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ORIGINAL

Child Sexual Abuse Material facilitated by Artificial Intelligence

Material de Abuso Sexual Infantil facilitado por Inteligencia Artificial

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ABSTRACT

The present study aimed to analyze how artificial intelligence can facilitate the production and distribution of child sexual abuse material. The scope of the study was descriptive, adopting a qualitative approach, and the research design was non-experimental cross- sectional. The selected sample comprised documents, agreements, laws and books related to the subject matter; the sampling method was non-probabilistic and qualitative data collection instruments were used in the conduct of the study. The results demonstrated the development of Artificial Intelligence (AI) in the criminal sphere, as well as the lack of efficient legislation at both national and international level, even though initiatives addressing these matters have been explored in both contexts, along with an analysis of how these crimes operate. In conclusion, the paper highlighted an increase in the prevalence of crime, emphasizing the complexities of combating it without a clear and robust regulatory framework. This study also underscored the risks posed by social platforms lacking appropriate restrictions. Mutual collaboration among governments, organizations, companies and society is key to address these crimes, and the implementation of preventive strategies is fundamental to mitigate risks and safeguard minors in digital environments. The findings presented in this paper emphasize the need for a regulatory framework that addresses child sexual abuse material preventively and reactively.

Keywords: Child Sexual Abuse Material; Artificial Intelligence; Child Abuse Prevention; Digital Platforms; Legislation.

RESUMEN

El presente trabajo buscó analizar como la inteligencia artificial facilita la creación y difusión de material de abuso sexual infantil. El alcance fue de tipo descriptivo, con un enfoque cualitativo, y su diseño fue no experimental-transversal. La muestra elegida se basó en documentos, acuerdos, leyes, libros, relacionados al tema; el muestreo elegido fue no probabilístico y los instrumentos de análisis fueron cualitativos. Los resultados evidenciaron el desarrollo de la inteligencia artificial en la esfera criminal, como también la insuficiencia de legislaciones eficientes tanto en el contexto nacional como internacional, aunque se exploraron iniciativas para ambos escenarios; así mismo se analizó el funcionamiento de estos delitos. Finalmente, a modo de conclusión, se destacó la presencia de un delito creciente, donde sin marcos regulatorios claros y robustos se complejiza combatirlo, y se destaca los riesgos que también presentan las plataformas sin restricciones adecuadas. La colaboración entre gobiernos, organizaciones, empresas y la sociedad es clave para abordar la problemática, y la implementación de estrategias preventivas resulta fundamental para reducir los riesgos y proteger a los menores de edad en el entorno digital. Estos hallazgos resaltan la necesidad de un marco regulador que aborde de manera preventiva y reactiva el contenido de abuso sexual infantil.

Palabras clave: Material De Abuso Sexual Infantil; Inteligencia Artificial; Prevención; Plataformas Digitales; Legislación.

INTRODUCTION

In recent years, Latin American states—primarily local governments—have begun to incorporate citizen security into their public policies. This involvement is due to closely connected and interdependent reasons that are evident in the realities of our countries:[1]

- The decline of the criminal justice system (justice, police, and prison system) in meeting citizens' demands in the face of existing crime levels. The emphasis on repression as a means of increasing and improving social control has not yielded results in the face of growing forms of crime, which therefore makes it possible to advance prevention strategies with a multisectoral approach and an emphasis on prevention.
- A sustained and significant increase and transformation of violence,[2] which this has led to security becoming a social requirement for local governments, as they are in direct and close contact with citizens, from whom they receive and channel their demands.
- According to Carrión, Pontón, and Armijos "the concept of citizen security (interpersonal coexistence and well-being) has been introduced above that of public security (maintenance of state public order)." The elements of public security deal with the classic and traditional institutions of the national or provincial criminal justice system (police, justice, and prison system). In contrast, citizen security involves a plurality of actors, such as municipalities, the media, and civil society ombudspersons.

