

ARTIFICIAL INTELLIGENCE AND ALGORITHMIC DISCRIMINATION: A REFLECTION ON RISK AND VULNERABILITY IN CHILDHOOD

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Abstract: This article is an investigation into the risks involved in the activity of artificial intelligence aimed at children and adolescents. It appears that artificial intelligence has been active in several fields, not being different in the daily lives of children, especially after the advent of the COVID-19 pandemic. However, its risks are often not properly analyzed, which culminates in damage and discrimination in one of the most vulnerable sectors: children and adolescents. This article aims, through deductive method of literature review, to analyze the risks that are involved in the activity of artificial intelligence and their impacts on childhood, recommending, in the end, mapping and mitigation measures. In this context, it appears that a reliable AI must act through multisectoral measures, involving civil institutions, family, State, private sector and organizations in impact assessments. Furthermore, technology must support children's development and well-being, ensure inclusion, safety and non-discrimination, protect data and privacy and provide transparency and explainability. Likewise, AI systems must address the best interests of the child over commercial interests and must also consider the need for disconnection, which is essential for physical and mental well-being.

Keywords: vulnerability; childhood; Artificial Intelligence; discrimination; risks.

INTRODUCTION

The development of childhood in contemporary society, in the face of the unbridled use of technologies and artificial intelligence in their daily actions, is changing every day. Considering this is a vulnerable group, this relationship deserves significant attention, since its impacts can lead to difficulties in the development of the infant's personality.

In this context, this text aims to understand the impact of artificial intelligence and algorithmic discrimination in childhood, recommending measures to mitigate the respective risks. For that, the deductive methodology of a qualitative approach of bibliographical review and documental research is used.

Such an analysis is relevant considering that the use of artificial

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intelligence and new technologies has also been increasingly applied to children and adolescents, especially with the advent of the COVID-19 pandemic, which forced the digitization and computerization of various sectors.

It investigates, therefore, what are the potential problems that arise from the vulnerability of the infant in relation to the impacts of artificial intelligence and how to deal with these reflexes in order to mitigate the risks involved, under the prism of the best interest of the child.

I. NOTIONS OF ARTIFICIAL INTELLIGENCE AND ALGORITHMIC DISCRIMINATION

The claim to understand artificial intelligence (AI) and its impacts involves trying to conceptualize it. This task, however, is not easy, considering that there is not a single universally accepted concept and the conceptualization of intelligence, in general, can assume different connotations.

Max Tegmark defines intelligence as the ability to achieve complex goals¹. The beginning of the use of the term “artificial intelligence” is attributed to the computer scientist John McCarthy in 1956², although the first work recognized as AI was developed by Warren McCulloch and Walter Pitts in 1943³.

There are, however, some characteristics that single out the artificial intelligence system as such. Peter Norvig and Stuart Russell, in the work “Artificial Intelligence: a modern approach”, list the four major categories where artificial intelligence is usually conceptualized: “systems that think like humans”, “systems that act like humans”, “systems that think rationally” and “systems that act rationally”. With regard to the aspects that make it unique and attribute to it the aspect of rationality analogous to that of human beings, it is argued that:

The first is communication. One can communicate with an intelligent entity. The easier it is to communicate with an entity, the more intelligent the entity appears. You can communicate with a dog, but not about Einstein's Theory of Relativity. The second is internal knowledge. An intelligent entity is expected to have some knowledge about itself. The third is external knowledge. An intelligent entity is expected to know

¹ Tegmark, Max. *Life 3.0. Being human in the age of artificial intelligence*. New York: Alfred A. Knopf, 2017, 70.

² Kaplan, Jerry. *Artificial Intelligence: What everyone needs to know*. Oxford: Oxford University Press, 2016, 13.

³ Norvig, Peter, and Stuart J. Russell. *Artificial Intelligence: A Modern Approach*. New Jersey: Prentice Hall, 1995, 16.

about the outside world, to learn about it, and to use that information. The fourth is goal-oriented behavior. The entity is expected to take action to achieve its objectives. The fifth is creativity. An intelligent entity is expected to have some degree of creativity. In this context, creativity means the ability to take an alternative action when the initial action fails. A fly tries to leave a room and the collisions against the windowpane continue to repeat the same futile behavior. When an AI robot crashes into a window, it tries to get out using the door. Most AI entities have these five attributes by definition⁴.

Patrick Henry Winston, in turn, argues that there are several ways to define artificial intelligence, defining it as the study of computing that enables it to perceive, reason and act⁵. It should also be noted that many machines are driven by command interfaces, which links their activity to the will of the issuer or owner. Others, however, have demonstrated a lower degree of interactivity, evidencing more autonomous driving in relation to the human being. In this way, the conduction of machine activity differs between systems that have high interactivity with the operator-user, usually subordinated to their emissions, and systems that have low interactivity with the operator-user, usually demonstrating self-sufficiency in the conduction of activities.

Jerry Kaplan adds that the essence of artificial intelligence - indeed, the essence of intelligence - is the ability to make appropriate generalizations in a timely manner, based on limited data⁶. In the contemporary context, artificial intelligence occupies space in several branches and has numerous functions, helping specialists to solve difficult analysis problems, to develop new tools, to learn through examples and representations, to work with semantic structures and to create new market opportunities⁷.

Artificial intelligence spreads exponentially in everyday life, from the most banal to the most sophisticated activities, without people often realizing the use of this technology. This technology learns from mistakes, in a true and false process, building its knowledge until it manages to satisfactorily answer a question⁸.

⁴ Hallevy, Gabriel. The criminal liability of artificial intelligence entities: from science fiction to legal social control. *Akron Intellectual Property Journal*, Ohio, vol. 4, p. 171-199, 2016.

⁵ Winston, Patrick Henry. *Artificial Intelligence*. 3rd edition, Massachusetts: Addison-Wesley Publishing Company, 1993, 5.

⁶ Kaplan, Jerry. *Artificial Intelligence: What everyone needs to know*. Oxford: Oxford University Press, 2016, 5.

⁷ Winston, Patrick Henry. *Artificial Intelligence*. 3rd edition, Massachusetts: Addison-Wesley Publishing Company, 1993, 10-14.

⁸ Cheliga, Vinicius, and Tarcisio Teixeira. *Inteligência artificial: aspectos jurídicos*. Salvador: Editora Juspodivm, 2019, 27.

