legally accountable. The role of legal academics, especially law lecturers, is also crucial in shaping a legal paradigm that is adaptive to technological developments. Law lecturers serve as educators, researchers, and shapers of legal awareness among students so

that they are able to understand the social, ethical, and juridical impacts of AI use. Integrating the issues of artificial intelligence and child protection into the civil law and marriage law curriculum will create a generation of law graduates who are more critical, ethical, and human-oriented. Thus, the presence of AI is not only a challenge for the legal system, but also an opportunity to strengthen legal protection for children as legal subjects who are not yet capable of acting, but have fundamental rights that must be guaranteed by the state.

Conclusion

Based on the results and discussion, it was found that the development of AI has implications for the legal protection of children, particularly in civil and marriage law. On the one hand, AI has the potential to strengthen child protection through early detection of child marriage, violence, and child rights violations. However, on the other hand, legal issues arise because children, as legal subjects who are not yet adults, have limitations in taking legal action, while AI systems can work autonomously without a clear basis of responsibility in Indonesian positive law. This shows the need for regulatory updates so that the law can adapt to technological developments that touch on the realm of child protection. In addition, there are challenges related to violations of children's personal data. The challenges of AI implementation include legal vacuums (rechtsvacuum), the risk of algorithmic bias, violations of children's privacy, and low digital literacy among the public. To minimize these risks, a comprehensive legal protection strategy is needed through the establishment of specific regulations, increased legal digital literacy, and the application of child-centered AI principles as emphasized by UNICEF. In the context of education, law lecturers also have a strategic role to integrate AI and children's rights issues into civil and matrimonial law learning, so that students are able to understand and respond to socio-legal challenges in the digital era with ethics and responsibility.

References

Amboro, Y. P., & Komarhana, K. (2021). Prospek Kecerdasan Buatan Sebagai Subjek Hukum Perdata Di Indonesia. *Law Review*, *21*(2), 145–172. https://doi.org/https://doi.org/10.19166/lr.v0i2.3513

Anggita, A. T. (2024). Implementasi Hukum Positif Dalam Perlindungan Hak Sipil Digital Warga Negara Di Era Kecerdasan Buatan. *Jurnal Hukum Dan Kewarganegaraan*, *6*(12). https://doi.org/https://doi.org/10.3783/causa.v2i9.2461

Ashya, R. (2024). Mengungkap Sejarah Perkembangan AI dari Masa ke Masa. *Www.Belajarlagi.Id*. https://www.belajarlagi.id/post/sejarah-perkembangan-ai

Berson, I. R., Berson, M. J., & Luo, W. (2025). Innovating responsibly: ethical considerations for AI in early childhood education. *AI Brain Child*, *1*(2). https://doi.org/https://doi.org/10.1007/s44436-025-00003-5

Cahya, A. N., Maksum, M. A., & Primadan, T. A. S. (2024). Transformasi Budaya Hukum dalam Era Digital (Implikasi Penggunaan AI dalam Perkembangan Hukum Di Indonesia). *Jurnal Ikraith-Humaniora*, *8*(2). https://doi.org/https://doi.org/10.37817/ikraith-humaniora

Marzuki, P. M. (2019). *Penelitian Hukum*. Prenada Media Group.

Mufti, M. W., Iksan, M. H., Sani, R., & Fauzan, M. (2024). Urgensi Pembentukan Peraturan Perundang-Undangan Teknologi Berbasis Artificial Intelligence. *Socius: Jurnal Penelitian Ilmu-Ilmu Sosial*, *1*(11), 137–148.

