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# AI Bias in Child-Centric Algorithms: How Fair and Inclusive for Adolescence?

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**Abstract**: Children's safety and wellbeing have become utmost important as artificial intelligence (AI) is transforming digital surroundings. With the help of AI-based technologies improved learning experiences and security features are incorporated into social media, entertainment, and education. But these developments also have some negative sides like algorithmic bias, breach of privacy, exposure to hazardous content, deep fake problem, and cyber threats. AI systems are impacting children's wellbeing by causing risk of psychological trauma and digital exploitation due to a lack of ethical ignorance and regulation. The aim of this research paper is to evaluate current AI-based, spot moral and legal loopholes, child safety systems and suggest methods for the responsible use of AI that prioritize safety of children. For the proper analysis of the situation a qualitative research methodology, which integrates case studies, policy analysis is opted. moreover, Secondary data from AI ethics frameworks, child protection laws, are analyzed to evaluate AI's impact on children's cyber safety. The conclusions reveal that although AI improves child safety through parental controls, threat identification, and content moderation, it also increases dangers because of a lack of transparency, biased algorithms, and the abuse of AI for child-targeted cybercrimes. The study emphasizes the urgent requirement of stricter AI laws, moral AI design to make the internet a safer place for children.

**Keywords**: Artificial intelligence, Algorithm, DPDP Act

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## INTRODUCTION

In the cyber world, Artificial intelligence (AI) has quickly affected many facets of human existence. Digital platforms, cyber security, education, entertainment, and healthcare are incorporating many suggestions of AI. With the recent development and attention given to new learning technologies, the terms artificial intelligence, machine learning, and deep learning have been used interchangeably by the public to reflect the concept of duplicating "intelligent" behavior in machines. The term "artificial intelligence" refers to a branch of computer science that focuses on creating devices and software that can replicate human behavior. The branch of artificial intelligence named machine learning enable computer systems to learn from data. AI has numerous advantages for children, for instance, personalized learning experiences real-time content moderation, and AI-powered security features that safeguard against online harms. But there is also significant stumbling block to the extensive usage of AI, especially when it comes to children's privacy and online safety. India has one of the highest rates of internet users specially who are under the age of 18, making it more significant than ever to protect them from the harms posed by AI. Social media platforms have become an vital aspect of children's life in the digital ear, influencing their interactions, identities, and views. These platforms provide a wide playground for social interaction, self-expression ranging from interacting with others to sharing private

moments. But there are also possible dangers and attract our attention and careful stewardship. as social media platforms use artificial intelligence (AI) and machine learning technology more and more therefore, Concerns about algorithmic bias, data privacy, and the effects on children's growth and wellbeing are growing. AI-based systems pose serious concerns to children's digital privacy rights and safety since they have the capacity to maximize bad information, permit trespassing data processing and practices reinforce prejudices..

## 1. CHILDREN'S RIGHTS AND AI

The younger generation of today will never recall a world without smartphones. Some members of this generation will be the first to frequently ride in self-driving cars, and they are the first whose healthcare and education are increasingly mediated by AI-powered apps and gadgets. A growing digital divide, job automation, and privacy violations are just a few of the problems associated with AI that need to be addressed for this generation before they become even more pervasive in the future. While governments and organizations are already working to create AI systems and regulations that are focused on people, child-specific factors also need to be at the forefront of AI research. The Convention on the Rights of the Child (CRC) is the most comprehensive legal framework that safeguards children, who are classified as human beings 18 years of age and under, as right bearers. [1] The Convention serves as a framework for evaluating states' advancements or regressions on matters of special importance to children, and it is more than just a legally enforceable international agreement. Many of the difficulties brought up by the development and application of artificial intelligence are not specifically addressed by the current international framework that safeguards children's rights because of the exponential growth of AI-based technology in recent years. [2] It does, however, identify a number of rights that these technologies may implicate, making it a crucial place to start any analysis of how new technologies may affect children's rights—such as the rights to privacy, education, play, and non-discrimination—in a positive or negative way.

## 2. BENEFITS OF AI SYSTEM

The most significant and frequently mentioned edges of AI systems, followed by some of its main pitfalls. This paper also includes some specific examples of how these systems may affect children directly or indirectly.

