pensar
Revista de Ciências Jurídicas
e-ISSN: 2317-2150
Universidade de Fortaleza

The emancipating role of Law in a context of abyssal lines and algorithms*

O Papel Emacipador do Direito em um contesto de linhas abissais e algoritmos

Dirceu Pereira Siqueira**
Fausto Santos de Morais***
Lucimara Plaza Tena****

Resumo

O marco histórico do presente estudo é o da Sociedade da Informação (Sociedade 4.0), que se forma e se fundamenta a partir de dados. O objetivo do artigo é analisar a ação dos algoritmos quando se comportam como armas matemáticas de destruição, as consequências dessa ferramenta e possíveis alternativas para reduzir o seu impacto na sociedade e nas vidas humanas, o que justifica o referencial teórico escolhido, qual seja: Boaventura de Sousa Santos (2007) e Cathy O' Neil (2016). O método utilizado é o hipotético-dedutivo o qual questiona se o Direito é capaz de exercer papel emancipatório em prol do desenvolvimento dos direitos da personalidade diante da manipulação dos algoritmos. A conclusão mostra que é possível ao Direito ser agente transformador na Sociedade da Informação produzindo e fortalecendo a regulação adequada dessa ferramenta de Inteligência Artificial. A metodologia empregada é a revisão bibliográfica.
Palavras-chave: Armas atemáticas de Ddestruição. Algoritmos. Direitos da ersonalidade. Inteligência Aartificial. Vulnerabilidades.

Abstract

The historical landmark of this study is that of the Information Society (Society 4.0), which is formed and based on data. The objective of the article is to analyze the action of the algorithms when they behave as mathematical weapons of destruction, the consequences of this tool, and possible alternatives to reduce its impact on society and human lives, which justifies the chosen theoretical framework, namely, Boaventura de Sousa Santos and Cathy O 'Neil. The method used is the hypothetical-deductive method, which questions whether Law is capable of exercising an emancipatory role in favor of the development of Rights of the Personality in the face of manipulation of algorithms. The conclusion shows that Law can be a transforming agent in the Information Society, producing and strengthening the proper regulation of this Artificial Intelligence tool. The methodology used is the bibliographic review.
Keywords: Mathematical Weapons of Destruction. Algoritms. Rights of the Personality. Artificial Intelligence; Vulnerabilities.

---

* Artigo traduzido por Inteligência Artificial.

** Pós-doutor em Direito pela Faculdade de Direito da Universidade de Coimbra (Portugal); Doutor e Mestre em Direito Constitucional pelo Centro de Pós-Graduação da ITE/Bauru – SP; Professor Permanente do Programa Pós-raduação em Ciências Jurídicas – Mestrado em Direito no Centro Universitário de Maringá/PR - UniCesumar; Professor nos Cursos de Graduação em Direito no Centro Universitário de Araraquara – UNIARA; no Centro Universitário de Bebedouro – UNIFAFIBE e na Faculdade Barretos – FB; Advogado. E-mail: dpsiqueira@uol.com.br. Lattes: http://lattes.cnpq.br/3134794995883683 e Orcid: https://orcid.org/0000-0001-9073-7759

*** Doutor em Direito (UNISINOS), Docente da Escola de Direito e do PPGD da Faculdade Meridional - IMED, Editor Chefe da Revista Brasileira de Direito (RBD) e da Revista Brasileira de Inteligência Artificial e Direito (RBIAD), Fundador da Associação Ibero Americana de Direito e Inteligência Artificial (AID-IA), pesquisador com fomento da Fundação Meridional, Advogado. E-mail: faustosmorais@gmail.com. Lattes: http://lattes.cnpq.br/2028518764749733 e Orcid: https://orcid.org/0000-0002-4648-2418.

**** Doutoranda em Direito pela Universidade Cesumar (UniCesumar) de Maringá – Unicesumar (2019-2022). Bolsista em período integral PROSUP/CAPES pelo Programa de Pós-Graduação, sob a orientação do Prof. Dr. Dirceu Pereira Siqueira. Mestra em Ciências Jurídicas pelo Programa de Mestrado em Ciências Jurídicas pela Universidade Cesumar (UniCesumar) (2015); Especialista em Direito Aplicado pela Escola da Magistratura do Paraná (EMAP); Graduada em Direito (1999) e Administração (1994), ambos pela Universidade Estadual de Maringá (UEM). E-mail: lucimaraplazatena@gmail.com. Lattes: http://lattes.cnpq.br/0452242712842724 e Orcid: https://orcid.org/0000-0002-5448-3808.

1 Introduction

The current period that produces the Information Society is recognized as that of the 4th Industrial Revolution (Society 4.0). Like the previous ones that succeeded it, this moment offers a challenge: how to deal with technological development and its advancement, in such a way that it is possible to harvest good fruits for the sake of human evolution? In this sense, the article wants to demonstrate that in the great umbrella of Artificial Intelligence (AI), there is still a human person, who, although wrapped in algorithms, *Big Data*, *cloud*, remains a unique, unreplicable, irreplaceable being.

It happens that this individual full of attributes has shown himself to be increasingly vulnerable in the face of the Information Society, which is strengthened from the elements that make up human individuality. It is the portrait of a nefarious, opaque and intangible domain to human eyes.

The study is based on two theoretical references, namely, Boaventura de Sousa Santos (2007), based on the text *Beyond Abyssal Thinking* and Cathy O'Neil (2016), *Weapons of Mathematical Destruction*[1]. The objective is to demonstrate that the inappropriate use of technology, especially algorithms, enhances the fragility of those who are already at risk and contributes to so many others being thrown into this circle.

The method used is the hypothetical-deductive one, which questions whether the Law is capable of playing an emancipatory role in favor of the development of personality rights in the face of the manipulation of algorithms. In a society in which individuality itself runs the risk of being lost, the relevance of the work lies in questioning the technological status quo and how the Law can contribute to the free development of personality and thus avoid a setback in terms of protection of the person.

In the final considerations, the authors conclude that it is possible for Law to be a transforming agent in the Information Society, producing and strengthening the appropriate regulation of this AI tool. The study presents some suggestions, which also justifies its importance for the scientific community and society. The methodology used is the bibliographic review.

The work is divided into five main topics after the introduction: What to expect from the theoretical frameworks in the context of the 4th Industrial Revolution; The use of mathematical weapons of destruction (WMD) and the consequences on the other side of the abyssal line;

[1] O'Neil (2016). Original title: *Weapons of Math Destruction (WMD).*

Reflections on personality development; How to Disarm WMD 's and Rescue Individuals and Final Considerations.