An artificial intelligence system is not only capable of storing and manipulating data, but also of acquiring, representing and manipulating knowledge. This manipulation includes the ability to deduce new knowledge from existing knowledge and use representational methods to resolve complex issues⁹.

For this, artificial intelligence often uses algorithms, a tool that can be understood as a sequence of steps used by artificial intelligence to solve a problem or perform an activity, crossing data and making correlations in search of a pattern¹⁰. Algorithms, in turn, can act through machine learning, which is, essentially, the activity of the machine to learn new facts through data analysis and previous experience, without explicit programming for that, adapting learning to new situations¹¹. Deep learning is an advanced specialization of machine learning and has the ability to process different types of data in a similar way to a human brain¹².

AI systems have also affected generations of children and teenagers. Whether through toys, virtual assistants and video games, or through video recommendations on YouTube, music on Spotify and friendships on social networks. However, the attention given to this interaction is still scarce considering the magnitude of its impacts and the vulnerability of children who, as a rule, have greater difficulty in understanding the long-term implications of these technologies. In the same sense, children often lack resources that enable them to understand and correct mistakes in learning or in the database.

According to the latest TIC Kids Online Brazil 2019 survey¹³, carried out by the Information and Coordination Center (NIC.Br)¹⁴ through personal interviews with the application of a structured questionnaire, it was found that

⁹ Câmara, Marco Sérgio Andrade Leal. *Inteligência artificial: representação de conhecimento*. Dep. de Engenharia Informática da FCTUC. Available at: https://student.dei.uc.pt/~mcamara/artigos/inteligencia_artificial.pdf

¹⁰ Gutierrez, Andriei. É possível confiar em um sistema de inteligência artificial? Práticas em torno da melhoria da sua confiança, segurança e evidências e accountability. In: *Inteligência artificial e Direito: Ética, Regulação e Responsabilidade* (edited by Ana Frazão and Caitlin Mulholland). São Paulo: Thomson Reuters Brasil, 2019, 85.

¹¹ Čerka, Paulius, Jugita Grigienė, and Gintarė Širbikytė. Liability for damages caused by artificial intelligence. *Computer Law and Security Review*, v. 31: 376-389, 2015, 380.

¹² Mulholland, Caitlin. Responsabilidade civil e processos decisórios autônomos em sistemas de inteligência artificial (IA): autonomia, imputabilidade e responsabilidade. In: *Inteligência artificial e Direito: Ética, Regulação e Responsabilidade* (edited by Ana Frazão and Caitlin Mulholland). São Paulo: Thomson Reuters Brasil, 2019, 329.

¹³ NIC.Br. *Tic Kids Online Brasil 2019*. Available at: https://cetic.br/media/analises/tic_kids_online_brasil_2019_coletiva_imprensa.pdf

¹⁴ In Brazil, the Information and Coordination Center (NIC.Br) is the executive branch that supports the Internet Management Committee (CGI), with the CGI being responsible for establishing strategic guidelines related to the operation, development and use of the Internet.

43% of children aged 9 to 17 have already seen someone being discriminated against on the internet. This is aggravated in the Brazilian context when we realize that there are multiple childhoods in the country, in view of the diversity of socioeconomic, cultural, ethnic and regional factors.

The use of artificial intelligence, despite bringing undeniable benefits to the user, also carries the risk of discriminatory results. The decision-making process by artificial intelligence algorithms, autonomously or humanly assisted, embodied by significant information extracted by data mining, results, with some frequency, in harmful biases directed at individuals and groups that have been discredited in the course of history¹⁵. Initially, it should be noted that

the word discriminate includes two meanings that translate into two different behaviors. On the one hand, a behavior with a positive connotation that seeks selection and exclusion without affecting rights that make up human dignity and derive from the legal reserve of the principle of equality. This type of selection and categorization of socialization does not, by itself, imply unlawful conduct when carried out with reasonable criteria, in accordance with the legal system and without harmful connotations. On the other hand, discrimination includes conduct with a negative connotation that implies unequal treatment of a person or group for reasons of race, religion, politics, sex, age, physical or mental condition. When the separation or distinction affects rights not delimited in legal reserve and is tinged with prejudice, arbitrariness, hostility or hurts the dignity of the human person, it is a manifestly illicit conduct capable of causing harm (freely translated)¹⁶.

¹⁵ França Netto, Milton Pereira de, and Marcos Ehrhardt Júnior. A inteligência artificial e os riscos da discriminação algorítmica. In: *Direito Civil e Tecnologia: Tomo II* (edited by Marcos Ehrhardt Jr. et al.). Belo Horizonte: Fórum, 2021, 148.

¹⁶ “La voz discriminar comprende dos acepciones que se traducen en dos comportamientos disímiles. Por un lado, una conducta de connotación positiva que procura la selección y exclusión sin afectar derechos que hacen a la dignidad humana y son derivadas de la reserva legal del principio de igualdad. Este tipo de selección y categorización de la socialización no implica per se una conducta antijurídica cuando es realizada con criterio de razonabilidad, de acuerdo al ordenamiento y sin connotaciones prejuiciosas. Por otro lado, discriminar comprende conductas con connotación negativa que implican un trato desigual a una persona o colectividad por motivos raciales, religiosos, políticos, de sexo, de edad, de condición física o mental. Cuando la separación o distinción afecta derechos que no se encuentran limitados bajo una reserva legal y está teñida de prejuicios, de arbitrariedad, de hostilidad o lesiona la dignidad humana, es una conducta claramente antijurídica con aptitud de causar daños”. Mercadal, Juan José Martínez. Discriminación algorítmica: anotaciones sobre la protección “pro homine” y la prevención del daño desde la propuesta europea de regulación de la inteligencia artificial 2021. In: *Direito Civil e Tecnologia: Tomo II* (edited by Marcos Ehrhardt Jr. et al.). Belo Horizonte: Fórum, 2021, 217.

The discrimination mentioned and intended to be combated in this text refers to discrimination in its negative connotation. At this point, the Toronto Declaration – a manifesto published by a coalition formed by activism groups and technology companies that aims to prevent artificial intelligence from violating human rights – defines discrimination as any distinction, exclusion, restriction or preference based on any grounds, such as race, color, sex, language, religion, political or other opinion, national or social origin, property, birth or other status of birth, and which has the purpose or effect of nullifying or preventing the recognition, enjoyment or exercise by all persons, on equal terms, of all rights and freedoms¹⁷.