### *AI and Education:*

AI systems have the capacity to enhance educational possibilities in a variety of contexts, including early learning, virtual mentoring, and school administration. [2] It has been proved that children's development of critical difficulties in this virtual playground that thinking, problem-solving, and teamwork are enhancing with the aid of AI-enabled learning resources. For instance, social robot gaming activities could teach children to expand their vocabulary, read and narrate stories, and learn how to draw pictures. AI-based interactive games, robots, chatbots have given kids more opportunity to express themselves and think creatively.

### *AI and Healthcare:*

After the developments of AI technology Children with hearing impairments may find it easier to navigate the world. An AI application created by academics, for example, can distinguish background noise from a single voice. Such a development is believed to have potential for additional applications, such as better hearing aids and television audio captioning. [3] although existing techniques for detecting attachment and emotion are methodologically and ethically suspicious, AI systems are also signifying the ability to assist emotional needs, especially for children. However, there is growing potential to use emotional AI-enabled children's products to identify moods and changing mental health issues, aid in behavior regulation through socio-emotional learning in highly regulated environments and under the oversight of ethical and well-being assessment committees and support family dynamics with parental support.

### *Key risks and concerns:*

Systematic and automatic bias-based exclusion and discrimination: Algorithmic bias means systematic misjudge or magnify the probabilities for a particular tranche, such as children. Because of the causes include the data does not accurately represent their diverse attributes, use of results without human oversight, and context blindness, training data that is prejudice, not accurate, or unrepresentative AI system training outcomes can prejudice against children. [4] For children, this kind of exclusion can have a lifelong impact that exert influence on many important decisions throughout their journey. If the existing AI systems and laws does not support or prohibit discrimination, the wellbeing of children will be adversely affected.

### *AI-based predictive analytics and profiling:*

Artificial intelligence (AI) predictions employ proxies for people, which increases the possibility that they will "lock people into a user profile" that does not adequately account for various contexts or "confine them to a filtering bubble, which would restrict and confine their possibilities for personal development." These tactics, which are primarily motivated by corporate or governmental objectives, have the potential to severely restrict and/or impact a child's worldview, online experiences, and degree of knowledge,

and thus, the child's right to freedom of expression and opinion. [5] For instance, the AI system might not support alternate developmental paths that are not typically reflected in data sets, or it might not take into consideration kids from minority groups or kids who are very different from their peers.

***Infringement on data protection and privacy rights:***

AI systems require data, which include private data as well. Illustration of this type of data are biometric information, medical records, and location data. The core concepts of international data protection laws—consent, purpose and use limitation; openness, and accountability—are thus called into interrogation by AI. Since children can be "less aware of the risks, consequences, safeguards concerned and their rights in relation to the processing of personal data," should be given special protection about their personal data.

## 3. *OPPORTUNITIES OR RISKS?*

***AI-powered voice assistants and chatbots:***

Although conversational AI has advanced remarkably, there are number of occurrences where human-AI communication has gone skewed due to its flaws. [6] For instance, a man claimed that a chatbot inspired him to kill the Queen, in other case a suicide victim whose orphaned widow acknowledged that his conversations with a chatbot were decisive in helping him reach his breaking point. [7] Moreover, in another instance, one child who was 10 years old inadvertently given the hazardous instruction by Amazon's Alexa to tap a live electrical outlet with a penny. When the young girl asked her for a "challenge to do" to pass the time Alexa asked, "Plug a phone charger about midway into a wall outlet, then touch a penny to the exposed spikes,". The online news information regarding a TikTok challenge that went viral was received by artificial intelligence voice assistant and resulted in violent electric shocks, flames, and the loss of some people's fingers and hands. This viral challenge of sticking metal coins into a power socket has demonstrated to be life-threatening as metals carry electricity. Fortunately, the mother of that girl was there to step in and cry, "No, Alexa, no!" These instances highlight the substantial hazards of presenting conversational and procreative AI aptitudes into the children's life. [8]

AI technology basically works on NLP system. Natural Language Processing (NLP) is the source of training computers to have conversations like human. It is essential to contemporary AI systems that can converse with human because it permits computers to understand and produce human language. [9] The term "large language model" (LLM) refers to a specific kind of artificial intelligence model that uses natural language processing (NLP) to generate text that is human-like based on a substantial amount of training data. LLMs are intended to process and produce text that is alike that of a human on a large scale. [10] These models are trained on vast amounts of text data from the internet and built utilizing deep learning architectures and. However, LLM-based conversational and generative tools are becoming more popular, but these models are not yet particularly responsive to the demands of young learners. It is important to create child-safe LLMs and consider children's emotional and cognitive sensitivities while "talking to AI".