2 The importance of theoretical frameworks in the context of the information society

Year 2020. Another pandemic emerges to be faced (Paho/Who Brazil, 2020)[2]. This time the scale was expanded and reached all the ends of the earth. The presence of Covid-19 has been globalized and has killed poor and rich. Obviously, poorer, especially in countries that did not have a public and free protection network, one of the basic rights of personality, which is health.

Since December 2019, when the Covid-19 disease theoretically emerged, governments and the private sector have captured and accumulated all possible personal data to face the recent evil of the century (this may be one of the good justifications). The information generated from this data is like docile lambs to feed the hunger of hungry wolves. Who got sick or died? Who received food donation? Who took out loans to pay for medical treatments or hospitalizations? Who was left with sequelae? Who lost their job and received financial support/aid from the government? Who continued to work from home on a *Home office?* Who was excluded from the labor market? Who reinvented themselves? How many couples have separated? What is the percentage of aggression in homes? Who lost the house? Who can guarantee that he is still a human person in and for the Information Society?

The truth is that in dice games, well before the beginning of the Covid-19 pandemic, individuals were no longer recognized as persons, as subjects of rights. They were and continue to be seen and analyzed as small fragments of products or objects (data) played and collected on digital boards spread over the internet.

The first theoretical framework analyzed is that of Boaventura de Sousa Santos, *Beyond Abyssal Thinking – from global lines to an ecology of knowledge* (2007). Although the text was published in 2007, the reflection it produces is ideal for the present moment of technological revolution centered on Data Mining.

Santos (2007) comments that Western thinking is abysmal. It is a system of visible and invisible distinctions. He explains that "invisible distinctions divide social reality into two

[2] This is the sixth time that the PHEIC (Public Health Emergency of International Concern) has been declared in history. PHEIC is the World Health Organization's highest alert level, as outlined in the International Health Regulations. Humanity has been at risk before, such as in 2009 – the H1N1 pandemic; 2014 – international dissemination of Poliovirus; 2014 – Ebola outbreak in West Africa; 2016 – Zika virus and increase in cases of microcephaly and other congenital malformations; 2018 – Ebola outbreak in the Democratic Republic of Congo.

distinct universes: 'on this side of the line' and 'on the other side of the line'. The division is such that 'the other side of the line' disappears as reality [...]" (2007, p. 71) Thus, and, according to the author, it not only becomes non-existent, but becomes produced as non-existent, that is, "not existing under any relevant or understandable way of being" (2007, p. 71). In this way, what "is produced as non-existent is radically excluded because it remains outside the universe that the very conception of inclusion considers as the 'other'" (Santos, 2007, p. 71). For the purposes of this study, a theoretical approach was made to evaluate the implications generated by invisible distinctions.

The second theoretical framework used is based on the thought of Cathy O'Neill in the work *Weapons of Mathematical Destruction: how BigData increases inequality and amenaza democracy* (2016), [3]in which she denounces the use of algorithms as mathematical weapons of destruction (WMD), a pun on weapons of mass destruction. It is important to note that the original title of O'NEILL's work is *Weapons of Math Destruction: how Big Data increases inequality and threatens democracy*. The Portuguese version, launched in Brazil, was entitled Algorithms of Mass Destruction: how *Big Data* increases inequality and threatens democracy.

The challenge of the study is to bring together the two theoretical frameworks and the reflection generated by them, to identify the problems produced and intensified by the WMD's on the other side of the line, and then to elaborate a proposal based on the idea of Law as an instrument of social emancipation.

2.1 What to expect from theoretical frameworks in the context of the 4th Industrial Revolution

Society is continuously in transformation, which is not always accompanied by the sense of evolution, which perhaps would lead individuals to mutual respect and a better world. It is true that each stage experienced has brought with it progress, but it has also deepened inequalities between individuals and peoples. The revolution is characterized by a "profound or complete change" (Dicio, 2021), including customs. There is no doubt that a revolution was underway, but with the emergence of the Covid-19 pandemic, since the middle of 2019, the

[3]Some preliminary clarifications: 1) in the research for the elaboration of the article, the authors used the work of Cathy O'Neill in the Spanish version, which is inserted in the references; 2) O'Neill refers to algorithms as "weapons of mathematical destruction" (WMD). For the present study, the authors chose to use the English acronym chosen by the author herself in the original version, that is, WMD (*Weapons of Math Destruction*); 3) *Algorithms of Mass Destruction: How Big Data increases inequality and threatens democracy*: this was the translation of the title into Portuguese (Brazil).

transformations were accelerated and became evident to everyone. An example of this disruption was the need to implement distance learning for all.

Schwab comments that "revolutions have occurred when new technologies and new ways of perceiving the world trigger a profound change in social structures and economic systems" (2016, p. 18). It is necessary to indicate, even for academic purposes, which events and/or contexts had the strength to drive the changes in social contexts. Bioni clarifies that the historical milestone that separates each society is linked to the way it is structured (2020, p. 3).

In the history of humanity, four relevant moments can be characterized as revolutions due to the abrupt changes they caused. The first is identified as the one that generated agricultural society: the product of the land boosted the economy through the practice of barter (Bioni, 2020, p. 3).

> The first profound change in our way of living – the transition from foraging (the search for food) to agriculture – occurred about 10,000 years ago and was made possible by the domestication of animals. The agricultural revolution combined the power of animals and human beings for the benefit of production, transport and communication. Little by little, food production improved, spurring population growth and enabling ever-larger human settlements. This eventually led to urbanization and the emergence of cities. (Schwab, 2016, p.18).[4]

According to Schwab, the agricultural revolution was followed by several industrial revolutions from the middle of the eighteenth century onwards. There was "the transition from muscular strength to mechanical energy, which evolves to the present fourth industrial revolution, at which time human production is increased by means of the enhanced power of cognition." (Schwab, 2016, p.18).

Each of the revolutions that preceded the current one has peculiarities that made possible the emergence of this fourth revolution. The 1st Industrial Revolution (between 1760 and 1840) was generated "by the construction of railroads and the invention of the steam engine, which began mechanical production. The 2nd Industrial Revolution, which began at the end of the nineteenth century, entered the twentieth century and, through the advent of electricity and the assembly line, made mass production possible." (Schwab, 2016, p.18).

At the beginning of the 60s, the first traces of the 3rd Industrial Revolution, or Digital or Computer Revolution, begin to be drawn. This new historical moment was driven "by the development of semiconductors, of computing in *mainframe* (1960s), personal computing (1970s and 1980s) and the internet (1990s)." (Schwab, 2016, p.18).