It should be noted that, in various municipal governments in different parts of the world, due to their legal and institutional structure, it is not within their powers to carry out police, judicial, or prison measures. Local governments are therefore faced with a new and dual dynamic:

- On the one hand, they must perpetuate measures that address the problem of public safety and violence primarily from a preventive perspective, as a process aimed at addressing the risk factors that generate illegal and/or violent behavior.
- On the other hand, from a governance perspective, they must guide this distributed delegation of powers, which involves sharing, coordinating, and articulating strategies with different levels of government, without prejudice to their responsibilities.

Based on this, the ability of AI to generate child sexual abuse material (CSAM), misnamed "child pornography," poses a growing challenge. How does AI facilitate the production and dissemination of this material, and what prevention strategies can be effective?

Understanding the following concepts is key: as set out in Article 9 of the Convention on Cybercrime, published in 2001 and to which Argentina acceded in November 2017, "child pornography" means any pornographic material containing the visual representation of: a minor engaging in sexually explicit conduct, a person appearing to be a minor engaging in sexually explicit conduct, realistic images depicting a minor engaging in sexually explicit conduct."

For its part, the Ministry of Justice of the Nation understands the dissemination of pornographic images and shows of minors as: "Producing, financing, offering, trading, publishing, facilitating, disseminating or distributing, by any means, any representation of a minor under the age of 18 engaged in sexual activities or a representation of their genital parts for sexual purposes."[3]

According to the Public Prosecutor's Office of Buenos Aires, the term "child pornography" is incorrect, and experts are seeking to eliminate its use. The proper way to refer to this crime is "sexual abuse against children and adolescents." The use of the incorrect term does not accurately reflect the seriousness of the crime and can lead to misinterpretation, causing stigmatization, distortion, or invisibility of the problem. Specialists emphasize that adults, not minors, commit these actions and constitute serious violations of the human rights of children and adolescents. Therefore, it is recommended that "child pornography" be replaced by "materials depicting the sexual representation of children and adolescents".[4]

METHOD

Design: this study is descriptive in scope, as it seeks to "specify important properties, characteristics, and features of any phenomenon under analysis." In this case, the phenomenon in question is the production and distribution of child sexual abuse material (CSAM) facilitated by artificial intelligence.

The research approach was qualitative, with non-numerical data collection that was interpreted dynamically.

The research design is non-experimental and cross-sectional, as no variables were deliberately manipulated; only the phenomena as they presented themselves were observed, and data collection was carried out at a single point in time.

Units of analysis: the sample chosen consisted of documents, reports, studies, and agreements collected about the creation and dissemination of child sexual abuse material (CSAM) facilitated by artificial intelligence.

The sampling was non-probabilistic, as the choice of elements was not based on probability but on factors

linked to the characteristics of the study.

Instruments: the analysis methods used in this research are qualitative. For data collection, written sources such as documents and scientific articles were consulted, as well as information available on official websites of organizations dedicated to the investigation and eradication of crime. The analysis of cases reported in the media was also included.

Data analysis

- The first stage consisted of a bibliographic analysis for the development and construction of the theoretical framework.
- In the second stage, a documentary data survey was proposed, and documentary sources such as laws, reports, and documents were collected, selected, and analyzed.
- Third, the data collected was analyzed by organizing the content of various documents. Variables were identified in advance, coded, and grouped into categories. The following categories were established:
    - Child sexual abuse material: Child sexual abuse content, known as Child Sexual Abuse Material (CSAM), refers to any visual representation involving minors under the age of 18 in explicit sexual activities or showing their genitals or sexual confines. This material not only documents the abuse, but also perpetuates the revictimization of victims by being shared online, representing a serious crime against minors.
    - Artificial intelligence: This is the scientific and technological field focused on the development of software that, through the reception and analysis of data, performs tasks that mimic human cognitive functions such as learning or reasoning.

RESULTS

Based on the analysis carried out, the results are presented in line with the specific objectives established.