It should be noted that children may suffer intersectional discrimination based on race, gender or economic status. In addition, they simultaneously experience one of the most unequal and even violent social power dynamics that still persist in contemporary societies: adult-centric relationships¹⁸.

Children are often monitored in their daily practices, with their data collected indiscriminately, without any control. This collection, in turn, can trigger access to content driven by purely commercial logic, which does not always serve the best interest of the child.

The definition and application of profiles, for several reasons, can lead to a discriminatory result. Among these results, we highlight the construction of profiles from incorrect data (incomplete or that present discriminatory biases), failures related to data processing (such as the coding error of the profiling algorithm), the processing of sensitive data or the extraction of sensitive knowledge from personal data, or even the definition of profiles from a database that is not broad and representative and profiling based on generalizations¹⁹.

At this point, the design and/or implementation of intelligent algorithms must respect the principle of non-discrimination, which consists of preventing AI systems from processing information or data under prejudice or distinctions in relation to human beings, due to race, color, sex, language, religion, political or other opinion, national or social origin, economic status, birth or any other social condition (art. 2, item 2, Covenant on Economic,

¹⁷ The Toronto Declaration. *Protecting the right to equality and non-discrimination in machine learning systems*. Available at: <https://www.torontodeclaration.org/declaration-text/english/>

¹⁸ Henriques, Isabella Vieira Machado, and Inês Vitorino Sampaio. Discriminação algorítmica e inclusão em sistemas de inteligência artificial - uma reflexão sob a ótica dos direitos das crianças no ambiente digital. *Revista de Direito Público. Dossiê – Inteligência artificial, ética e epistemologia*. Brasília, Volume 18, n. 100, 245-271, oct./dec. 2021, 255.

¹⁹ Modesto, Jéssica Andrade, and Marcos Ehrhardt Júnior. Definição de perfis e o risco de discriminação: a importância das legislações de proteção de dados para a tutela da pessoa natural. In: *Direito Civil e Tecnologia: Tomo II* (edited by Marcos Ehrhardt Jr. et al.). Belo Horizonte: Fórum, 2021, 332.

Social and Cultural Rights) (freely translated)²⁰.

The right to isonomy and non-discrimination is guaranteed, in Brazil, by art. 5, caput, of the Federal Constitution of 1988, which provides that all people are equal before the law, without any distinction. Furthermore, Decree no. 99.710/1999 enacted the Convention on the Rights of the Child, which mentions, in its art. 2, that countries shall ensure the rights of the child without distinction of any kind, regardless of race, color, sex, language, creed, political or other opinion, national, ethnic or social origin, economic position, physical disability, birth or any other condition of the child, his parents or his legal representatives.

The Child and Adolescent Statute also provides, in art. 3, sole paragraph, that the rights of children are applicable to all of them, without distinction, without any discrimination, as well as stipulates, in art. 5, that no child shall be subject to any form of discrimination. At the international level, General Comment n. 25 of the UN presents the principle of non-discrimination as one of the essential vectors for the implementation of children's human rights in the digital environment, including in relation to AI.

Despite all the normative framework mentioned, in the field of AI, algorithms can manifest built-in discriminations due to the transmission of prejudices from their developers or programming errors. Although they do not have built-in discriminatory biases, algorithms have the ability to generate unsatisfactory and flagrantly prejudiced results, if they are fed by data with concepts and values full of biases, starting to learn from them²¹.

Regarding algorithmic discrimination, Laura Schertel and Marcela Mattiuzzo list four of the main forms of discrimination that help to understand the scenario: by statistical error, by generalization, by the use of sensitive information and by limiting the exercise of rights. In this context, discrimination by statistical error occurs in the failure from incorrect data collection or accounting, to problems in the algorithm code²². Discrimination

²⁰ “El diseño y/o implementación de los algoritmos inteligentes deben respetar el principio de no discriminación, que consiste en impedir que los sistemas de IA procesen la información o los datos bajo sesgos o distinciones frente a los seres humanos, por motivo de raza, color, sexo, idioma, religión, opinión política o de otra índole, origen nacional o social, posición económica, nacimiento o cualquier otra condición social (art. 2º, inc. 2º, Pacto de los Derechos Económicos Sociales y Culturales)”. Mercadal, Juan José Martínez. Discriminación algorítmica: anotaciones sobre la protección “pro homine” y la prevención del daño desde la propuesta europea de regulación de la inteligencia artificial 2021. In: *Direito Civil e Tecnologia: Tomo II* (edited by Marcos Ehrhardt Jr. et al.). Belo Horizonte: Fórum, 2021, 231.

²¹ Henriques, Isabella Vieira Machado, and Inês Vitorino Sampaio. Discriminação algorítmica e inclusão em sistemas de inteligência artificial - uma reflexão sob a ótica dos direitos das crianças no ambiente digital. *Revista de Direito Público. Dossiê – Inteligência artificial, ética e epistemologia*. Brasília, Volume 18, n. 100, 245-271, oct./dec. 2021, 251.

²² Mendes, Laura Schertel, and Marcela Mattiuzzo. Discriminação Algorítmica:

by generalization occurs due to the mistake in classifying certain people in certain groups:

For example, if a person lives in a neighborhood commonly associated with poverty and the model has no information other than their address to decide whether or not they are a good candidate for a loan, it will classify them as belonging to a group from which she may not be a party if she presents herself as an outlier. This could occur if that person has a higher or lower income than people in their neighborhood, for example. Thus, although the algorithm is correct and the information as well, the result will still be an incorrect generalization, as even a statistically relevant result will present a percentage of people who do not fit perfectly into that average²³.

Discrimination for the use of sensitive data occurs when the analysis is based on legally protected data, as would occur, for example, in the use of an individual's religious information to designate their credit score²⁴. Finally, discrimination by limiting the exercise of rights occurs when the information used by the algorithm greatly affects a holder's right²⁵.