[4] Diamond clarifies that "it is only in the last 11,000 years that some peoples have begun to engage in what we call food production: that is, the domestication of wild animals and the cultivation of plants, eating the flesh of cattle and what they harvested." (2020, p. 84).

Based on the digital revolution, the 4th Industrial Revolution emerged in the early 2000s and caused important ruptures in its predecessor, the 3rd Industrial Revolution. "It is characterized by a more ubiquitous and mobile internet, by smaller and more powerful sensors that have become cheaper, and by artificial intelligence and machine learning (or machine learning)." (Schwab, 2016, p.19). Thus, as the new revolution takes hold, it transforms society and the global economy. And although not all countries may be experiencing this scenario of evolution, it is certain that the global suffering as a result of Covid-19 would have been even more severe. The creation of vaccines in such a short space of time, for example, is a demonstration of the benefits that access to technology and data in quantity and speed is capable of producing.

That data is the new oil (Regulating, 2017) of the present is indisputable. With that in mind, we have to *Big Data* Companies have gained efficiencies at scale to capture and transform data into valuable information for those willing to pay. It turns out that these data fragments create profiles that do not always correspond to the person; they may be contaminated by the vision of the one who programmed the algorithm or the one who contracted its construction; in addition to having the power to exclude individuals from society without them being aware of the reason. In this way, therefore, giving personal data for individualized treatment has become a trap.

On the other hand, it is not possible to exclude oneself from a society that has information as a structuring element, even if one wants to. In this Covid-19 pandemic, for example, not being connected to the network was the equivalent of a ban: no classes *Online*without *home-office*without *Uber*, without telemedicine, without registration for emergency aid. Chaos!

But the pandemic also showed, in addition to lives lost, what is already something regrettable, another side of the Brazilian reality: people who could not remain in isolation due to the need to work; queues at Banco Caixa Econômica branches to receive emergency aid; individuals without identification documents; people without alcohol gel, running water, soap (items necessary for sanitization against Covid-19); food shortages and the loss of benefits and economic aid due to lack of official registration in government databases.

And speaking of these sides of society, it is opportune to understand Santos' definition by explaining that the other end of the line

> [...] it is a universe that extends beyond legality and illegality and beyond [*sic*] truth and falsehood. Together, these forms of radical negation produce a radical absence: the absence of humanity, modern subhumanity. Thus, exclusion becomes simultaneously radical and non-existent, since subhuman beings are not even considered candidates for social inclusion (the supposed exteriority on the other end

> of the line is actually the consequence of their belonging to abyssal thinking as a foundation and as a negation of the foundation). Modern humanity cannot be conceived without a modern subhumanity. The denial of one part of humanity is sacrificial, insofar as it constitutes the condition for the other part of humanity to affirm itself as universal (Santos, 2007, p. 76).

It is part of the course of history portraits of entire civilizations destroyed and enslaved by other stronger social groups. There has always been an element that has brought the possibility of maintaining the exploitation of peoples, of keeping them on the other side of the line. Nowadays, it is to technology that this power belongs. O'Neil says that data science can be used as a WMD and thus efficiently maintain individuals, as Santos identifies, on the other end of the line, in life imprisonment with no possibility of escape or defense.

The other side of the line "[...] it is a non-territory in legal and political terms, an unthinkable space for the rule of law, human rights and democracy" (Santos, 2007, p.76). Manifestations of this abyssal line are the "[...] sexual and racial discrimination, both in the public and private spheres: in the wild areas of megacities, in ghettos, in prisons, in forms of slavery, in the illegal trafficking of human organs, in child labor, in the exploitation of prostitution" (Santos, 2007, p. 76). All the examples reported by Santos can be enhanced or even constructed by WMD's and destroy the subject's life, career or identity.

> The fourth industrial revolution is not only changing what we do, but also who we are. The impact on us as individuals is manifold, affecting our identity and the many facets related to it—our sense of privacy, our notions of ownership, our patterns of consumption, the time we spend at work and play, how we develop our careers and cultivate our skills. It will influence the way we get to know people and cement our relationships, the hierarchies we depend on, our health, and perhaps, sooner than we think, it could lead to forms of human betterment that will make us question the very nature of human existence. (Schwab, 2016, p. 96)

The exclusions denounced by Santos, O'Neil or Schwab have always existed, however, with the current availability of technological tools, parity of arms is impossible. The fight is even more unequal and the opponent's reach power is scaled.

But, after all, what are these mathematical weapons of destruction (WMD)?

Well, we live in the age of algorithms. To facilitate understanding, eventually the dynamics of their operation can be compared to the execution of a cake recipe, however, if they are improperly manipulated, they are not innocent at all. In fact, a WMD "is an important, secretive, and destructive algorithm. Unfair to the individuals it evaluates" (O'Neil, 2018).

According to O'Neil, our lives are guided by mathematical models that in theory should lead to greater equality, since everyone would be subject to the same rule. But when it comes to a WMD, this does not occur, since the models used "*are opaque, not regulated and*

incontestable, including when they are mistaken" (2016, p. 2). They reinforce discrimination and prevent the individual from achieving rights such as health, education, work and housing, as specified, for example, in the Brazilian Constitution.

3 The use of mathematical weapons of destruction and the consequences on the other end of the line

Algorithms[5] are explained as "a sequence of steps to solve a problem or perform a task automatically, whether it has only a dozen lines of programming or millions of them stacked in a kind of virtual scroll" (Pierro, 2018). Erickson clarifies that "an algorithm is explicit, precise, unambiguous, mechanically executes a sequence of elementary instructions, usually intended to fulfill a purpose." (2019, p. 1 - free translation by the authors)[6]. In the same sense, Cesar Junior, completes the definition of algorithm and explains that "[...] it is the most fundamental concept that exists. It's like the atom in physics or DNA in biology, for example" (PESQUISA FAPESP, 2018). Cormen *et al.* describes that,

> An algorithm is any well-defined computational procedure that takes some value, or set of values, as input and produces some value, or set of values, as output. An algorithm is therefore a sequence of computational steps that transform the input into the output. We can also see an algorithm as a tool for solving a well-specified computational problem. The problem statement specifies in general terms the desired input/output ratio. The algorithm describes a specific computational procedure to achieve this input/output ratio.[7](Cormen *et al*, 2009, p. 5). [free translation by the authors].

O'Neil's look at the algorithm is that of someone who analyzes a living being and then describes it as "[...] a system of demographic profiles[8] generated from *Big Data*. It finds out if

[5] Christian and Griffiths explain that the origin of the word algorithm "comes from the name of the Persian mathematician al-Khwārizmī, author of a ninth-century book on techniques for doing mathematics by hand. (His book was entitled al-Jabr wa'l-Muqābala (Compendium on Calculus by Restoration and Balancing), and the "al-Jabr" in the title is in turn the source of our word "algebra.") However, the earliest known mathematical algorithms predate even the work of al-Khwārizmī: a 4,000-year-old Sumerian clay tablet found near Baghdad describes a scheme for a long division operation. (2017, p. 9).

