

Criminalization Of Ai-Generated Child Sexual Abuse Material (Csam): Challenges of Evidentiary Proof and Jurisdictional Limits In Indonesian Criminal Law

¹Asep Hermawan, ²Agustiana
^{1,2}Universitas Nahdlatul Ulama Cirebon
¹matdung.chandra@gmail.com, ²agustiana@unucirebon.ac.id

ABSTRACT

The rapid acceleration of generative Artificial Intelligence (AI) has significantly disrupted the cybercrime landscape, giving rise to new forms of morality-based offenses in the form of synthetically created Child Sexual Abuse Material (CSAM), commonly referred to as AI-generated CSAM. In contrast to conventional CSAM, which depicts real physical exploitation of child victims, synthetic CSAM reproduces hyper-realistic visual content without any empirical actus reus involving actual physical abuse. This article aims to analyze the normative vacuum and juridical challenges in criminalizing AI-generated CSAM within the framework of Indonesia's positive criminal law system. The analysis focuses on the discourse of digital forensic evidence in judicial processes and the determination of jurisdictional boundaries in criminal law in responding to the borderless nature of cybercrime. Based on normative legal research, the findings indicate the urgency of re-conceptualizing the legal definitions of "victim" and "child pornography" within the Pornography Law, the Electronic Information and Transactions Law (ITE Law), and their harmonization with the criminal law system under Law Number 1 of 2023. Comprehensive reform of penal policy is required to ensure that law enforcement mechanisms are capable of addressing and prosecuting both creators and distributors of AI-generated child sexual exploitation material. Such reform is essential to adapt criminal law to the evolving challenges posed by advanced generative technologies.

Keywords: AI-Generated CSAM, Digital Forensics, Criminal Law, Jurisdiction, Law Number 1 of 2023

ABSTRAK

Percepatan pesat perkembangan Artificial Intelligence (AI) generatif telah secara signifikan mengganggu lanskap kejahatan siber, dengan memunculkan bentuk-bentuk baru kejahatan kesusilaan berupa materi eksploitasi seksual anak yang dibuat secara sintetis (*Child Sexual Abuse Material/CSAM*), yang dikenal sebagai *AI-generated CSAM*. Berbeda dengan CSAM konvensional yang menggambarkan eksploitasi fisik nyata terhadap korban anak, CSAM sintetis mereproduksi konten visual yang sangat realistis tanpa adanya unsur *actus reus* berupa tindakan fisik yang benar-benar terjadi. Penelitian ini bertujuan untuk menganalisis kekosongan norma serta tantangan yuridis dalam kriminalisasi *AI-generated CSAM* dalam kerangka hukum pidana positif di Indonesia. Analisis difokuskan pada diskursus pembuktian forensik digital dalam proses peradilan serta penentuan batas yurisdiksi hukum pidana dalam menghadapi karakter kejahatan siber yang bersifat lintas batas. Berdasarkan penelitian hukum normatif, hasil kajian menunjukkan adanya urgensi untuk melakukan rekonsepsi terhadap definisi hukum mengenai "korban" dan "pornografi anak" dalam Undang-Undang Pornografi, Undang-Undang Informasi dan Transaksi Elektronik (UU ITE), serta harmonisasinya dengan sistem hukum pidana nasional sebagaimana diatur dalam Undang-Undang Nomor 1 Tahun 2023. Reformasi kebijakan penal secara komprehensif diperlukan guna memastikan bahwa mekanisme penegakan hukum

mampu menjangkau serta menjerat pelaku yang menciptakan maupun mendistribusikan konten eksploitasi seksual anak berbasis AI. Reformasi tersebut menjadi krusial sebagai upaya adaptasi hukum pidana terhadap tantangan baru yang ditimbulkan oleh perkembangan teknologi generatif.

Kata Kunci: *AI-Generated CSAM*, Forensik Digital, Hukum Pidana, Yurisdiksi, Undang-Undang Nomor 1 Tahun 2023

Introduction

The disruption of information technology, particularly the rapid advancement of *Generative Artificial Intelligence* (Generative AI), has significantly transformed various aspects of human life, including the domain of criminal law (Nopiansyah, 2025). This technology enables the creation of highly realistic synthetic visual and audiovisual content, thereby introducing new challenges in regulating and enforcing laws against illegal digital material (Prayoga & Tuasikal, 2025). One of the most alarming consequences is the emergence of AI-generated *Child Sexual Abuse Material* (CSAM), which can be produced without involving real child victims, yet still generates serious psychosocial harm and contributes to the normalization of deviant sexual behavior (Europol, 2022).