Define artificial intelligence, its development, and its influence in the criminal sphere, with a specific focus on the facilitation of child sexual abuse material

Artificial intelligence (AI) was defined as the discipline that seeks to build machines capable of performing tasks that require human intelligence. Margaret A. Boden explains that artificial intelligence seeks to enable computers to perform tasks that can be carried out by the human mind.[5] AI is classified into various categories, such as assisted AI, which helps to perform tasks more efficiently, and autonomous AI, which makes decisions without human intervention. In addition, UNESCO has pointed out that artificial intelligence systems can exhibit bias, given that search engines using these technologies are not neutral and can reinforce existing stereotypes in society.[6] This highlights how artificial intelligence has evolved and become integrated into multiple areas, while raising concerns about its application.

The development of artificial intelligence (AI) has had a significant impact on the criminal sphere, especially in facilitating child sexual abuse content. A specific case that illustrates this problem is that of a student in Córdoba, Argentina, who used AI tools to create manipulated images of his female classmates, merging their faces with naked bodies and distributing this content on pornographic platforms.[7,8] This incident highlights the lack of adequate legal protection and how technology can be used to violate people's privacy, leading to an increase in gender-based violence and other sexual crimes.[6] In addition, the rise of new technologies has facilitated the creation of this content, enabled the exploitation of victims and posing significant challenges for justice systems.

Another representative case is the arrest of Justin Culmo, who used an AI model called Stable Diffusion to generate thousands of illegal images of children.[9] This incident highlights how technological advances have made tools for creating MASI more accessible, leading to an increase in the use of AI for criminal activities.[10] The combination of technologies such as deepfakes and the lack of effective regulation has allowed these criminal practices to multiply and evolve, which in turn increases the vulnerability of victims.[8,11]

Finally, the arrest of Daniel Clark Warren in Florida, who allegedly used AI to generate child sexual abuse content of a neighbor, adds another concern to this issue.[12,13] In addition, there have been incidents in schools where educators and students manipulated images of classmates and students to create content of this type.[6] This context reveals growing concern about the impact of AI on people's privacy and security, as well as the need to develop more effective policies to protect victims of abuse. Emerging technologies, such as deep learning algorithms, have improved their ability to generate content, thereby increasing the risk of exploitation.[14]

Defining what is meant by sexual abuse related to child sexual abuse material and how artificial intelligence technologies can facilitate these criminal behaviors artificial intelligence technologies

The term "child sexual abuse material" (CSAM) is preferred over "child pornography" because it more accurately reflects the nature of the content, which is evidence of child sexual abuse.[15,16,17] The use of the

term "pornography" can give the mistaken impression that consent exists, as in adult pornography, whereas images of children always represent a violation of their rights and are a manifestation of the abuse to which they are subjected.[15,17] Therefore, many organizations have opted to use the term CSAM to emphasize the need to address this issue from a child protection and justice perspective, rather than a term that minimizes the seriousness of the abuse.

The advancement of artificial intelligence (AI) has brought with it several alarming challenges in the context of CSM. The Europol report has warned that AI is increasingly being used to generate child sexual content, complicating the identification of both victims and offenders.[18,19,20] AI tools enable the creation of hyperrealistic images and videos of children who do not exist, amplifying the production of child exploitation material and making it more difficult to detect.[18,19] This technology also allows the manipulation of existing images, generating sexualized content from innocent photos, which contributes to the normalization of abuse and psychological harm to victims.[18]

In addition, the increase in the use of AI to create child sexual abuse material has led to a saturation of content on social media, making it more difficult for law enforcement agencies to identify and prosecute offenders. The difficulty in distinguishing between AI-generated images and authentic images creates an environment in which investigation becomes more complex and time-consuming.[18] This highlights the urgency of establishing stricter regulations and ensuring that technology companies take adequate measures to protect children from this crime.

Identify the existence of current laws and regulations that address the use of artificial intelligence in the commission of crimes, focusing on protection against against children

After researching various documentary sources, it was found that there is no specific law or regulation governing the scope of the use of artificial intelligence (AI).