[6] "An algorithm is an explicit, precise, unambiguous, mechanically-executable sequence of elementary instructions, usually intended to accomplish a specific purpose." (Erickson, 2019, p.1).

7 "Informally, an algorithm is any well-defined computational procedure that takes some value, or set of values, as input and produces some value, or set of values, as output. An algorithm is thus a sequence of computational steps that transform the input into the output. We can also view an algorithm as a tool for solving a well-specified computational problem. The statement of the problem specifies in general terms the desired input/output relationship. The algorithm describes a specific computational procedure for achieving that input/output relationship." (Cormen *et al.*, 2009, p.5).

[8] One cannot lose sight of the fact that O'Neil is analyzing algorithms under the dimension of mathematical weapons of destruction, so, in the context analyzed by the author, there is the creation of "a system of demographic profiles, generated from *Big Data".*

you are a paying customer or what are your possibilities to buy a house based on the clues you leave, such as your social class, your income, your race or ethnicity" (2018).

For an algorithm to be used as a WMD[9], three elements must be present to a greater or lesser degree for its characterization: opacity, scale, and damage. (O'Neil, 2016, p. 28)

When an algorithm is developed, decisions such as what should be included in it, which databases should be used, the correlations to be composed, which estimates of errors and successes are admitted in the model or where this limit would be, for example, are taken into account to make it understandable. It turns out that there may be blind spots, without any importance, or that reflect the points of view of their creator (ideologies), although theoretically they should behave as neutrals (O'Neil, 2016). In fact, they end up reflecting that "*nuestros propios valores y deseos influyen em nuestras elecciones, desde los datos que decided recopilar hasta las preguntas que hacemos. The models are opinions integrated in mathematics*" (O'Neil, 2016, p. 20).

So, although the system can be considered rational, there is a human who directs the process from his worldview or from the one who hired him, in order to meet a business model. It is not magic and there is no scientific authority behind them, although this discourse can be somewhat reinforced when it makes mistakes. When faced with a WMD, one of the questions that matters most is what the company that commissioned it wants to find (O'Neil, 2016). For example, why do certain organizations that claim to use AI tools for resume screening have such a small number of women, blacks, homosexuals, or foreigners on their staff? Or, still observing the examples brought by O'Neil in his book, why are people in vulnerable situations selected for certain vacancies who are more easily subjected to abusive work, not to say analogous to slavery?

Santos characterizes "[...] Western modernity as a paradigm founded on the tension between social regulation and emancipation" (2007, p. 72). According to the researcher, this distinction is visible and underlies modern conflicts. However, "[...] this distinction underlies another, invisible one, on which the previous one is founded: the distinction between metropolitan societies and colonial territories" (Santos, 2007, p. 72). Therefore, the dichotomy "regulation/emancipation" applies to metropolitan societies, while the dichotomy "appropriation/violence" applies to colonial territories (Santos, 2007, p. 72).

[9] The context of this study is to analyze algorithms from O'Neil's perspective, that is, their use as mathematical weapons of destruction in conjunction with Santos' thinking. It is important to emphasize that not every algorithm has the destination chosen by the author to expose in her book.

The WMD's take advantage of a social phenomenon and act calmly in the areas that Santos calls colonial territories, whose characteristic is appropriation and violence. For the author "[...] appropriation involves incorporation, co-optation and assimilation, while violence implies physical, material, cultural and human destruction" (2007, p. 75). And it is in this movement of the abyssal lines that Santos identifies the return of the colonial and the colonizer, accelerated by the WMD's.

> The return of the colonial is the abyssal response to what is perceived as a threatening intrusion of the colonial into metropolitan societies. This return takes three main forms: that of the terrorist, that of the *undocumented immigrant* and that of the refugee. In different ways, each of them carries with it the global abyssal line that defines radical exclusion and legal nonexistence. [...] The return of the colonial does not necessarily mean its physical presence in metropolitan societies. It is enough that you have a relevant connection with them. [...] In the case of the undocumented immigrant worker, it is enough that he or she is *underemployed* in one of the many hundreds of *sweatshops*, the manufactures subcontracted by multinational metropolitan corporations operating in the global south (Santos, 2007, p. 78). [g.n]

In the Information Society, the colonizer uses various technological tools in order to put into practice "appropriation/violence", and it is possible to identify WMD as a perfect instrument for this purpose.

The following is a synthesis of the three basic phases of building an algorithm. It is possible to see how subtly an innocent algorithm can turn into a weapon to serve the colonizer.

In the first step, the problem for which a solution is intended is identified. At this point, it is recommended that the data scientist work together with other expert professionals in the area in which the algorithm will be developed (Pierro, 2018). If what you want is to create a model that helps identify whether or not an individual is experiencing symptoms of depression based on their voice, it will be necessary, in addition to a database of voices, a team made up of professionals in the field of data science and mental health.

Jhonata Emerick Ramos, president of the Brazilian Association of Artificial Intelligence (ABRIA), commented on the development of two AI systems with potential for use in public policies. In one of them, the algorithm identifies depression by tone of voice and in another seeks to reduce the rate of recalls for new mammography exams, in view of the poor execution of the previous one (Brasil, 2019). It is easy to see that the data generated by the models can be used as WMD.

In the second step of building an algorithm, the sequence of steps is described in current language so that, in a third step, it is "translated into some programming language. Only then can the computer understand the commands – which can be simple orders, mathematical

operations and even algorithms within algorithms – all in a logical and precise sequence" (Pierro, 2018, p. 21).

The problem involving these mathematical models is the opacity that is perceived and understood by the general population. In the end, due to lack of technical knowledge of the subject or a tangible explanation for laymen, we end up not investigating the functioning of the algorithms that surround us. In addition, as already mentioned, there is an unconscious belief that leads individuals to accept the answers delivered by machines as true.

Because of this belief that the machine does not make mistakes, therefore it is fair, the researcher draws attention to the negative impact of algorithms on human lives, as weapons with invisible destructive power and directed preferentially to those on the other side of the line, the vulnerable (O'Neil, 2016).