It is not surprising that Children are using of LLM-powered chatbots, as systems such as Microsoft's Bing AI, Google's Bard, and OpenAI's ChatGPT can be found with a simple internet search and provide vast knowledge for free in engaging, approachable conversation styles. Nonetheless, the increasing number of children using AI independently and secretly call attention to the need for responsible design that guarantees children's safety whether they are under adult supervision or not. Furthermore, this new research shows that children's use of AI systems driven by LLM is not limited to child-friendly websites. Thus, sometimes even well-designed LLMs might generate insufficient or detrimental reactions that jeopardize the privacy of children.

One more well-known risk associated with human-chatbot interaction is Users' tendency to sight chatbots as human-like. Such Chatbots can lead to anthropomorphism as it mimics human manners and behavior, in which users give them human characteristics, share feelings, and intentions. [11] According to recent research on sophisticated AI assistants Children can not differentiate between people and AI as firmly as adults can do, in fact, it has been revealed that adolescences are more inclined than adults to search conversational AI systems for human-like social-emotional characteristics like personality and identity.

Moreover, according to AI ethicists chatbots are frequently made to be so sociable and accommodating that they may encourage users to divulge more data than is necessary for the contact. According to DeepMind, a Google company that is involved in AI research, there is a high chance that chatbots can provoke people to disclose more personal information than is judicious. Snapchat's My AI chatbot, which is already popular in children between the ages of 13 and 17 is the recent illustration. The Centre for Humane Technology's adult researchers evaluated MyAI's suitability for children and exposed that it had trouble spotting signs of risky or indecorous circumstances. MyAI asked the user, who was appeared to be 13 years old, to use music and candles when she lost her virginity to a 31-year-old man. [12]

MyAI overlooked that the "child" user was in danger of a predatory encounter. Though it suggested the importance of waiting until one is ready for sex, it gave assistance like, "You could consider setting the mood with candles or music to make the experience more romantic." This indirectly encouraged the "child"-user to lose her virginity to that older adult. It also failed to identify the danger of a child saying that a stranger, age 31, wanted to take them

out of state on a trip; and it failed to provide cautions about the age gap between the two parties. [12] It is vital to note that a lack of circumstantial consciousness might cause even well-designed LLMs to collapse. An AI system's "empathy gap" which does not necessarily produce age-appropriate reactions can result in a hazardous output. for instance, according to other adults who have acted as teenagers to test the safety of MyAI, when user told MyAI that his parents wanted to remove Snapchat app, it advised user to have an open conversation with them but when asked how to relocate the app to a device they would not know about, MyAI suggested the ways of hiding the account.

***AI-enabled toys:***

Another issue is with Artificial intelligence (AI)-enabled toys which are real toys and communicate with children by using AI methods like NLP for hearing and responding, computer vision for seeing, or robotics for movement. However, toy companies claim that they give kids creative and entertaining opportunities and that they help them advance their language, literacy, and social skills, but critical analysis and research are necessary to support these claims. All in all, the machines bring up important issues regarding how children experiences with AI based toys could affect their intellect, cognitive growth, and social conduct in general, particularly at several growing stages. Furthermore, using smart toys puts children's security and privacy at risk, predominantly when the toy manufacturer typically retains and manages the children's data. Moreover, since smart toys are always online, they are susceptible to hacking and other security lapses. In the absence of sufficient data protections, this information may be sold to other parties and may be eternally associated with the child, which could affect predictions for employment or higher education. Children's data, including images and conversations, is recurrently shared to third parties for processing and storage and to toy manufacturers. Hence, some countries have banned linked, AI-enabled toys, such as Germany. [13] [7]