In Argentina, several projects were identified that proposed regulating different areas. About the commission of child sexual offenses through the use of AI, three bills were identified in Argentina that proposed amendments to Article 128 of the Penal Code (Law 11179). These bills sought to regulate the use of AI in the creation, dissemination, and commercialization of sexually explicit material involving minors. The first bill, presented to the Senate, proposed to punish both the production and distribution of representations of minors in sexual activities, generated by AI or any other technological mechanism. This bill emphasized the need to adapt legislation to address technological advances that enable the creation and distribution of hyperrealistic or fictional representations of minors in sexually explicit situations.[21]

Similarly, two bills presented to the Chamber of Deputies proposed to criminalize the creation and distribution of sexually explicit images, specifically through the use of deepfakes. These technologies allow images of minors to be manipulated, using their faces on other people's bodies or in entirely fictional representations. Both bills also provided for penalties for those who commercialize this type of AI-generated content.[22]

In the international context, some US states, such as Texas, Minnesota, Virginia, New York, Hawaii, and Georgia, have already banned the creation and distribution of non-consensual deepfake pornography. However, it has been noted that this legislation has not entirely stopped the increase in AI-generated MASI images, particularly in school settings. In California, a series of laws has been proposed that seek to regulate the use of AI to combat the creation of sexually explicit deepfakes, including criminal penalties and the possibility for victims to sue those who create and distribute such material.[23,24]

Identify the types of sexual abuse related to child sexual abuse material that are most common in the context of the use of artificial intelligence

Several types of sexual abuse related to child sexual abuse material were identified in the context of the use of artificial intelligence. Among the most common practices was the generation of intimate and pornographic images of minors using AI technologies, primarily through deepfake applications. These tools allow users to manipulate photographs and create visual representations of minors in sexualized situations, facilitating the creation and distribution of illegal content.[25,26,27] Researchers have pointed out that the volume of images produced by creators is significant, with some claims that their goal is to make at least 1,000 images per month.[1,27,28] In addition, it was observed that sexual predators use these technologies to produce material that can be confused with legitimate content, complicating its detection and removal from digital platforms.[1,26,29] This type of abuse is not limited to the creation of images, but also includes extortion and manipulation of victims, creating an environment of fear and vulnerability.[1,27,29]

Abusive images are shared through a three-stage process: first, pedophiles generate the images using AI software; second, they promote the photos on platforms such as Pixiv, a Japanese image-sharing site; and finally, these accounts include links that direct customers to more explicit images on sites such as Patreon, where they can pay to access that content. Although Pixiv is mainly used by artists who share manga and anime, its legal context allows the exchange of sexual cartoons and illustrations of minors, which complicates

the response to this phenomenon.[1,26,28] Despite Pixiv's efforts to address this issue and its ban on realistic depictions of sexual content involving minors, it has become clear that some users continue to promote their work in groups and through tags, facilitating the circulation of such material.[1,27,28]

Analyze common patterns and methods in the use of artificial intelligence to facilitate child sexual abuse material

Analysis of common patterns and methods in the use of artificial intelligence to facilitate access to child sexual abuse material revealed various strategies used by criminals to evade detection. Many of these actors were found to use popular social media platforms, such as TikTok and Instagram, to disseminate AI-generated content, thereby increasing young people's exposure to risky situations. Likewise, the use of applications that generate realistic images of people, including pictures of minors, was identified as a key tool in the dissemination of child sexual abuse material.[1,26,27,28,29]

In this context, many accounts on Pixiv include links in their biographies that direct users to their "uncensored content" on Patreon, where they offer to sell photorealistic obscene images of children and adolescents, with different price levels depending on the type of material requested. For example, one user provided access to "exclusive uncensored art" for $8,30 per month, while another stated that he "trained his girls on his PC" with "submission" content. The Patreon platform has claimed to have a "zero tolerance" policy toward content involving minors, although the existence of accounts that violate these policies by offering child exploitation material has been confirmed.[1,26,27,29]

The data also revealed that criminals use automated technologies and bots to facilitate the distribution of this content, further complicating the efforts of authorities and child protection organizations to prevent and respond to abuse.[1,27,28] This landscape suggests the urgency of developing prevention strategies that address the relationship between artificial intelligence and child sexual abuse, considering the new methods and patterns emerging in this context.[30,31,32,33,34] Ian Critchley, director of child protection at the National Police Chiefs' Council, highlighted that the invasion of realistic AI or "synthetic" images could hinder the process of identifying real victims of abuse, creating an additional requirement for law enforcement authorities.[1,39,40,41]