WMD works from a scoring system. If the individual has a high score, according to the criteria of the algorithm, which the analyzed person is unaware of, he has an option, otherwise, the answer is negative, that is, he is denied credit, for example. In his book O'Neil mentions situations involving WMDs, which, at first glance, seem impossible to be happening without society having noticed. He comments that, for example, companies would be evaluating potential candidates for job vacancies, based on credit ratings, that is, those who pay their bills on time would be better able to comply with the company's rules. For the author, the decision method is unfair, since these scores are secret (O'Neil, 2016).

Within the scenario of the Covid-19 pandemic, the question is: what data will companies use to hire? What correlations will you make to include or eliminate a candidate? The fact that you are in debt with your bills? Is having already been contaminated a relevant factor? Depending on how the algorithms are developed, the individual is removed from the job market, and their profile, created by AI tools, will be compromised. Without the possibility of being hired for a paid activity, it is certain that he will continue to be indebted, unemployed and with the potential to join the army of the discouraged.

In this line of O'Neil's, Santos explains that the other side of the abyssal line "[...] it is a universe that extends beyond legality and illegality and beyond truth and falsehood. Together, these forms of radical negation produce a radical absence: the absence of humanity, modern subhumanity" (2007, p. 76), "which does not even admit that the individual becomes a candidate for social inclusion" (2007, p. 72).

In addition to opacity, that is, the lack of public transparency of their elaboration and execution processes, WMDs are also characterized by the ease with which they reach and

punish the poor. This selectivity of people happens, in part, according to the author, because WMDs are structured to "[...] *evaluate large groups of personas. They are specialized in working with large volumes, and are cockroaches. This is part of its attraction*" (O'Neil, 2016, p. 11). Moreover, it is unlikely that the candidate for the job will be able to question a WMD decision, which is practically unbreakable (O'Neil, 2016). But those who are on this side of the line, the rich, receive individualized treatment, are interviewed and analyzed by people and not machines, as occurs with the less favored (O'Neil, 2016).

4 Reflections on personality development

O'Neil's denunciation, in relation to the way companies that use the WMD's, brings with it a warning: human beings objectified in a mosaic (Madrid Conesa, 1984) of data, whose damage they suffer is nothing more than collateral effects of the tool (2016,). What's more, each time this process feeds back, it creates "mathematical prisons that prevent these individuals from accessing services, positions and opportunities. It affects mostly poor and middle-class citizens, thus generating a less democratic society" (Braga; Cardoso, 2016, p.96), unjust and pernicious.

Over the centuries, the recognition of the dignity of the human being has been sought. And in the year 2020, at the height of technological development, in the midst of a health crisis, when an infinite number of tools are available to improve society's quality of life, the predatory and unscrupulous fury of capital comes again.

Another complaint by O'Neil (2016) is the power of WMD's to regulate (command, define) the various market segments, such as banking and health, equating the laws created by the States. If the banking model classifies the individual as a high-risk customer, this information will be replicated and affect all aspects of the subject's life.

In an interview with *El País Newspaper* in 2018 (Menárguez, 2018), The researcher recalls a news article about the *Amazon* That would have a algorithm to select sexist employees. He reports that when news of this size comes to the public, there is a climate of surprise in companies, as well as in the technological community. However, for O'Neil, who is an expert on the subject, such a reaction is feigned, since there are discriminatory algorithms everywhere. He states that if this imperfection of the algorithms were admitted, the problem should be solved. However, if they act as if they know nothing "they can continue to spread this blind

faith in algorithms, which they don't really have, but they know the rest of the public does" (O'Neil, 2018). It is undoubtedly a lucrative conduct as long as it is possible to maintain it.

This situation of misuse of algorithms is observed in Santos' thinking from the "return of the colonizer", where there is a resurgence of colonial forms of government, and the one that stands out is idealized as a form of indirect government "[...] that emerges in various situations in which the state withdraws from social regulation and public services are privatized, so that non-state actors acquire control over the lives and well-being of vast populations" (2007, p. 80).

The fascination with technology cannot be an impediment for the State to fulfill its role as Guarantor (Supiot, 2007) of the search for a just and egalitarian society. The WMD's they create situations that incarcerate individuals and their losses/losses are side effects of mathematical arrangements. It is the growth of a parallel, cross-border power, concentrated in the hands of a few, without control and that not only competes with the legitimate power of the State, but surpasses it and even manipulates it.

This form of action in society is similar to what Santos denounces as a government of appropriation/violence, which he described as the "[...] rise of social fascism, a social regime of extremely unequal power relations, which grant the stronger party veto power over the life and way of life of the weaker party" (2007, p. 80).

So, this indirect government exercised from the WMD's by several authors, it has transformed the person into an object, available to meet the purposes that the contractor of these tools desires: buyer, public security, employment, loans with lower or higher rates, selected exclusions, education, religion, in short! In this objectification of the individual, the human being is analyzed *No* as a unique being, within a perspective of personality rights, but in comparison with other similar and categorized data.

O'Neil explains that the WMD's they analyze people through a huge amount of data and in seconds calculations are performed "[...] *About "Similar Persons to the Analyzed Individual". And if a sufficient number of these "similar" persons to the analyzed individual result in being a holgazanes or, incluso peor, delincuentes, this individual will be treated as a self-suffering person*" (2016, p. 117). The issue, according to the author, is not about the past behavior of people in comparison to the individual, but about the behavior of the individual himself, as a unique person.

Well, as the system feeds itself and it is not known for sure the paths that each person's personal data takes, at first there is not much to do. However, it is envisioned that an alternative

is to investigate how companies treat the data they receive and whether they are part of the input of the business model. If so, it is indisputable that the legislation needs to be adjusted.

In the case of Brazil, despite the advance of the General Data Protection Law (LGPD) in terms of protection of natural persons, the issue of the algorithm is not exactly treated from the perspective of WMD, but the law brings a relative level of protection:

> Article 20. The data subject has the right to request the review of decisions made solely on the basis of automated processing of personal data that affect his or her interests, including decisions aimed at defining his or her personal, professional, consumer and credit profile or aspects of his or her personality.
> Paragraph 1 - The controller shall provide, whenever requested, clear and adequate information regarding the criteria and procedures used for the automated decision, observing commercial and industrial secrets.
> Paragraph 2 - In case of failure to provide the information referred to in paragraph 1 of this article based on the observance of commercial and industrial secrets, the national authority may carry out an audit to verify discriminatory aspects in the automated processing of personal data (Brasil, 2018, s. p.).

Article 20 protects two rights that may be violated as a result of automated decisions, such as those involving algorithms, namely: the right to explanation and the right to review. Paragraph 1 of Article 20 contemplates the right to explanation: it must clarify to the data subject the criteria used by the *controller* for the processing of data. The right to review authorizes the holder to request the review of decisions that are only automated and that have an impact on his or her interests (Silva; Medeiros, 2019) and especially in the free development of their personality, since it violates fundamental rights and personality.