Nsude, I. (2025). Enhancing child rights protection in Nigeria through artificial intelligence (AI). *Journal Of Communication, Technologies et Développement*, *15*(2). https://doi.org/https://doi.org/10.4000/123j3

Nurjanah, A. A., & Liyus, H. (2025). Perlindungan Hukum Bagi Korban Penyalahgunaan Artificial Intelligence (Ai) Terhadap Serangan Malwaredalam Perspektif Peraturan Perundang-Undangan. *PAMPAS: Journal of Criminal Law*, *6*(2). https://doi.org/https://doi.org/10.22437/pampas.v6i2.39732

Perc, M., Ozer, M., & Hojnik, J. (2019). Social and juristic challenges of artificial intelligence. *Humanities and Social Sciences Communications*, *5*(61). https://doi.org/https://doi.org/10.1057/s41599-019-0278-x

Pongtambing, Y. S., Appa, F. E., & Siddik, Muh. A. (2023). Peluang dan Tantangan Kecerdasan Buatan Bagi Generasi Muda. *Bakti Sekawan: Jurnal Pengabdian Masyarakat*, *3*(1), 23–28.

Putri, P. N. T., & Gorda, A. A. (2025). Pengaturan Hukum dalam Penanggulangan Deepfake Artificial Intelligence (AI) terhadap Anak sebagai Korban Kejahatan Siber di Indonesia. *Jurnal Magister Hukum Udayana (Udayana Master Law Journal)*, *14*(3), 713–728.

Ramadhani, N. K., & Rustam, M. R. (2025). The Use of Artificial Intelligence in Optimizing Supervision and Legal Protection for Children in the Criminal Justice System. *Journal Deciso*, *2*(2). https://doi.org/https://doi.org/10.52249/decisio.v2i2.30

Rizal, C., Fachri, B., Hendry, & Irwan. (2025). Kebijakan Digitalisasi Berbasis AI Untuk Perlindungan Hak Anak dan Perempuan Dalam Ekosistem Teknologi Informasi. *Jurnal Hasil Pengabdian Masyarakat (Juribmas)*, *3*(3).

Rodrigue, R. (2000). Legal and human rights issues of AI: Gaps, challenges and vulnerabilities. *Journal of Responsible Technology*, *4*(3). https://doi.org/https://doi.org/10.1016/j.jrt.2020.100005

Solihah, D. Z., Nyawiji, K., & Fera. (2024). Kajian Normatif terhadap Efektivitas Peraturan Perlindungan Anak dalam Penanggulangan Eksploitasi Anak di Dunia Maya. *Perkara: Jurnal Ilmu Hukum Dan Politik*, *2*(4), 603–614.

Unicef. (2021). Policy Guidance on AI for Children. *Www.Unicef.Org*. https://www.unicef.org/innocenti/reports/policy-guidance-ai-children

Wahyudi, B. R. (2025). Tantangan Penegakan Hukum terhadap Kejahatan Berbasis Teknologi AI. *Innovative: Journal of Social Science Research*, *5*(1).

Zahrasadat, N., Mitra, S., & Reza, M. (2025). Analysis of Legal Challenges and Data Protection Strategies in the Era of Artificial Intelligence in the International Legal System. Interdisciplinary Studies in Society, Law, and Politics. 4(2). *Interdisciplinary Studies in Society, Law, and Politics*, *4*(2). https://doi.org/https://doi.org/10.61838/kman.isslp.4.2.3

Surat Edaran Menteri Komunikasi dan Informatika Republik Indonesia Nomor 9 Tahun 2023 tentang Etika Kecerdasan Artifisial.

Kitab Undang-Undang Hukum Perdata (KUHPerdata), Pasal 2 ayat (1).

Undang-Undang Republik Indonesia Nomor 35 Tahun 2014 tentang Perlindungan Anak, Pasal 1 angka 1.

Undang-Undang Republik Indonesia Nomor 35 Tahun 2014 tentang Perlindungan Anak, Pasal 1 angka 2.

Undang-Undang Republik Indonesia Nomor 27 Tahun 2002 tentang Perlindungan Data Pribadi, Pasal 25 ayat (2)

Undang-Undang Republik Indonesia Nomor 16 Tahun 2019 tentang Perubahan atas Undang-Undang Nomor 1 Tahun 1974 tentang Perkawinan, Pasal 7 ayat (1).

Undang-Undang Dasar Negara Republik Indonesia Tahun 1945, Pasal 28D ayat (1).