CONCLUSIONS

The research carried out allowed us to develop one of the most worrying aspects of artificial intelligence (AI) applied to crime: the creation and dissemination of Child Sexual Abuse Material (CSAM) through advanced technologies. Thanks to advances in AI, this problem has given rise to new forms of crime that urgently require criminological analysis and a readjustment of regulations. Among the findings of this study, the growing use of AI to facilitate the dissemination of this content online stands out. Therefore, there is an urgent need to establish prevention strategies and updated laws with an emphasis on protecting the most vulnerable victims: children and adolescents.

Advances in artificial intelligence have revolutionized society in every way, from how we interact with technology to how criminals use these tools for their gain. AI has provided criminals with easy access, making it easier for them to commit these types of crimes. The growth of technologies such as machine learning and image generation algorithms has allowed offenders to evade security measures. According to research, it is clear that these technologies facilitate the creation of this type of content at an alarming rate, simplifying child exploitation and making it challenging to detect criminals. The lack of knowledge about how these technologies work and their criminal uses highlights the need to develop effective regulatory and prevention frameworks.

As mentioned, the emergence of strict regulations is one of the main factors that necessitates action. Technology companies must implement robust strategies to protect children from these crimes. However, the lack of clarity about what regulations are necessary and how they should be applied may hinder their implementation. It should be emphasized that any regulatory framework must not only be strict, but also adaptable to the rapid evolution of technology and, consequently, the criminal tactics associated with it, ensuring that the measures are truly effective.

One obstacle encountered in the research was the inability to find regulations governing artificial intelligence, demonstrating that the lack of legislation or regulation in this area in Argentina is one of the main shortcomings, especially in this context where not only technology is advancing, but also the problem itself. The current situation not only exposes more and more children to becoming potential victims, but also leaves a void for the authorities, who do not have the necessary tools to address the issue. Without clear and specific legislation, criminals continue to operate in a favorable environment, highlighting the need for immediate action.

Although the United States took the initiative in measures to ban the creation and distribution of deepfake pornography, it failed to eradicate the problem, especially in school settings. This shows the inadequacy of the few current measures, which are often not implemented effectively or lack the necessary resources to achieve the objective. The lack of enforcement and current legal loopholes allow criminals to evade justice, which is why it is suggested that the creation of new measures should go hand in hand with strategies for their

implementation and awareness campaigns in communities.

The lack of a legal and regulatory framework on artificial intelligence and child protection, therefore, constitutes a considerable challenge in the fight against AI-facilitated MASI. In addition, the lack of cooperation between jurisdictions creates legal loopholes, allowing criminals to find escape routes through platforms where regulation is non-existent or lax. National and international measures and regulations are therefore necessary to unify criteria and promote cooperation in the investigation and prosecution of these crimes. Without consolidated international collaboration, local or national efforts will be insufficient to tackle this complex problem, which operates in the digital sphere and transcends borders.

The lack of training for law enforcement agencies and access to specialized tools is another obstacle. The rapid evolution of technology exceeds the ability of security agencies to adapt, creating a gap between the techniques used to generate and distribute MASI and the response capacity of the authorities. This underscores the need to equip agencies with the necessary resources, both in terms of technology and training, so that they can act against these new forms of crime and protect potential victims.

The case of Pivix shows the complications arising from the lack of restrictions on sexual content on platforms. Despite implementing policies to prohibit realistic representations of this content involving minors, it is claimed that users find ways to circumvent these rules by using private groups and specific tags. This reveals that the measures are not robust enough and that it is essential for platforms to establish clear rules and invest in technologies to detect this content. Without effective collaboration with the authorities, these platforms are a direct gateway for the circulation of MASI.

Similarly, it was observed that these criminals use social networks such as TikTok and Instagram to disseminate AI-generated content, reflecting a lack of protective measures for young people. The danger of these platforms is their virality, which, combined with a lack of oversight, creates fertile ground for the dissemination of images and videos of this nature. The situation calls for an urgent review of content policies and collaboration between technology companies and law enforcement agencies to develop strategies to reduce the risks faced by young people in the digital world.