Despite this relative advance, transparency was still impaired, since the reviews of decisions continue to be automated, that is, there is no human review. The issue is controversial, but this was the position of President Jair Bolsonaro when he vetoed § 3 of Article 20 of the LGPD, which provided for review by an individual (Silva; Medeiros, 2019).

In any case, with regard to the WMD's it is necessary the strong presence of the State regulating, punishing, raising awareness and educating in order to reduce the damage to personality rights that such a weapon is capable of provoking. However, as the State is not always able to fulfill its role of protecting its citizens, the demands of civil society are a way of forcing regulations related to the protection of individuals and democracy.

Saints identifies a phenomenon that further impacts the lives of the vulnerable. The author comments that the global abyssal lines have never remained fixed, which means that at each historical moment their positions are fixed, watched and preserved. It turns out that in the last sixty years these lines have suffered shocks, and one of them, which has been happening since 1970, shows that the other side of the line seems to expand, while this side of the line seems to

shrink. It brings concern because "the logic of appropriation/violence begins to gain strength to the detriment of the logic of regulation/emancipation to such an extent that the latter's dominance not only shrinks but is also internally contaminated by the former" (2007, p. 77).

The violence of WMD's, is not limited to the violation of the right to privacy or personal data, in fact they influence the free development of personality, creating a profile that does not always correspond to reality and which does not enjoy legal protection, if it were equivalent to the real individual. A probable "regulation/emancipation", as Santos mentions, "is increasingly disfigured by the presence and growing pressure of 'appropriation/violence within it'" (2007, p. 79). The opacity of the WMD is one of the reasons why the regulation of algorithms has become so difficult, in addition to the return of the colonial that takes advantage of AI tools to maintain the dominance and exclusion of groups, in addition to control over our bodies, since it already controls our finances (O'NEIL, 2016).

5 How to disarm WMDs and rescue individuals

To disarm WMDs , it is first necessary to recognize them by their basic characteristics: opacity, scale, and damage (O'NEIL, 2016). There are algorithms built that do not meet such attributes and, therefore, despite recognizing the damage caused, they are not classified as WMD, according to the author's criterion, which is observed in this work, in view of the choice of the theoretical framework.

Regarding the particularities of WMDs, O'Neil points out that "*they are opaque, nadie las cuestiona, no dan ningún tipo de explicaciones y operan a escala que classificacan, tratan y «optimizan» a millones de personas*" (2016, p. 14). The existence of opaque and invisible models that shape people's lives is more common than transparent ones (O'Neil, 2016) and perhaps, for this reason, they are so profitable and efficient for companies and public authorities that use them. In one allegorical description they are wolves in sheep's clothing.

The lack of transparency or opacity of algorithms is a serious problem, difficult to be solved and that directly confronts the principle of informational self-determination present in the LGPD, General Data Protection Regulation (GDPR) and other foreign regulations.[10] It is the individual's right to know where their personal data is stored and how it is being processed. Data available in the hands of any company remains the property of the individual and not the

[10] The objective of the study does not envision delving into the peculiarities of algorithms in legislation. The focus is to address WMD and its effects on society, particularly on the most vulnerable groups.

other way around. Furthermore, it is up to the person, and only him, to decide who can have access to his data (O'Neil, 2016), which are an extension of his personality as an asset, in the sense of property rights, and as parts of his being, of his essence as a human person, even if captured in a fragmented way.

The crux of opacity is that it hides behind an algorithm that is already developed for this purpose. The companies that create WMD's "[...] *ends up sumergiéndose en conjuntos de datos without just regulation, such as the analysis of clicks on web pages and geolocation tags, with the purpose of creating a parallel data market*" and thus manage to escape State supervision (O'Neil, 2016, p. 116). These algorithms travel in a territory outside the law, historically called the colonial zone (Santos, 2007), where it is not possible to identify what is legal or not. It is basically on the other end of the line that WMDs identify their victims and create Guantánamos (Santos, 2007) to act freely.

It is true that in a very short time algorithms will also need regulation[11], but, for now, companies will not open their models, and it is common to justify that it is an industrial secret, an intellectual property. Algorithms like those of *Google*, *Amazon,* and *Facebook* are worth millions of dollars. O'Neil explains that WMDs are black boxes "[...] *And this makes it especially difficult to categorically contest the second question: ¿opera el modela en contra de los intereses del sujeto? En otras palabras, ¿es unfair? Do you destroy lives?*" (2016, p. 26). It is the logic of appropriation/violence mentioned by Santos.

With the tools currently available in AI, our footprints across the network, streets, cell phones, household appliances, or the Internet of Things (IoT) are invisibly and indiscriminately collected, often by default and stored in *Big Data* over which the data owners have no control. Individuals are classified as objects on shelves, depersonalized as humans and chosen for the various advertising campaigns, legitimate or not.

When data becomes input for WMDs , predatory advertising, for example, seeks to identify "[...] *A las personas con grandes necesidades y les venden promesas falsas o productos a precios excesivos. This type of publicity finds the inequality and a party is given to its coast*". The result is that social abysses continue and with them all injustices (O'Neil, 2016, p. 59).

The business model of companies that use algorithms as WMD they destroy the individual and consequently society, since they target people in economic, emotional or any other

[11] The 2016 U.S. presidential election was the first electoral process, according to the website *Olhar Digital,* to use the networks' algorithms to spread disinformation on a scale. In the 2020 presidential elections, social networks adopted a policy of moderation to contain excesses. In view of the lack of adequate regulation by the State, the private sector produced its self-regulation (Santino, 2020).

vulnerability. For O'Neil, these weaknesses have their weight in gold (2016, p. 60). Note that the logic of the system is enriched by the exploitation of the weaknesses of people or groups.

In view of the harmful effect of WMD's, wonders: where is the public power in the face of predatory practices that in the medium and long term have the power to blow up the public coffers, since it makes citizens increasingly dependent on the State. O'Neil states that the operations of these companies "[...] *they provoke inmensos y viles bucles de feedback and dejan a sus clientes buried under the mountains of deudas, and the victims do not intend to pu*" (2016, p. 59). The models of WMD benefit from habits, hopes, fears, and set standards for even more effective exploration (O'Neil, 2016, p. 63). All this happens on a scale and destruction follows the same rule.

In general, it is possible to observe the effort of countries to regulate data protection, but this is insufficient, because "[...] *algunas de las WMD más efectivas y perversas consiguen ingeniárselas para evitar esos obstacles*" (O'Neil, 2016, p. 69). And it is for this reason that the role of the Data Protection Authority is so important, as it exists in Brazil.