In this context, the use of criteria such as nationality, gender, political position, religion, age or sexual identity can lead to a series of discriminations because they are related to the intimate personality of each individual, in addition to intensifying the stereotyping of groups and inciting social tensions. When applied in childhood, the reflexes are even more impactful, especially considering the vulnerability of this group:

digital technologies and AI itself are not neutral, they reflect values and interests of those who influence their design and use, as well as being the result of the same structures of power and inequality that operate in society. Not only do they have the capacity to reproduce, but to exacerbate existing inequalities in various contexts, not least because the automation of historical discrimination can cause massive damage. From the children's point of view, exclusions and discriminations can reverberate in a phase that is of learning their readings of the world. In

Conceito, Fundamento Legal e Tipologia. *Revista de Direito da Univille*. Porto Alegre, Volume 16, n. 90, 2019, 39-64, nov./dec. 2019, 14.

²³ Mendes, Laura Schertel, and Marcela Mattiuzzo. Discriminação Algorítmica: Conceito, Fundamento Legal e Tipologia. *Revista de Direito da Univille*. Porto Alegre, Volume 16, n. 90, 2019, 39-64, nov./dec. 2019, 14.

²⁴ Mendes, Laura Schertel, and Marcela Mattiuzzo. Discriminação Algorítmica: Conceito, Fundamento Legal e Tipologia. *Revista de Direito da Univille*. Porto Alegre, Volume 16, n. 90, 2019, 39-64, nov./dec. 2019, 14.

²⁵ Mendes, Laura Schertel, and Marcela Mattiuzzo. Discriminação Algorítmica: Conceito, Fundamento Legal e Tipologia. *Revista de Direito da Univille*. Porto Alegre, Volume 16, n. 90, 2019, 39-64, nov./dec. 2019, 14.

addition to implying situations of suffering, they are projected in a broader scope of time (from childhood to adult life), making the resolution of these problems even more difficult²⁶.

It is worth remembering that vulnerability is understood as the quality of being vulnerable (those susceptible to being exposed to physical or moral harm due to their fragility) and can be applied to a person or a social group, according to their ability to prevent, resist or to circumvent potential impacts, so that vulnerable people are those who, for various reasons, are in a situation of risk or fragility²⁷.

In this same context, under the terms of Section 2 of the 100 Rules of Brasilia on access to justice for people in vulnerable conditions²⁸, vulnerable people are considered to be those who, due to their age, gender, physical or mental state, or due to social, economic, ethnic and/or cultural circumstances, encounter special difficulties in fully exercising before the justice system the rights recognized by the legal system²⁹.

The document goes on to add in Section 3 that children and adolescents are considered to be all persons who are under eighteen years of age, unless they have reached the age of majority beforehand due to the applicable national legislation, further determining that every child and adolescent must be object of special protection by the organs of the justice system in consideration of its evolutionary development³⁰.

In this regard, because they are people who live a special period of biopsychosocial development, there are several situations in which their rights can be made vulnerable. General Comment No. 25 on the rights of children in relation to the digital environment, prepared by the UN Committee on the Rights of the Child, presents as examples of discrimination situations in which children are excluded from the use of digital technologies

²⁶ Henriques, Isabella Vieira Machado, and Inês Vitorino Sampaio. Discriminação algorítmica e inclusão em sistemas de inteligência artificial - uma reflexão sob a ótica dos direitos das crianças no ambiente digital. *Revista de Direito Público. Dossiê – Inteligência artificial, ética e epistemologia*. Brasília, Volume 18, n. 100, 245-271, oct./dec. 2021, 252.

²⁷ Jaborandy, Clara Cardoso Machado, and Tatiane Gonçalves Miranda Goldhar. Inclusão digital das pessoas com deficiência e a proteção de dados pessoais. In: *Direito Civil e Tecnologia: Tomo II* (edited by Marcos Ehrhardt Jr. et al.). Belo Horizonte: Fórum, 2021, 380.

²⁸ The “100 Rules of Brasilia” on access to justice for vulnerable people is a document drawn up by a Working Group set up at the Ibero-American Judicial Conference and approved by the XIV Ibero-American Judicial Conference in Brasilia in 2008.

²⁹ Conferência Judicial Ibero-Americana. *Regras de Brasília sobre acesso à justiça das pessoas em condição de vulnerabilidade*. Available at: <https://www.anadep.org.br/wtksite/100-Regras-de-Brasilia-versao-reduzida.pdf>.

³⁰ Conferência Judicial Ibero-Americana. *Regras de Brasília sobre acesso à justiça das pessoas em condição de vulnerabilidade*. Available at: <https://www.anadep.org.br/wtksite/100-Regras-de-Brasilia-versao-reduzida.pdf>.

and services or receive hate speech or unfair treatment in the web³¹.

In addition, the document also lists that other forms of discrimination can arise from automated processes that result in information filtering, profiling or decision-making are based on partial biased data or unfairly obtained in relation to a child. It is in this scenario that the principles of the General Data Protection Law are relevant to the discussion, since the indiscriminate use of personal information is capable of objectifying the subject, promoting manipulations and affecting the free development of the personality, conditions that, especially in the case of children, have the ability to lead to discrimination with consequences for a lifetime.

Boosting through the use of AI, for example, has impacts on access to culture itself, in its universality and diversity, which is compromised when, in children's leisure, the child receives content that was driven by a marketing logic that is linked to other interests. other than your best interest³²:

Any child who accesses social networks in the country will not be able to do so absolutely free from commercial harassment. They are encouraged to stay connected, enjoy and share content, being monitored in their digital footprints, starting to receive recommendations that often contribute – intentionally or unintentionally – to polarization, discrimination and exclusion³³.

In this context, the determination of art. 14 of the LGPD, in the sense that the processing of personal data of children is carried out exclusively in their best interest, is consistent with the principle that AI systems that affect children are centered on them³⁴. Therefore, “it is not possible, for example, for the interest of the controller or third parties – even if legitimate – to be used as a legal basis for the processing of children’s data, since it is their best

³¹ United Nations. *Comitê dos Direitos da Criança. Comentário Geral n. 25*. Available at: <https://criancaeconsumo.org.br/wp-content/uploads/2022/01/comentario-geral-n-25-2021.pdf>.

³² Henriques, Isabella Vieira Machado, and Inês Vitorino Sampaio. Discriminação algorítmica e inclusão em sistemas de inteligência artificial - uma reflexão sob a ótica dos direitos das crianças no ambiente digital. *Revista de Direito Público. Dossiê – Inteligência artificial, ética e epistemologia*. Brasília, Volume 18, n. 100, 245-271, oct./dec. 2021, 262.