Despite Patreon´s stated zero tolerance» policy toward content involving minors, it has been confirmed that accounts violate the measures, calling into question their effectiveness. Therefore, platforms must take greater responsibility for content regulation and the prevention of child abuse. The lack of rigorous measures allows criminals to operate in the shadows, thus requiring effective mechanisms to detect and remove content. Clear policies, effective enforcement, and a culture of responsibility among internet service providers are needed to create a safe digital environment.

Because these crimes are transnational, countries need to work together to address the issue, as significant differences in laws and regulations make it challenging to provide an effective and coordinated response to this growing problem. The creation of international agreements that align standards and facilitate information exchange will improve the ability to combat these crimes. Cooperation between states, organizations, and companies is key to creating a comprehensive approach to protection against AI-facilitated MASI.

Developing prevention strategies on this issue is a necessary measure, but they must be designed comprehensively and effectively, rather than reactively. To this end, it is worth highlighting the need for an in-depth analysis of emerging methods and patterns, ensuring efficient and adaptive responses. This implies multidisciplinary collaboration that includes experts in technology, psychology, criminology, and cybersecurity, as well as community participation.

As Ian Critchley of the NPCC mentioned, the number of realistic or synthetic images generated by AI makes it difficult to identify real victims. This statement highlights that current identification and response strategies are not adequate for this crime. This critical issue can complicate the rescue and protection of victims, requiring a reassessment of investigative methodologies and the integration of technologies and tactics to analyze and detect these shortcomings. Authorities must adapt to this reality and strengthen their capabilities to address this phenomenon with the necessary speed.

It is also crucial to address the psychological consequences that victims of child exploitation may suffer as a result of these crimes. The availability and distribution of MASI can have adverse effects on minors, and recognizing this is essential for developing intervention and prevention strategies. Victims require comprehensive support, not only from the legal sphere, but also from psychological and emotional counseling.

Criminology plays a crucial role in analyzing these crimes, providing a theoretical and practical framework for understanding their dynamics. As technology evolves, criminologists must adapt their approaches to investigate new methodologies and their implications for identifying and protecting victims. The link between artificial intelligence and criminology is essential for developing prevention strategies and responses that address child exploitation. This will not only identify criminal patterns and trends but also encourage the creation of public policies and regulations that protect minors and promote a safe digital environment.

Finally, it should be noted that recognizing the fight against the creation and dissemination of AI-generated MASI is not solely the responsibility of the state or platforms. The whole of society, including parents and

educators, must be committed to preventing this crime and creating a protected digital space. Therefore, education on the risks of technology use and the promotion of a culture of responsibility in the virtual world is required. The collaboration of all social actors is essential to build a trustworthy environment for children and adolescents, where artificial intelligence can be used as a tool for benefit and evolution, rather than as a risk.

This research contributes to the field of cybersecurity and criminology in Argentina, addressing an issue that is not yet effectively regulated anywhere in the world, including in the local context. We are in a context where the cyber world is advancing by leaps and bounds, and regulations and agents have not adapted to this. The study highlights the urgency of regulatory frameworks to regulate, restrict, and prevent the generation and dissemination of AI-facilitated child sexual abuse content. By strengthening the understanding of the dynamics of these crimes, a basis for future studies and regulations in criminology and cybersecurity is provided. Value is added by exploring the ethical, technological, and criminal implications of artificial intelligence in the facilitation of child sexual abuse material. This provides an academic resource for policymakers, law enforcement, and criminology professionals seeking to understand and address the emerging risks of this issue.

Based on the conclusions of this study, further research is recommended on the psychological and emotional impacts on victims of AI-facilitated CSEM. In addition, the effectiveness of tools for detecting and blocking illegal content in real time on digital platforms should be investigated, as this may offer proactive solutions to mitigate this problem. At the same time, it is crucial to establish prevention strategies to reduce this problem more effectively and quickly.

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CONFLICT OF INTEREST

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