Well, once the damage that the WMD's provoked by the algorithm model that is created or even by the way the results are interpreted, it is necessary to use it in favor of humanity, after all, this is the initial promise of technology.

One of O'Neil's suggestions (2016) to disarm a WMD it is to establish a list of people who need help as a priority and to help them, instead of manipulating them in search of more capital. It is expected that companies will seek profit, but not at the cost of the destruction of human lives and the transfer of all the collateral effects of the predatory practice to the State, which will need more resources to serve the dispossessed population.

If the WMD's exclude individuals from health plans and insurances and choose to stay only with the healthy, the State will be responsible for taking care of the sick not accepted by the private initiative, raising its costs while the private increases profits. The same occurs with private education institutions that use predatory practices to attract students in search of government subsidies/funding, without commitment to quality education. It is obvious that the State will again be harmed and the consequence is to remain doomed to underdevelopment.

Another way to disarm mathematical models, according to O'Neil, It is to start with the programmers who create the algorithms, establishing a good philosophical foundation. But the idea of ethics or self-regulation would have effects on those scrupulous, and would not face the pressure that these professionals suffer from their recruiters. (2016). In any case, ethical frameworks should be created to deal with the potential of such technological tools, but also

think that the Law should establish guidance and punishment systems for those who benefit from such practices.

Also, to disarm the WMD's, according to O'Neil, it is necessary to measure its impact and audit the algorithms, because these programming codes are like black boxes: they collect data and produce conclusions. On the other hand, therefore, the WMD's are people-oriented, and so how can we make sure, for example, that "*esta persona presentaun risksgo medio de cometer otro delito, esta tiene un 73% de probabilities de votara los republicanos, esta maestra está en el decile inferior*" (O'Neil, 2016, p. 164). There are movements that seek to audit the algorithms:

> En Princeton, por ejemplo, los investigadores han lanzado un proyecto sobre responsabilidad y transparencia en la web. Han created *software* robots that are disfrazan enInternet as if they were people of all kinds – rich, poor, men, women or people with mental health problems –. Los investigadores estudian eltratamiento que reciben estos robots y así pueden detectar los sesgos existentes en los sistemas automáticos, desde los motores de búsqueda asta las páginas web debúsqueda de empleo. Similar initiatives are being launched at universities such as Carnegie Mellon and MIT. Academic support for these initiatives is crucial. Al fin y al cabo, para vigilar las ADM necesitamos a personas que tengan las competencias necesarias para construir las (O'Neil, 2016, p. 166).

But the algorithm created, not yet used as a WMD It is part of the business structure of many companies, for example, and obviously no company will voluntarily allow audits to be carried out and expose what is defended as secret. "[...] *Google, por ejemplo, ha prohibido a los investigadores externos crear montones de perfiles falsos para identificar los sesgos del motor de búsqueda. Sila company actually carries out audits of sesgos, prefers to make internally*" (O'Neil, 2016, p. 167). It will be necessary to find a balance between the interests of companies and the protection of privacy and informational self-determination of the human person.

Another suggestion by O'Neil is to follow the European example that requires that the collection of data be previously authorized by the user (2016). The Plaintiff mentions the "non-reuse" clause, which makes the sale of user data illegal, which in a way would prevent it from falling into the hands of agencies that would use it in a harmful way (O'Neil, 2016). Theoretically, such a clause is interesting as long as the individual has the technical conditions to exercise his right to informational self-determination, otherwise it will have little or no value.

Finally, O'Neil argues that "[...] *Models that have a significant impact on our lives, such as credit and electronic ratings, should be public and accessible to all classifications*" (2016, p. 169). This technological revolution that gave rise to the current Information Society, whose central element is data, will not disappear (O'Neil, 2016). Therefore, it is important to use this input with some minimum standard of ethics, justice and prudence. It's not just about data, it's

about people. Therefore, if the information generated is unfair, it is necessary to review and calibrate it. It is in this sense that the role of Law is relevant, since it is the law that, based on a multidisciplinary action, becomes the element of social transformation of society with the appropriate use of algorithms.

6 Final considerations

In each historical moment through which humanity has trodden, the groups that emerge with more vigor and strength, so that a new cycle of revolution comes to light, are also those that frequently appropriate the benefits generated. Over time, in different civilizations, small and large historical landmarks show the presence of appropriation/violence.

The current Information Society instrumentalized by the 4th Industrial Revolution is no different from the previous ones. Data, especially personal data, once processed is transformed into valuable information for all market segments, including governments.

Technological advances have brought evolution to numerous areas. Several of the AI models created are contributing to people's well-being and driving progress. Distance boundaries have practically ceased to exist and communication has become globalized. The Covid-19 pandemic, which devastated humanity in 2020/2021, could have achieved even more catastrophic results if it were not for technological tools. But not everything is rosy and the Information Society also has its *Dark side of the force*[12], and what strength!

The algorithm models used as WMD are some of the examples of the dark side of AI. If, on the one hand, they are used as a prediction tool, when they become WMD its effects are disastrous: they exclude individuals and entire groups from job opportunities, credits, and education, and when used in predatory marketing campaigns, they lead to the ruin of thousands of people, as mentioned by O'Neil (2016).

The movement caused by the WMD's when it corralls populations in cybernetic ghettos can be analyzed, from the perspective of Santos (2007), such as the return of the colonizer, where those on the other end of the line suffer the horrors of being in a colony, in Guantánamo, where the imposed logic is violence, expropriation marked by underemployment and exploitation, all intensified by the WMD's.

On the other hand, all is not lost, since the WMD's can be disarmed with the awareness of the professionals who deal with them, as well as by the ethical posture of the companies that

[12] Reference to the Star Wars soundtrack. (LUCAS, 1999).

make use of such tools and suggest which data will feed the training of the algorithms. The indicators for exclusion should be those that would actually cause inclusion and the reduction of vulnerabilities. Santos is right when he mentions that "global injustice is intimately linked to global cognitive injustice" (2007, p. 77) and that a paradigm shift would require fighting for global cognitive justice, that is, post-abyssal thinking, according to the author.

In this aspect, the role of Law as a regulatory element of the market that is based on the use of Data Science comes into play (*Data Science*) and, for the purposes of this article, algorithms. Instead of a predatory society on account of the WMD's, for example, it is preferable to experiment with development that is feasible with technology. The role of Law is not that of castrating in the face of the ongoing technological revolution, but once aligned with social needs and from a multidisciplinary vision, it is imperative that it becomes an instrument of emancipation that society claims for its development.