This phenomenon creates an anomaly in substantive criminal law, as traditional legal constructions generally require the existence of a tangible victim (*actus reus*) (Mustikasari, 2024). In the case of AI-generated CSAM, although no physical victim is directly involved, the substance of the content clearly violates public morality and undermines the protection of children (Syahrani et al., 2026). This situation underscores the necessity of adopting a more progressive legal interpretation, considering that law functions not only as a repressive instrument but also as a reflection of societal moral values (Rahmawati & Naili, 2025). As argued by (Scholten & Scholten, 1974) legal consciousness represents the internal awareness within individuals regarding what law is and what it ought to be, enabling a distinction between just and unjust norms. In this regard, society expects criminal law to establish clear moral boundaries, including for algorithmically generated outputs that harm public decency, even in the absence of real victims (Dharmayanti, 2025).

Furthermore, the development of this technology exposes a significant *legal gap*, particularly concerning the extent to which Indonesian positive criminal law can address acts categorized as *victimless crimes* in a physical sense, yet possessing substantial societal harm (Utara & Widyawati, 2025). Existing regulations, such as (Undang-Undang (UU) Nomor 11 Tahun 2008 Tentang Informasi Dan Transaksi Elektronik, 2008; Undang-Undang (UU) Nomor 44 Tahun 2008 Tentang Pornografi, 2008) remain largely oriented toward content involving real objects or individuals. Meanwhile, the enactment of Law Number 1 of 2023 on the Indonesian Criminal Code (New Criminal Code) provides an opportunity for a more adaptive reinterpretation of the legality principle, allowing for a contextual approach that aligns with evolving societal values and technological developments.

In addition to normative challenges, significant issues also arise in the evidentiary process within criminal proceedings (Nugraha et al., 2025). The nature of AI-generated content, which is often indistinguishable from authentic material, creates complexities in digital forensic analysis, particularly in verifying authenticity, identifying sources, and establishing the intent of content creators (Alif et al., 2025). These challenges directly affect the validity of evidence and the standards of proof required in criminal justice systems (Shabrina et al., 2026). Therefore, a

multidisciplinary approach integrating legal, technological, and ethical perspectives is essential to formulate an effective framework for the criminalization of AI-generated CSAM .

Accordingly, this study is crucial to examine how Indonesian criminal law responds to this emerging phenomenon, particularly in terms of normative construction, evidentiary mechanisms, and jurisdictional boundaries in addressing increasingly complex transnational cybercrime.

Methods Research

This study employs a literature review method (*doctrinal legal research*), which focuses on examining secondary data derived from legal materials, academic literature, and relevant scientific publications. This approach is appropriate given that the research aims to analyze normative legal issues concerning the criminalization of AI-generated Child Sexual Abuse Material (CSAM), particularly in relation to evidentiary challenges and jurisdictional limitations within Indonesian criminal law.

The research applies two primary analytical approaches. First, the statute approach (statute approach) is utilized to examine and evaluate the consistency, harmonization, and scope of existing legal regulations governing pornography and electronic systems. This includes an analysis of Law Number 44 of 2008 on Pornography, Law on Electronic Information and Transactions, and Law Number 1 of 2023 on the Indonesian Criminal Code. Through this approach, the study identifies potential regulatory gaps (legal gaps) and assesses the adequacy of existing legal frameworks in addressing emerging cybercrime phenomena involving AI-generated content.

Second, the conceptual approach (conceptual approach) is applied to explore and analyze fundamental doctrines of criminal law and key principles within information technology architecture. This includes concepts such as the principle of legality (*nullum crimen sine lege*), criminal liability, victimology, and the classification of victimless crimes, as well as technical notions related to artificial intelligence, digital forensics, and algorithmic content generation. The conceptual approach enables a deeper understanding of how traditional legal doctrines can be interpreted or adapted to respond to technologically mediated offenses.