³³ Henriques, Isabella Vieira Machado, and Inês Vitorino Sampaio. Discriminação algorítmica e inclusão em sistemas de inteligência artificial - uma reflexão sob a ótica dos direitos das crianças no ambiente digital. *Revista de Direito Público. Dossiê – Inteligência artificial, ética e epistemologia*. Brasília, Volume 18, n. 100, 245-271, oct./dec. 2021, 262.

³⁴ Henriques, Isabella Vieira Machado, and Inês Vitorino Sampaio. Discriminação algorítmica e inclusão em sistemas de inteligência artificial - uma reflexão sob a ótica dos direitos das crianças no ambiente digital. *Revista de Direito Público. Dossiê – Inteligência artificial, ética e epistemologia*. Brasília, Volume 18, n. 100, 245-271, oct./dec. 2021, 262-263.

interest that must always prevail”³⁵. The best interest of the child, then, must be the guideline that guides all AI development aimed at children.

II. THE IMPACT OF ARTIFICIAL INTELLIGENCE IN CHILDHOOD

The impacts of AI on childhood are reflected in several areas. Guilherme Calmon, for example, defends the feasibility of artificial intelligence being used for the purpose of adopting children and adolescents, notably in light of the public records of children and adolescents in a position to be adopted and the records of applicants for adoption (arts. 50 and 197-A to 197-F, of the ECA), currently concentrated in the National Adoption and Reception System – SNA³⁶. The idea behind this is that the algorithms would be able to more accurately predict the compatibility between the two ends - adopting adults and adopted children (or adolescents) -, potentially reducing adoptee “return” rates³⁷.

The author considers that it would be possible to insert a similar algorithmic technology in the adoption process in Brazil, provided that three main points are fundamentally considered: (i) the possibility of overcoming the chronological criterion; (ii) the need to impose absolute variables in the programming of the algorithm, such as age, ethnicity and simultaneous adoption; and, finally, (iii) the imperative need for human participation in the process of analyzing the compatibility results indicated by the algorithms³⁸.

In the United States of America, the case of the Family-Match³⁹ program became known, which claims that it “makes it easier for loving families to adopt or raise children”, since its data “allows it to discover and match compatible families and children, which increases positioning stability and achieves better results for everyone”⁴⁰. The data that the platform collects

³⁵ Henriques, Isabella Vieira Machado, and Inês Vitorino Sampaio. Discriminação algorítmica e inclusão em sistemas de inteligência artificial - uma reflexão sob a ótica dos direitos das crianças no ambiente digital. *Revista de Direito Público. Dossiê – Inteligência artificial, ética e epistemologia*. Brasília, Volume 18, n. 100, 245-271, oct./dec. 2021, 262-263.

³⁶ Gama, Guilherme Calmon Nogueira da. Direito e processos digitais, algoritmos e adoções: análise preditiva e proteção às crianças e adolescentes. *GENJurídico.com.br*. Available at: <http://genjuridico.com.br/2021/01/05/inteligencia-artificial-adocao/>

³⁷ Gama, Guilherme Calmon Nogueira da. Direito e processos digitais, algoritmos e adoções: análise preditiva e proteção às crianças e adolescentes. *GENJurídico.com.br*. Available at: <http://genjuridico.com.br/2021/01/05/inteligencia-artificial-adocao/>

³⁸ Gama, Guilherme Calmon Nogueira da. Direito e processos digitais, algoritmos e adoções: análise preditiva e proteção às crianças e adolescentes. *GENJurídico.com.br*. Available at: <http://genjuridico.com.br/2021/01/05/inteligencia-artificial-adocao/>

³⁹ Family Match. Available in: <https://www.family-match.org/>.

⁴⁰ Gama, Guilherme Calmon Nogueira da. Direito e processos digitais, algoritmos e adoções: análise preditiva e proteção às crianças e adolescentes. *GENJurídico.com.br*.

“both from the family and from the child informs a family compatibility and helps the greatest number of families to provide stability and permanence for the children”⁴¹:

That is, what the platform tries to do is predict compatibility with greater accuracy, in order to facilitate “matches” between applicants for adoption and children and adolescents. It is important to emphasize, however, that the platform only provides human data, usually social workers, who will analyze their results so that, with this, they can seek rapprochement between the parties in the adoption process⁴².

Furthermore, there are already studies that support the possibility of deploying AI as a means of supporting guardianship counselors in making their decisions⁴³. On the other hand, it is also important to highlight the connected toys, which are toys connected to the internet that can interact with each other through data sharing. Thus, the name internet of toys is the set of toys with artificial intelligence and connected to the internet, capable of producing personalized responses to children and a direct interaction with the user⁴⁴.

In 2015, the company Mattel began to market a doll called Hello Barbie, which would be able to interact with children. However, the activist group Campaign for a Commercial Free Childhood accused the toy of transferring data from children's voices to the company's partners, called ToyTalk⁴⁵. It was also found that, when connected to the internet, the doll was vulnerable to attacks and access to information, from which it would also be possible to take over the Wi-Fi network and, from then on, gain access to other connected devices.

In addition, in early 2017, the German Federal Network Agency warned

Available at: <http://genjuridico.com.br/2021/01/05/inteligencia-artificial-adocao/>

⁴¹ Gama, Guilherme Calmon Nogueira da. Direito e processos digitais, algoritmos e adoções: análise preditiva e proteção às crianças e adolescentes. *GENJuridico.com.br*. Available at: <http://genjuridico.com.br/2021/01/05/inteligencia-artificial-adocao/>

⁴² Gama, Guilherme Calmon Nogueira da. Direito e processos digitais, algoritmos e adoções: análise preditiva e proteção às crianças e adolescentes. *GENJuridico.com.br*. Available at: <http://genjuridico.com.br/2021/01/05/inteligencia-artificial-adocao/>

⁴³ Barros, Juliana C. do R., Martine D. Medeiros, Ana Paula de A. Lopes, and Rodrigo S. González. *O uso de aplicativos de inteligência artificial no apoio aos conselhos tutelares*. Available at: https://www.lume.ufrgs.br/bitstream/handle/10183/82908/Resumo_20020854.pdf

⁴⁴ Piazza, Marina Silveira de Freitas, and Loyana Christian de Lima Tomaz. Connected toys: aportes sobre proteção de dados de crianças em abandono digital. *Revista Jurídica Luso-Brasileira*, Ano 8, 2022, 1200.

