

CAN JUDGES BE REPLACED BY MACHINES? THE BRAZILIAN CASE

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ABSTRACT: *The objective of this article is to study the development and use of artificial intelligence (AI) in the Brazilian judiciary in order to assess the likelihood that machines could ultimately replace the judge, and to identify the necessary conditions that might allow for such replacement. To this end, we will examine the relevant concepts related to AI and the scholarship addressing the possibility of replacing the judge with machines in the near future. The methodological procedure used was doctrinal research specific to both new technologies and artificial intelligence. Our conclusion is that AI will reduce the cost of the judicial machinery by allowing many relatively simple and frequently occurring judicial tasks to be resolved more quickly, while leaving ultimate responsibility for judicial decision-making with the judge. Replacement of the judge by automated algorithmic tools would require specific, necessary conditions, even if it were to promote efficiency and cost reduction. These conditions are (i) the adequacy and efficiency of AI generated results, and (ii) the ability of computerized routines to adapt and improve the quality of their application of the law by accommodating and incorporating human corrections of the automated decisions. We also diagnose the philosophical issue that replacing judges with machines might signal a possible “end of interpretation,” even though ongoing human inspection and correction of the computerized systems would be necessary.*

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KEYWORDS: *Artificial intelligence; process; cost; judicial decision-making; judge.*

RESUMEN: *El objetivo de este artículo es estudiar el desarrollo y el uso de la inteligencia artificial (IA) en el Poder Judicial brasileño para evaluar la probabilidad de que las máquinas puedan acabar sustituyendo al juez, e identificar las condiciones necesarias que podrían permitir esta situación. Para ello, se realizará el estudio del concepto de IA y se debatirá la posibilidad o no de reemplazar al juez por la máquina en un futuro próximo. El procedimiento metodológico utilizado ha sido la investigación doctrinal específica de las nuevas tecnologías y la inteligencia artificial. Como resultado, se entiende que IA reducirá el costo de la máquina judicial al permitir que muchas tareas judiciales relativamente sencillas y frecuentes se resuelvan con mayor rapidez, dejando al mismo tiempo la responsabilidad última de la toma de decisiones judiciales en manos del juez. La sustitución del juez por herramientas algorítmicas automatizadas requerirá condiciones específicas y necesarias, incluso si promoviera la eficiencia y la reducción de costos. Estas condiciones son (i) la respuesta adecuada y eficiente al caso en discusión y (ii) la evaluación constante y la adecuación de las rutinas computarizadas a la calidad de la aplicación de la ley, en base a posibles correcciones humanas a la decisión automatizada. También diagnosticamos un problema de orden filosófico, dada la posibilidad de sustitución del juez por la máquina, podría suponer el posible “fin de la interpretación”, aunque sería necesaria la inspección humana y por ende la corrección de los sistemas informatizados.*

PALABRAS CLAVE: *Inteligencia artificial; proceso; costo; decisión judicial; juez.*

TABLE OF CONTENTS

I. INTROCUTION.....	54
II. ARTIFICIAL INTELLIGENCE: THE CONCEPT.....	55
III. ARTIFICIAL INTELLIGENCE IN BRAZILIAN COURTS: THE CONTEMPORARY REALITY.....	65
IV. LIMITS ON THE APPLICATION OF ARTIFICIAL INTELLIGENCE: THE DE- BATE ON REPLACING JUDGES WITH MACHINES	68
V. TECHNOLOGY PROBLEMS AND LACK OF SUPERVISION: THE BRAZILIAN CASE	77
VI. CONCLUSION	79

I. INTROCUTION

This article will assess the possibility of replacing the magistrate with artificial intelligence, that is, with an AI system, given the current Brazilian legislative

reality. To begin, existing conceptions about AI will be analyzed, as well as the difficulty of limiting this conception to any single perspective. Furthermore, it will be demonstrated that the complexity of conceptualizing AI has, in fact, facilitated the research and development of that field. AI has already been implemented in several courts across Brazil, some involving activities considered to be merely bureaucratic, such as the Clara system, to more complex systems which can assist magistrates in the judicial decision-making process, such as Radar.

In Brazil, AI has provided an opportunity to reduce the cost of the judicial branch. Recently, the cost of the judiciary to the nation was determined to be R\$90,846,325,160.00. Is it possible that AI systems could evolve to the point where sentences and judgments would no longer be handed down by human beings? Would a decision on the legal merits of a case reached by an AI system be valid? Would such a system be able to effectively analyze all the relevant issues of fact and law presented in any given lawsuit? These are some of the questions researchers will be contending with in the coming years as the application of computer technologies to the law increases.