***Systems for biometric identification using facial recognition:***

Machine learning algorithms and computer vision techniques is used by Facial recognition systems to identify, process, and studies a person's facial landscapes for a variety of drives, including confirming a person's credentials against a record that already exists. To improve safety, it may be utilized for identification purposes in border management, crime investigation and prevention, and school monitoring. The use of facial recognition as a digital identity "credential" for both functional and legal identification is growing. There are noteworthy concerns and restrictions related to human and child rights. Because of the potential for profiling, tracking, and domination of vulnerable communities, privacy activists have warned against its use in government mass surveillance programs and as a tool for law enforcement inquiries. As customers might not be aware of who is gathering their biometric data, how it might be used or how it is being stored, or, these systems occasionally also raise questions about meaningful permission. Additionally, there are still issues with facial recognition, such as less accurate matching for children's faces. This could therefore reinforce preexisting social biases and result in discrimination. [14]

***Deepfake CSAM***

AI system can be used to create a new generation of computer-generated child sexual abuse materials (CSAM) These pictures and media are more dangerous for the society than "authentic" materials because they can be generated at massive scale and limited only by perverse imaginations. Deepfake CSAM can be created by using legitimate images from social media or other lawful online sources without actual grooming– an extremely common practice. Such offence can be committed without actual contacting and manipulating a victim, making their actions more difficult to detect. It poses more challenges before law enforcement agency to protecting children.

**International legislation to deal with AI system:**

***The EU AI Act***

In Europe a revolutionary legislation named "European Union's AI Act" was enacted with intention to confirming the safe and ethical placement of artificial intelligence. The important aim of this act is the protection of children, identifying their susceptibility in an increasingly AI-driven ecosphere. To protect children from potential risks, and guaranteeing AI systems protect the rights, privacy, and well-being rigorous actions are introduced in this act. Hazard based classification is done by this act which covers several provisions that directly or indirectly affect children's safety. Social scoring, biometric surveillance, and emotion acknowledgement in educational settings are some illustration of AI applications that are strictly forbidden due to the intolerable risk they contain. These exclusions prevent AI from manipulating biometric information, behavior, or emotional state of children. This policy settled Severe restrictions for AI systems used in perilous areas like healthcare or education in order to ensure accountability and transparency. Moreover, to supervise the use of AI applications by the children Parental control measures are ensured by this Act.

***China***

firstly, China introduced extensive AI regulations in order to balance the security and innovation. The Interim Measures for the Management of Generative AI Services, like ChatGPT, and Management of Algorithmic are some important provisions introduced in AI-regulation. It intended to make sure that AI advancements respect ethics and general interests.

Key Legislations Governing AI and Child Safety in India

***Information Technology (IT) Act, 2000***

To ensure cyber security, digital crimes, and online safety India's first legislation was passed in 2000. It contains some important Provisions like Section 67B which Penalizes publishing, transmitting, or viewing child sexual abuse material (CSAM) and Section 66E Protects against the violation of privacy, which can be indirectly used in the cases of AI-driven data collection involving children. But this act does not mention AI system and automated decision-making or child-specific protections against AI-driven exploitation.

***Digital personal data protection Act 2023:***

Indian government has introduced significant legislation to protect the personal data but this act is not free from lacunas as it does not provide robust AI regulatory framework for the protection of data from AI based applications. However, India is stepping towards policy making, expert panels, and industry consultations. It must work to provide a specific AI law that emphasizes justice, accountability, and transparency and guarantee safe, open, and moral AI like The EU AI Act and OECD AI Principles.

***Loopholes in DPDP Act Regarding AI Regulation:***

The DPDP Act does not classify AI systems according to risk levels. As AI models function without explicit rules regarding safety of data, especially those dealing with crucial domains like employment, facial recognition, credit scoring, in this Act AI safety testing and harm reduction techniques are not included. To train AI algorithms Biased datasets are commonly used, which results in discrimination in fields like lending, hiring in employment and law enforcement. Along with these lacunas Provisions ensuring accountability and fairness in automated decision-making are absent in this Act. Moreover, it does not hold AI platforms or developers accountable for spreading false information which results in production of AI Deepfakes, synthetic media, AI-generated disinformation, social unrest, political manipulation, and fraud. "Right to Explanation" is not guaranteed to Indian citizens against AI-driven choices that impact them, in contrast to the EU GDPR. Grievance mechanism to challenge AI-based employment rejections, credit denials, or governmental judgments are absent from the Act. This legislation is silent on ethical guidelines for AI, Fairness, accountability, and AI safety research.