The data sources in this study consist primarily of secondary legal materials, which are categorized into three types:

1. Primary legal materials, including statutory regulations, official legal documents, and government-issued policies;
2. Secondary legal materials, such as textbooks, peer-reviewed journal articles, research reports, and expert opinions relevant to criminal law and cyber law;
3. Tertiary legal materials, including legal dictionaries, encyclopedias, and other supporting references that provide clarification of legal terms and concepts.

In addition to formally published sources, this research also incorporates relevant materials such as seminar reports, scientific discussion records, policy briefs, and official publications issued by governmental and non-governmental institutions, both in printed and digital formats. These sources are considered important in capturing contemporary discourse and emerging perspectives on AI-related crimes.

The collected data are analyzed using a qualitative analytical method, specifically through descriptive-analytical and prescriptive techniques. The descriptive analysis aims to systematically present and interpret existing legal norms and theoretical frameworks, while the

prescriptive analysis seeks to formulate legal arguments and recommendations (*ius constituendum*) for future legal development. This includes proposing normative constructions and policy directions that are more adaptive, progressive, and responsive to the challenges posed by AI-generated CSAM within the Indonesian legal system.

Through this methodological framework, the study is expected to provide a comprehensive and in-depth legal analysis, as well as contribute to the development of criminal law policies that are aligned with technological advancements and societal values.

Results and Discussion

Legal Construction and the Limits of the Principle of Legality toward AI-Generated CSAM

From a doctrinal perspective, the findings indicate that the existing legal framework in Indonesia has not explicitly accommodated algorithmic computational outputs—such as AI-generated visual content—as material objects of criminal offenses. This normative gap reflects the inherent lag of law in responding to rapid technological developments. In essence, law evolves from social norms and behavioral patterns that aim to maintain order and stability within society. When such patterns crystallize into binding rules, they form the foundation of legal norms that regulate human conduct (Pratama, 2024). However, the emergence of AI-generated CSAM challenges this traditional process of norm formation, as it introduces a form of harm that is not directly tied to physical victimization but still undermines public morality and child protection principles.

Within the positive legal framework, Law Number 44 of 2008 on Pornography, particularly Article 4 paragraph (1), limits the definition of pornography to representations involving sexual exploitation. This provision raises interpretative ambiguity regarding whether terms such as “images” or “animations” can lexically and legally encompass AI-generated visual outputs produced through *prompt engineering*. The results of this study suggest that such ambiguity creates uncertainty in judicial interpretation, potentially leading to inconsistent law enforcement. Scholars argue that the absence of clear legal definitions in emerging technological contexts often results in under-criminalization or over-criminalization, both of which undermine legal certainty (Sitorus, 2025).

From a theoretical standpoint, the construction of new criminal norms to address AI-generated CSAM aligns with the normative theory of law as articulated by Hans Kelsen, who posits that law consists of norms prescribing how individuals ought to behave. In this sense, the criminalization of AI-generated CSAM represents a necessary normative response to regulate new forms of deviant behavior facilitated by technology. The absence of a real victim does not negate the normative violation, as the harm lies in the representation itself and its broader societal implications, including the normalization of exploitative content (Antoin et al., 2025).

Furthermore, the enactment of Law Number 1 of 2023 on the Indonesian Criminal Code introduces a paradigm shift toward corrective and restorative justice. Nevertheless, the findings reveal that this paradigm requires further adaptation when dealing with technologically mediated crimes, particularly those involving automated systems. In such contexts, criminal law must function not only as a mechanism for resolving disputes but also as a reflection of societal moral consciousness. This aligns with the view that law embodies the collective legal awareness of society, thereby necessitating responsiveness to evolving ethical concerns (Cantika et al., 2025).

A critical issue identified in this study is the limitation of the principle of legality (*nullum crimen sine lege*), which traditionally requires that criminal acts be clearly defined in written law.

While this principle ensures legal certainty and protects individuals from arbitrary prosecution, it may also hinder the criminalization of novel forms of cybercrime such as AI-generated CSAM. Therefore, a more progressive and dynamic interpretation of legality is required, particularly through the expansion of key elements of criminal liability (Syahril & Adi, 2024).