⁴⁵ Fair Play For Kids. *Child advocates mobilize to stop Mattel's Eavesdropping "Hello Barbie"*. Available at: <https://fairplayforkids.org/child-advocates-mobilize-stop-mattels-eavesdropping-hello-barbie/>.

parents about probable problems regarding the privacy and security of an interactive doll called Cayla, recommending its deactivation. This is because it was found that the toy could be accessed by someone who was using the same internet network, being able, through it, to dialogue with the child user⁴⁶.

In addition, Amazon launched in 2018 Echo Dot Kids, a kind of virtual child assistant, which would be able to choose songs and formulate responses and stories for children. However, it was observed that the device was storing the children's voices without parental authorization, even if the audio was deleted by the parents. Consequently, Amazon was sued for injuring the privacy and safety of the children involved⁴⁷.

Countless situations of algorithmic discrimination have been verified in relation to children, such as in the case of the facial recognition system in Buenos Aires with a focus on public safety, whose alleged that the youngest offender identified, cited for crimes of serious injury to persons, would be less than four years⁴⁸. Furthermore, facial recognition systems, even under ideal laboratory conditions, are considered even worse for dealing with children, precisely because they are trained and tested, for the most part, on adults⁴⁹.

Also noteworthy is the case involving Instagram, which was accused of boosting body pattern content to give rise to psychological damage and mental health in adolescents⁵⁰, a phase in which are developed brain capacities relevant to human personality, evidencing the condition of vulnerability.

Within this context, there are possibilities of collisions between the right of children and adolescents to access technology, in confrontation with the dignity of the human person and full protection. In fact, invaders can use these

⁴⁶ Gazeta Online. *Agência alemã alerta que boneca pode ser usada para espionar crianças*. Available at: <https://www.gazetaonline.com.br/noticias/mundo/2017/02/agencia-alema-alerta-que-boneca-pode-ser-usada-para-espionar-criancas-1014026030.html>.

⁴⁷ Canal Tech. *Amazon é processada por gravar vozes de crianças com o dispositivo Echo Dot Kids*. Available at: <https://canaltech.com.br/casa-conectada/amazon-e-processada-por-gravar-vozes-de-criancas-com-o-dispositivo-echo-dot-kids-141865/>.

⁴⁸ Henriques, Isabella Vieira Machado, and Inês Vitorino Sampaio. Discriminação algorítmica e inclusão em sistemas de inteligência artificial - uma reflexão sob a ótica dos direitos das crianças no ambiente digital. *Revista de Direito Público. Dossiê – Inteligência artificial, ética e epistemologia*. Brasília, Volume 18, n. 100, 245-271, oct./dec. 2021, 255.

⁴⁹ Henriques, Isabella Vieira Machado, and Inês Vitorino Sampaio. Discriminação algorítmica e inclusão em sistemas de inteligência artificial - uma reflexão sob a ótica dos direitos das crianças no ambiente digital. *Revista de Direito Público. Dossiê – Inteligência artificial, ética e epistemologia*. Brasília, Volume 18, n. 100, 245-271, oct./dec. 2021, 255.

⁵⁰ The Wall Street Journal. *Facebook knows Instagram is toxic for teen girls, company documents show*. Available at: <https://www.wsj.com/articles/facebook-knows-instagram-is-toxic-for-teen-girls-company-documents-show-11631620739>.

instruments as a means of accessing the infant, without intermediation or parental supervision. There is also a risk that the toy will send data without parental consent and the risk of using advertisements.

The issue of digital abandonment also arises. It is understood that digital abandonment is negligence, that is, absence of the legal duty of care and vigilance of parents or guardians regarding the safety and privacy of their children and adolescents, in the virtual universe⁵¹. Considering that digital abandonment is a kind of parental negligence, it appears that such abandonment violates article 5 of the Statute of the Child and Adolescent⁵², resulting in punishments for those who are negligent with children by action or omission⁵³.

This concern is also relevant when we observe that injuries perpetrated in the digital environment usually last much longer than those that once occurred in analogue media⁵⁴. In this point,

(...) it is noted that the injury practiced virtually has the capacity to produce effects – damage, therefore – for a long period due to the mentioned space-time detachment provided by the network. Thus, the same damage to honor practiced virtually through the publication of defamatory text on the internet can generate various damages, both pecuniary and non-pecuniary, throughout the entire period that the harmful content is available for access to internet users, if the temporal removal is verified of the damage in relation to the initial injury to the legal honor⁵⁵.

Nor can one ignore the possibility that AI systems are at the service of children's rights, helping them in the development of their personality. The algorithms themselves, by the way, can be used to detect and combat cases of discrimination – as in the case of the Unicef chatbot created to face

⁵¹ Piazza, Marina Silveira de Freitas, and Loyana Christian de Lima Tomaz. Connected toys: aportes sobre proteção de dados de crianças em abandono digital. *Revista Jurídica Luso-Brasileira*, Ano 8, 2022, 1198-1199.

⁵² “Art. 5th. No child or adolescent shall be subject to any form of negligence, discrimination, exploitation, violence, cruelty and oppression, any attack, by action or omission, against their fundamental rights being punished under the law”.

⁵³ Piazza, Marina Silveira de Freitas, and Loyana Christian de Lima Tomaz. Connected toys: aportes sobre proteção de dados de crianças em abandono digital. *Revista Jurídica Luso-Brasileira*, Ano 8, 2022, 1198-1199.

⁵⁴ Buarque, Gabriela, and Tâmara Moura. Crianças na contemporaneidade: um diálogo sobre a concepção de infância e o uso intensivo das plataformas digitais. In: *Transformações do Direito na contemporaneidade*. (edited by Ariane Ferreira Ferro et al.). Andradina: Meraki, 2021, 137.

⁵⁵ Monteiro Filho, Carlos Edison do Rêgo, and Gustavo Souza de Azevedo. A lesão continuada decorrente de publicação em mídia digital. In: *Direito Civil e Tecnologia: Tomo II* (edited by Marcos Ehrhardt Jr. et al.). Belo Horizonte: Fórum, 2021, 400.

discrimination against Venezuelan children in Brazil⁵⁶. Likewise, the case of the autistic child who developed language skills by talking to Siri, Apple's virtual assistant⁵⁷.

In this panorama, assumes prominence the discussion about the measures that can be taken so that the risks involved are properly eliminated or mitigated, in order to preserve the development of the infant personality.