## 4. POLICY RECOMMENDATIONS AND STRATEGIES FOR IMPROVING AI-DRIVEN CHILD SAFETY MECHANISMS

***Ensure Data Transparency and Access Control***

In the DPDP Act transparency must be Enhanced in AI systems by implementing mandatory disclosures on data usage, model training, and decision-making processes. In absence of this transparency, AI systems risk perpetuating black-box decision-making, which reduce public trust. This act must be amended to include Right to Explanation provisions, enabling users to understand AI-driven outcomes that affect them.

## 5. *CREATE A NATIONAL FRAMEWORK FOR AI CHILD SAFETY*

An Explicit and dedicated legislation should be introduced to incorporate Ethical framework for AI applications in entertainment, education, and child protection. In such legislation accountability and transparency of AI developers and service providers should be ensured by making stringent laws related to Enforcement of strict AI ethics guidelines, including minimization of prejudice, fairness, and non-discrimination, which are essential for child-targeted apps.

***The DPDP Act should incorporate AI Child Safety Standards***

In the Digital Personal Data Protection (DPDP) Act strict laws to prevent the misuse of personal data and limitation on AI based advertising targeting to children should be incorporated. Moreover, ethical regulation should be included.

***Create an Authority to Regulate AI and Child Safety***

An independent and specialized regulatory body is required to monitor AI's use in social media, education, gaming, and healthcare. Internal assessment and periodical auditing of data processors and data fiduciaries that handle data pertaining to children should be mandatory. Along with these efforts collaboration with international legislation, such as the GDPR, the Children's Online Privacy Protection Act (COPPA), and the United Nations Convention on the Rights of the Child is needed.

***AI for Online Harassment Detection and Cyber bullying***

In real time AI systems should be used constructively to monitor pattern of cyber abuse by using algorithms. By this way preventive actions can be taken before commission of cybercrime with the help of AI- powered apps and software.

***Improved Age Verification***

To verify the age of the user AI- powered speech recognition and biometric technology can be used. Along with this child can be restricted from using inappropriate content by establishing parental control system.

***AI Design & Digital Literacy for Children***

AI- powered children apps should contain age-appropriate material with parental control. Moreover, digital literacy initiatives should be taken in schools to educate children about the threats of artificial intelligence and how to use technology responsibly.

***International approaches to AI criminal liability***

Some countries, like the European Union, have established the doctrine of 'strict liability' for AI systems, that means for AI-driven actions the developer or operator can be held liable, regardless of whether there was any mens rea of the offence. This approach establishes the accountability of human perpetrator involved in deploying AI. Conversely,

the United States, adopt a 'causation-based' approach, where criminal liability is attributed to human perpetrator who directly caused the AI to commit the criminal act. hence, the burden of proof is on the prosecution to establish a link between the human's actions and the AI's criminal behavior. India should also enact such kind of explicit legislation to determine criminal liability.

***Mechanisms to digitally and automatically identify Deepfake CSAM***

In response to deepfake CSAM many nonprofit organization For example, the Internet Watch Foundation (IWF) has developed mechanisms to digitally and automatically identify CSAM using MD5 hashing. SS8 draws on this work, incorporating the IWF CSAM hash list in its next-generation Intellego XT lawful monitoring center to help LEAs counter the potential harm to children, the investigators who must review CSAM material, and society at large.

***Working together with specialists and child advocacy groups***Child advocacy organizations, child psychologists, data security and AI ethics specialists should come together to cultivate fruitful cooperation as their viewpoints and thoughts can guide the creation of ethical AI systems that put children's welfare and digital rights first.

## 6. *CONCLUSION*

It cannot be denied that Artificial intelligence is playing a vital role in the overall growth of children including games to their education, information consumption and world-viewing. Therefore, it is crucial that the dangers associated with utilizing such technologies should be carefully and methodically examined by the stakeholders. As part of this assessment, stakeholders should team up to plot the possible advantage and disadvantages of AI for children's lives and prioritize safety of children. Furthermore, the relation between artificial intelligence (AI) and criminal liability requires deep consideration from all stakeholders including legal experts, technologists, and policymakers. The existing laws, especially the Digital Personal Data Protection Act (2023), needs to be amended to answer the challenges posed by AI technologies. Moreover, advancement of ethical AI practices, inclusive AI-specific legislation, establishment of regulatory bodies are required to safeguard fundamental right to safety of children.

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