In this regard, the study proposes an expansive interpretation of *actus reus*, whereby the act of inputting prompts into an AI system can be considered a form of conduct that initiates the creation of illicit content. Similarly, *mens rea* can be established through the intentional use of AI tools to generate sexually exploitative material. This interpretation is consistent with contemporary cybercrime theories, which recognize that human intent and interaction with digital systems constitute actionable conduct within criminal law (Puspita & Firdaus, 2025).

Overall, the results demonstrate that the current Indonesian legal framework faces significant limitations in addressing AI-generated CSAM due to rigid interpretations of legality and the absence of explicit regulatory provisions. Consequently, the development of adaptive legal interpretations and the formulation of new norms are essential to prevent legal impunity and ensure that criminal law remains relevant in the face of technological innovation.

Complexity of the Evidentiary System and Digital Forensic Integrity

The findings indicate that the transformation of electronic evidence in AI-based cybercrime introduces a profound epistemological dilemma, particularly in determining the validity and reliability of digital evidence. In the context of AI-generated CSAM, there are two principal categories of AI outputs relevant to legal assessment: (1) visual manipulation using deepfake or face-swapping techniques that superimpose the face of a real child onto another body; and (2) fully synthetic images generated entirely through machine learning models without any direct reference to real individuals. Although both forms are technologically distinct, they equally pose serious challenges to evidentiary assessment and criminal accountability.

Normatively, Indonesia's evidentiary framework under the Law on Electronic Information and Transactions recognizes electronic information and documents as lawful evidence. However, in practice, proving AI-generated content presents substantial difficulties in authentication and attribution. This is primarily due to the highly realistic nature of AI-generated outputs, which makes it increasingly difficult to distinguish between authentic and artificially generated materials (Putri et al., 2024). As a result, the reliability of digital evidence becomes a critical issue in criminal proceedings involving AI-generated CSAM.

This study finds that the main obstacle for investigators and digital forensic analysts lies in tracing the data architecture and metadata embedded within digital files. In many cases, offenders utilize anonymous networks and decentralized open-source AI models that systematically erase digital traces. Key metadata components – such as Exchangeable Image File Format (EXIF) data, IP addresses, and cryptographic parameters – are often removed or altered automatically by generative systems, thereby hindering digital traceability and offender identification (Harun & Nurhadiyanto, 2024).

This challenge is further compounded by the absence of standardized hashing mechanisms or digital tagging systems specifically designed for AI-generated content. In digital forensics, hashing plays a crucial role in maintaining the integrity of evidence by ensuring that digital files remain unchanged from the point of seizure to presentation in court. Without a standardized hashing or watermarking system for AI-generated outputs, the integrity of

electronic evidence becomes vulnerable to challenge during litigation, particularly regarding claims of alteration or contamination (Mudita, 2024).

From a theoretical perspective, this issue reflects an epistemological gap between legal truth and material truth. In cases involving AI-generated CSAM, technological limitations in forensic verification may result in discrepancies between what can be legally proven and what actually occurred in reality. This gap highlights the necessity of strengthening law enforcement capacity, particularly in digital forensic expertise and AI-driven investigative tools .

Furthermore, a comprehensive regulatory approach is required to address these challenges, including both legal reform and the development of technical guidelines for digital evidence handling. The integration of legal standards with technological innovation is essential to ensure that criminal justice systems remain responsive to the evolving nature of AI-based crimes. In this regard, the development of national standards for digital evidence validation – such as blockchain-based chain-of-custody systems or trusted forensic logging mechanisms – may serve as potential solutions to enhance evidentiary integrity and accountability.

Overall, the findings demonstrate that the complexity of evidentiary issues in AI-generated CSAM cases is not merely technical but also structural and normative. Therefore, a comprehensive reform is required, encompassing regulatory strengthening, enhancement of forensic digital capabilities, and harmonization between evidentiary law principles and AI technological advancements to ensure effective law enforcement in the digital era.

Extraterritoriality and Penal Policy

The findings of this study indicate that the borderless nature of cloud-based cybercrime significantly reduces the relevance of the traditional principle of absolute territoriality in criminal law. In cases of AI-generated CSAM, the subject of law may be located in Indonesia, while the AI model or generative system is hosted on servers in the United States, and the resulting content is distributed through infrastructures located in Europe. This fragmented digital architecture creates a multilayered jurisdictional challenge that complicates the attribution of criminal responsibility and the enforcement of national criminal law.