References

ARTIFICIAL INTELLIGENCE in public policies: public hearing. Production: Senate of the Future Commission. Brasília, DF: TV Senado, 21 ago. 2019**.** 1 video (1h40min39sec). Available at: https://www12.senado.leg.br/tv/plenario-e-comissoes/comissao-senado-do-futuro/2019/08/csf-inteligencia-artificial-ia-em-politicas-publicas. Accessed on: May 11, 2020.

BIONI, Bruno Ricardo. **Protection of personal data:** the role and limits of consent. 2. ed. Rio de Janeiro: Forense, 2020.

BRAGA, Filipe Meirelles Ferreira; CARDOSO, Pedro Vinhaes; O'NEIL, Cathy. Weapons of math destruction: how *Big Data* increases inequality and threatens democracy. New York:

CROWN, 2016. ISBN 9780553418811. **Mural Internacional**, Rio de Janeiro, v. 7, n. 1, p. 94-97, jan./jun. 2016. Available at: https://www.e-publicacoes.uerj.br/index.php/muralinternacional/article/view/25939/19637. Accessed on: 09 nov. 2020.

BRAZIL. **Law No. 13,709, of August 14, 2018.** General Law for the Protection of Personal Data (LGPD). Brasília, DF: Presidency of the Republic, [2020]. Available at: http://www.planalto.gov.br/ccivil_03/_ato2015-2018/2018/lei/L13709compilado.htm. Accessed on: 12 nov. 2020.

CHRISTIAN, Brian; GRIFFITHS, Tom. **Algorithms for living:** the exact science of human decisions. Translation: Paulo Geiger. São Paulo: Companhia das Letras, 2017.

CORMEN, Thomas H; LEISERSON, Charles E; RIVEST, Ronald L; STEIN, Clifford. **Introduction to algorithms**. 3. ed. Cambridge: The MIT Press, 2009.

DIAMOND, Jared M. **Guns, germs and steel:** the destinies of human societies. Translation: Silvia de Souza Costa *et al*. 24. ed. Rio de Janeiro: Record, 2020.

DICTIUM. Revolution. **Dicio – Online Dictionary of Portuguese**, [*S.l.*], [2021]. Available at: https://www.dicio.com.br/revolucao/. Accessed on: 30 ago. 2021.

MADRID CONESA, Fulgenio. **Derecho a la intimidad, informática y Estado de Derecho.** Valencia: Universidad de Valencia, 1984.

MENÁRGUEZ, Ana Torres. The privileged are analyzed by people; the masses, by machines. **Imediata.org -** El País**,** Brazil, 22 Nov. 2018. Available at: http://imediata.org/intensidata/2018/11/22/os-privilegiados-sao-analisados-por-pessoas-as-massas-por-maquinas/. Accessed on: 22 set. 2021.

O'NEIL, Cathy. The next political revolution will be through the control of algorithms. Translation: **Bernardo Neves. LavraPalavra,** [*S.l.*], 27 nov. 2018. Available at: https://lavrapalavra.com/2018/11/27/a-proxima-revolucao-politica-sera-pelo-controle-dos-algoritmos/. Accessed on: 31 out. 2020.

O'NEIL, Cathy. **Weapons of mathematical destruction:** how Big *Data* increases inequality and threatens democracy. Translation: Violeta Arranz de la Torre. [*S.l.*]: Lectulandia, 2016. Available at: www.lectulandia.com. Accessed on: 31 out. 2020.

PAHO/WHO BRAZIL. COVID-19 fact sheet. **PAHO/WHO Brazil**, Brasília, DF, [2020]. Available at: https://www.paho.org/bra/index.php?option=com_content&view=article&id=6101:covid19&Itemid=875. Accessed on: 22 Apr. 2020.

PIERRO, Bruno de. The world mediated by algorithms: logical systems that underpin computer programs has a growing impact on everyday life. **Revista Pesquisa Fapesp**, São Paulo, ed. 266, p.18-25, Apr. 2018. Available at: https://revistapesquisa.fapesp.br/o-mundo-mediado-por-algoritmos/. Accessed on: 02 nov. 2020.

REGULATING the internet giants: the world's most valuable resource is no longer oil, but data. **The Economist,** London, 6 May 2017. Available at: https://www.economist.com/leaders/2017/05/06/the-worlds-most-valuable-resource-is-no-longer-oil-but-data. Accessed on: 18 Dec. 2019.

SANTINO, Renato. How social networks acted to limit disinformation in the US elections. **Olhar Digital,** [*S.l.*], 04 nov. 2020. Available at: https://olhardigital.com.br/noticia/como-as-redes-sociais-atuaram-para-limitar-desinformacao-nas-eleicoes-dos-eua/109777?notificacao=&utm_campaign=notificacao&utm_source=notificacao. Accessed on: 12 nov. 2020.

SANTOS; Boaventura de Souza. Beyond abyssal thinking – from global lines to an ecology of knowledge. **Novos Estudos** CEBRAP, São Paulo, n. 79, p.71-94, nov. 2007. Available at: https://www.scielo.br/j/nec/a/ytPjkXXYbTRxnJ7THFDBrgc/?format=pdf&lang=pt. Accessed on: 22 set. 2021.

SCHWAB, Klaus. **The fourth industrial revolution.** Translation: Daniel Moreira Miranda. São Paulo: Edipro, 2016.

SILVA, Priscila; MEDEIROS, Juliana. The controversy of (human) review about automated decisions. **ITS Rio,** Rio de Janeiro, 10 dez. 2019. Available at: https://feed.itsrio.org/a-pol%C3%AAmica-da-revis%C3%A3o-humana-sobre-decis%C3%B5es-automatizadas-a81592886345. Accessed on: 12 nov. 2020.

STAR Wars: The Phantom Menace. Directed by George Lucas. [*S.l.: s.n.*], 1999. 1 video (2h13min). Available at: http://www.adorocinema.com/filmes/filme-20754/. Accessed on: 12 jul. 2020.

SUPIOT, Alain. **Homo Juridicus**: essay on the anthropological function of law. Translation: Maria Ermantina de Almeida Prado Galvão. São Paulo: WMF Martins Fonte, 2007.

THE WORLD mediated by algorithms – Bruno de Pierro – Ed. 266. Production and Direction: Renata Druck. Guests: Roberto Marcondes Cesar Junior and Sérgi Amadeu da Silveira. São Paulo: Pesquisa FAPESP, 28 May 2018. 1 video (6min 59sec.). Available at: https://revistapesquisa.fapesp.br/o-mundo-mediado-por-algoritmos-2/. Accessed on: 02 nov. 2020.

Received: 01/04/2021

Accepted on: 09/14/2021