III. RECOMMENDATIONS AND RISK MITIGATION

The Policy Guidance on AI for children is a policy guideline developed by UNICEF that aims to promote children's rights in AI policy and practice in government and the private sector, as well as raise awareness of artificial intelligence⁵⁸. To this end, UNICEF sought input from interested parties or from those who are working in areas related to the fields of AI and children's rights, in a multisectoral perspective.

Based on the Convention on the Rights of the Child, the document presents some requirements for achieving a child-centered AI: 1) supporting the development and well-being of children; 2) ensure inclusion of and for children; 3) prioritize justice and non-discrimination; 4) protect data and privacy; 5) ensure safety; 6) provide transparency, explainability and accountability for children; 7) empowering governments and companies with AI knowledge of children's rights; 8) prepare children for present and future development in AI; 9) create an enabling environment.

In the same context, Instituto Alana is a non-profit Brazilian civil society organization that invests in programs that seek to guarantee conditions for the full experience of childhood. At this point, Instituto Alana, through the *Criança e Consumo* program, sent a contribution to UNICEF's public consultation for the construction of the Policy Guide on AI for Children⁵⁹. The document was developed to promote the rights of children and adolescents in the face of AI policies and practices, raising awareness of the need for an inclusive technology.

One of the three main guidelines of this document is that AI policies and

⁵⁶ UNICEF. *Policy Guidance on AI for Children*. Available at: <https://www.unicef.org/globalinsight/reports/policy-guidance-ai-children>.

⁵⁷ GZH. *Como Siri, assistente virtual da Apple, se tornou a melhor amiga de uma criança autista*. Available at: <https://gauchazh.clicrbs.com.br/saude/vida/noticia/2014/10/Como-Siri-assistente-virtual-da-Apple-se-tornou-a-melhor-amiga-de-uma-crianca-autista-4630628.html>.

⁵⁸ UNICEF. *Policy Guidance on AI for Children*. Available at: <https://www.unicef.org/globalinsight/reports/policy-guidance-ai-children>.

⁵⁹ Criança e Consumo. *Inteligência artificial centrada nos direitos das crianças*. Available at: <https://criancaeconsumo.org.br/noticias/inteligencia-artificial-direitos-das-criancas/>.

systems must aim to protect children, above any commercial interests. At this point, it is argued about the end of the use of AI to collect personal data from children and adolescents in order to target them with micro-segmented advertising, which is advertising based on the user's profile.

In addition, the document talks about the right to disconnect, with respect and encouragement for moments of pause in the use of technologies being essential for the well-being of the child⁶⁰. This becomes relevant when we realize that part of the AI systems used in the digital environment are made with persuasive design that prevails in platforms and applications used by children and adolescents to keep them attached to screens, interfering with development, the right to culture and the right to leisure outside the virtual environment. It is, therefore, about encouraging the development of AI systems that facilitate children's access to offline spaces, as well as encourage them to take breaks during use, balancing with everyday experiences in the city and nature.

There is also an argument for safety in all children's interactions with AI, so that systems that may impact them must respect children's rights with absolute priority. In another north, in art. 14 of the *Lei Geral de Proteção de Dados Pessoais* states that at least one parent or legal guardian must provide specific consent for the processing of child data.

The interaction of toys with children is often guided by algorithms that need to have a minimum degree of transparency, in addition to respecting the legal precepts for the protection of children and adolescents as vulnerable and developing subjects of law. The role of parents in this context should also be reflected, so that there is a balance between monitoring and children's privacy.

It is essential to understand the impact of AI on childhood, mapping public policy initiatives, regulatory frameworks, enforcement apparatus and educational efforts. Another tool that can be useful in controlling systems is the artificial intelligence impact assessment, characterized by being a document that evaluates, documents and accounts for the characteristics and impact of systems that may pose a risk to fundamental rights.

In this context, UNICEF proposed an AI development canvas for children, a tool that supports the design and structuring of applications for developers, summarizing the important factors in this process⁶¹:

⁶⁰ Criança e Consumo. *Inteligência artificial centrada nos direitos das crianças*. Available at: <https://criancaeconsumo.org.br/noticias/inteligencia-artificial-direitos-das-criancas/>.

⁶¹ UNICEF. *Tools to operationalize the UNICEF policy guidance on AI for children*. Available at: <https://www.unicef.org/globalinsight/media/1166/file/UNICEF-Global-Insight-tools-to-operationalize-AI-policy-guidance-2020.pdf>.

TABLE 1- Tools to operationalize UNICEF's policy guidance on AI for children⁶²

OBJECTIVE/MOTIVATION Brief description of the project		
Impact on children: 1. How are children impacted? (directly or indirectly) 2. Who is responsible for the impact of the AI system on children?	Values/principles: 1. What children's rights, human values and ethical principles are respected or put at risk? 2. Did you perform an ethics review? How? 3. Did you follow any specific AI guidelines? What? Why not?	Regulation: 1. What laws/regulations apply to the use of the AI system?
DESIGN REQUIREMENTS		
Positive effects on children: 1. What are the positive effects for children? (e.g. education, health, entertainment) 2. Are you measuring and communicating positive impact? How?	Negative effects on children: 1. Could children be negatively affected by this project? If yes, how? 2. How are limitations and risks handled and communicated?	Child development and well-being: 1. Is the project specific to a particular age or developmental group? If not, can it be more tailored to the target group? 2. How does the project contribute to the defense of children's rights? 3. Does the project support the Sustainable Development Goals? Which?
Data protection and privacy: 1. What data is used? 2. How is it collected, managed and protected? How is children's privacy protected? 3. Can users opt out of	Fairness/non-discrimination: 1. How do you mitigate any harmful bias? 2. What definitions (techniques) of justice do you use and what is their motivation?	Transparency: 1. How open can you be about this project? Could you publish your methodology, metadata, datasets, code or impact measurements? 2. Will you post your actions and responses on this screen openly?