From a legal standpoint, such transnational characteristics necessitate a more rigid and adaptive enforcement mechanism. Sanctions, in essence, function as a reactive instrument to violations of normative rules within a legal community. Drawing on the postulate of Schwartz and Orleans, negative sanctions (i.e., punishment) are considered effective in reducing violations, both by offenders and by other members of society. Furthermore, the harsher the imposed sanction, the higher the expected level of deterrent effectiveness in influencing behavioral compliance with the law (Lamasi et al., 2025).

However, the findings also emphasize that penal policy cannot rely solely on punitive deterrence. Excessive dependence on coercive instruments may reduce the legitimacy and long-term effectiveness of criminal law enforcement. In line with this, Peter Hoefnagels argues that both censure and encouragement are essential mechanisms in shaping lawful behavior, stating that “it may be assumed in principle and in view of human experience that censure and encouragement are both useful for influencing behavior to conform with the law” (Fazri, 2023). This perspective highlights the importance of combining repressive and preventive strategies within criminal policy.

In the context of AI-generated CSAM, this dual approach implies that penal policy must be supported by strong international cooperation mechanisms. One of the most crucial

instruments in this regard is the Mutual Legal Assistance (MLA) framework, which facilitates cross-border cooperation in criminal investigations, evidence gathering, and prosecution. Without a robust and binding international consensus regulating AI service providers and digital platforms, the effectiveness of national criminal sanctions will be significantly weakened due to jurisdictional limitations, extradition constraints, and difficulties in obtaining admissible cross-border digital evidence.

Furthermore, the extraterritorial nature of AI-based crimes necessitates a re-evaluation of jurisdictional doctrines in international criminal law. Traditional territorial jurisdiction becomes increasingly insufficient when criminal acts are fragmented across multiple jurisdictions and executed through decentralized digital infrastructures. Therefore, a more integrated approach combining extraterritorial jurisdiction principles, international regulatory harmonization, and platform accountability is required to ensure effective enforcement.

Overall, the results demonstrate that AI-generated CSAM not only challenges substantive criminal law but also exposes structural weaknesses in penal policy at the international level. Strengthening transnational legal cooperation and developing adaptive jurisdictional frameworks are essential to maintaining the effectiveness of criminal sanctions in the era of borderless digital crime.

Conclusion

Based on the findings and analysis of this study, it can be concluded that the existence of AI-generated Child Sexual Abuse Material (CSAM) creates significant ambiguity within Indonesia's positive criminal law framework. Current legislative instruments have not explicitly accommodated hyper-realistic synthetic content produced by artificial intelligence as a material object of child sexual exploitation offenses. This condition reflects a substantial legal gap, limiting the capacity of criminal law to effectively address emerging technology-based crimes.

In addition, evidentiary processes in AI-generated CSAM cases demonstrate a high level of complexity, as they heavily rely on the validity and integrity of digital forensic analysis. This process is frequently hindered by offenders' ability to anonymize metadata and manipulate digital data structures, making it difficult to identify and trace perpetrators. Furthermore, the borderless nature of such crimes highlights the limitations of the territorial jurisdiction principle in Indonesian criminal law, thereby necessitating a more adaptive jurisdictional approach, particularly through a progressive application of extraterritorial principles.

This study also emphasizes the need for regulatory re-engineering within the national legal system. Such reform may be achieved through updating legal nomenclature in existing pornography and electronic information laws, as well as developing prosecutorial guidelines under Law Number 1 of 2023 on the Indonesian Criminal Code, which explicitly recognizes "algorithmic or AI computational outputs" as material elements of criminal offenses.

Furthermore, the effectiveness of addressing AI-generated CSAM requires interdisciplinary collaboration between information technology experts, digital forensic specialists, and law enforcement authorities. This synergy is essential for developing integrated forensic algorithm-based detection systems capable of preventing, identifying, and mitigating the spread of AI-generated child sexual exploitation content more effectively. Accordingly, legal reform and technological capacity building are two key pillars in responding to the challenges of digital crime in the era of artificial intelligence.

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