⁶² UNICEF. *Tools to operationalize the UNICEF policy guidance on AI for children*. Available at: <https://www.unicef.org/globalinsight/media/1166/file/UNICEF-Global-Insight-tools-to-operationalize-AI-policy-guidance-2020.pdf>.

using their data?	3. How are you ensuring that all children can benefit from the project? 4. Have you considered actions to raise awareness of this issue?	
Liability and reparation: 1. Are there accountability and redress mechanisms? 2. Are children able, encouraged and supported to express their concerns and complaints about the system?	Security: 1. What child safety mechanisms are there? 2. Have you tested the system with child users?	Inclusion: 1. How inclusive and diverse is the composition of the development team? Is it multidisciplinary? 2. Can others, and in particular children, participate and comment on your project?
Explanation: 1. Is it clear to children that the system uses AI and how? If yes, how do you know it? 2. Can the system provide explanations understandable by children?	Conscious Users: 1. Are you empowering children to be conscious and critical digital users? As?	Prepare for the future: 1. Are you empowering children as future AI users/developers/leaders? As?

Source: UNICEF

The analysis of these factors must be documented to assess the impact that the technology can have on the community, helping to understand and mitigate the risks involved. UNICEF analyzed twenty national AI strategies and found that most make only cursory mention of children and their specific needs⁶³. In this context, the Brazilian Artificial Intelligence Strategy points out that:

(...) it was found that most AI policies and strategies in different countries do not bring adequate focus to children's rights and needs in their actions. It remains a challenge to develop global policy guidance – aimed at governments and industry – to determine how best to use AI systems for child development and how children can be prioritized in AI systems. During the childhood and adolescence cycle, it is important to ensure listening processes about the impact of AI on their development and,

⁶³ Penagos, Melanie. *UNICEF: What do national AI strategies say about children?* Available at: <https://www.unicef.org/globalinsight/stories/what-do-national-ai-strategies-say-about-children>.

respecting the abilities of each stage of life, to balance protection with participation, whether in a playful way in childhood or through dialogue in adolescence. In addition to the need to educate children and adolescents, it is also essential to contribute to the education of parents, guardians and educators so that they have a minimum of digital knowledge to be able to function properly in digital life, guiding and supporting children and adolescents. Countries that have already achieved excellence in digital education have implemented digital education across the entire school curriculum, including young people of all school ages. It is also important to point out that AI can and should also be used as an auxiliary tool for education, in the most different areas of knowledge, from human sciences to natural sciences. However, the use of AI as a mechanism for monitoring children and adolescents should be avoided, given the sensitivity of this group of individuals⁶⁴.

Therefore, in addition to government participation, it is worth underlining the relevance of encouraging parents or guardians to learn the basic concepts of AI systems and their respective impacts on childhood, also developing a critical perspective on the massive use of data and the hyperexposure of child, which includes the active participation of spaces such as schools and organizations in this process.

This concern also extends to the private sector, with emphasis on the preparation of impact assessments at this point. Furthermore, Instagram, for example, has launched measures involving: the ban on sending direct messages between teenagers and adults who are not followed on the social network; encouraging young people to keep their accounts private; the smaller appearance of teenagers in the “suggested users” tabs; sending alert notifications when adults engage in suspicious behavior; and the development of artificial intelligence systems in order to detect the real identity of users who register⁶⁵.

In addition, children's participation in the development of AI systems that can impact them is desirable. The challenge, however, is to create mechanisms that ensure “this process of listening from the design of AI systems to their implementation and evaluation process. It is about

⁶⁴ Brazil. Ministério da Ciência, Tecnologia e Inovações Secretaria de Empreendedorismo e Inovação. *Estratégia Brasileira de Inteligência Artificial*. Available at: https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/transformacaodigital/arquivosinteligenciaartificial/ia_estrategia_documento_referencia_4-979_2021.pdf

⁶⁵ Buarque, Gabriela, and Tâmara Moura. Crianças na contemporaneidade: um diálogo sobre a concepção de infância e o uso intensivo das plataformas digitais. In: *Transformações do Direito na contemporaneidade*. (edited by Ariane Ferreira Ferro et al.). Andradina: Meraki, 2021, 137.

conceiving, in ethical terms, the parameters of this participation process, including the definition of public access protocols”⁶⁶.

In the field of technologies that make use of the internet, it is believed that dialogue and non-judgmental listening are still the most effective tools to learn from children what activities they do online, since children need the mediation of older generations to decode the information they receive, under penalty of sanctioning cyberbullying practices, misuse of data, child pornography, sharing and abusive child advertising⁶⁷.

In this context, although AI is a relevant innovation factor, it can also present risks, especially for vulnerable groups. In this way, AI policies, strategies and guidelines should avoid superficial approaches, striving for comprehensive, effective and multisectoral protection, aware that such guidelines are always starting points that must be constantly updated and enriched.

FINAL CONSIDERATIONS

When we think about children a few decades ago, we see that their lifestyle is not the same as that of contemporary children. The contemporary child presents a development linked to the use of digital technologies, a factor that was also boosted after the advent of the COVID-19 pandemic. Although the use of such technologies is also a sociability factor, it is essential to observe the risks involved, ranging from privacy, data protection, freedom of expression, access to culture and, to a more severe degree, integrity, mental and even physical.

Multisectoral guardianship in these cases is an extremely relevant factor so that the child can have his best interest protected, also counting on the preparation of impact assessments. At this point, it is a question of instructing parents, the private sector, civil society and the State so that, together, they can deal with the idea of intensive use of digital platforms by children, especially artificial intelligence, considering the risks involved in machine learning.

In this field, credible AI should, at a minimum, support the development and well-being of children, ensure inclusion, safety and non-discrimination, protect data and privacy, and provide transparency and explainability. In this

⁶⁶ Henriques, Isabella Vieira Machado, and Inês Vitorino Sampaio. Discriminação algorítmica e inclusão em sistemas de inteligência artificial - uma reflexão sob a ótica dos direitos das crianças no ambiente digital. *Revista de Direito Público. Dossiê – Inteligência artificial, ética e epistemologia*. Brasília, Volume 18, n. 100, 245-271, oct./dec. 2021, 265.

⁶⁷ Buarque, Gabriela, and Tâmara Moura. Crianças na contemporaneidade: um diálogo sobre a concepção de infância e o uso intensivo das plataformas digitais. In: *Transformações do Direito na contemporaneidade*. (edited by Ariane Ferreira Ferro et al.). Andradina: Meraki, 2021, 145.

way, AI systems must aim at the best interest of the child, above commercial interests. They must also consider the need to disconnect, which is essential for physical and mental well-being.

Such goals may not be easy, but they are absolutely necessary for developing inclusive AI. Therefore, multisectoral management is essential, in which all institutions and technological sectors work in their respective spheres in order to ensure the best interests of the child, from a precautionary perspective of risk management.

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