II. ARTIFICIAL INTELLIGENCE: THE CONCEPT

The concept of technology has expanded over time, acquiring new contours, and changing definitions, and the study of its meaning and societal implications involve an extensive global network of researchers and interdisciplinary projects.¹ Technology is a broad concept and can be evaluated from various perspectives.² As Antonio Enrique Pérez Luño warns, new technologies are omnipresent in both the individual and collective lives of human beings. New technologies directly impact the exercise of citizenship. The introduction of new technologies into society requires deep reflection on the resulting legal and political implications.³ In dialogue with Luño, Klaus Schwab also emphasizes the importance of evaluating the impact of new technologies on society, for example, the mobile internet, small electromagnetic sensors, and the increased potential of artificial intelligence.⁴ In the words of Ricardo Luis Lorenzetti:

The rise of the digital age has raised the need to rethink important aspects related to social organization, democracy, technology, privacy, and freedom. The open, interactive, and global character of the internet, added to the low transaction costs it presents as technology, have a great impact on a wide category of issues belonging to legal sociology and, therefore, to dogmatics: the

¹ EDUARDO MAGRANI, THE INTERNET OF THINGS 31 (2018).

² *Id.*, at 30.

³ ANTONIO ENRIQUE PÉREZ LUÑO, CIBERCIUDADANÍ@ O CIUDADANÍ@.COM? 57 (2003).

⁴ KLAUS SCHWAB, THE FOURTH INDUSTRIAL REVOLUTION 11 (2016).

notion of time, space, frontier state, place, privacy, public goods, and others that appear equally affected.⁵

One of these issues is the impact technology has had on legal relations, more precisely, on the judicial process. Technological advances require the constant assessment of potential challenges which could impact society and legal science.⁶ The concept of artificial intelligence, however, does not have a single or widely accepted definition among scholars on the subject.⁷ On February 19, 2020, the European Union published its “White Paper on Artificial Intelligence-A European Approach to Excellence and Trust”,⁸ which created a paradigm asserting that human intelligence is not substitutable by systems based on artificial intelligence. In addition, these new technologies must be transparent, explainable, and capable of inspiring confidence in both the business and social spheres.

This perspective warrants close examination. Alan Turing, one of the predecessors of modern AI studies, had focused his efforts on the potential for computers to replicate not the human thought process itself, but rather, achieving the same external result.⁹ Turing’s test was the “game of imitation,” in which a computer attempts to convince an interrogator that it is human and not a machine.

Today, the possibility of designing a computational intelligence capable of creativity could be the last frontier of investigations relating to artificial intelligence.¹⁰ The human brain represents an inexhaustible source of surprises and the unknown. However, it is creativity which places humanity at a level

⁵ RICARDO LUIS LORENZETTI, *TEORIA DA DECISÃO JUDICIAL: FUNDAMENTOS DE DIREITO* 50 (2009).

⁶ Adriano M. Godinho & Nelson Rosenvald, *Inteligência artificial e responsabilidade civil de robôs e seus fabricantes*, in *RESPONSABILIDADE CIVIL-NOVAS TENDÊNCIAS* 21, 23 (Foco, 2019).

⁷ “Any AI regulatory regime must define what exactly it is that the regime regulates; in other words, it must define artificial intelligence. Unfortunately, there does not yet appear to be any widely accepted definition of artificial intelligence even among experts in the field much less a useful working definition for the purposes of regulation... The difficulty in defining artificial intelligence lies not in the concept of artificiality but rather in the conceptual ambiguity of intelligence. Because humans are the only entities that are universally recognized (at least among humans) as possessing intelligence, it is hardly surprising that definitions of intelligence tend to be tied to human characteristics.” Matthew Scherer, *Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies and Strategies*, 29 HARV. J. L. & TECH. 353, 359 (2016).

⁸ *White Paper on Artificial Intelligence - A European Approach to Excellence and Trust*, PUBLICATIONS OFFICE OF THE EUROPEAN UNION (April 15, 2020), available at: <https://op.europa.eu/en/publication-detail/-/publication/aace9398-594d-11ea-8b81-01aa75ed71a1/language-pt>.

⁹ Alan Turing, *Computing Machinery and Intelligence*, 236 Q. REV. OF PSYCHOL. & PHIL. 433, 433 (1950).

¹⁰ Computational creativity is defined as “[P]hilosophy, science and engineering of computational systems which, by taking on particular responsibilities, exhibit behaviours that unbiased observers would deem to be creative.” Simon Colton and Geraint A Wiggins, *Computational Creativity: The Final Frontier?* 242 ECAI 2012 21, 21-26 (2012).

of cognitive superiority over other animals. Humanity employs both philosophical and technological tools in order to better understand how we think, and this fact alone indicates that the imitation of human intelligence may be unattainable for algorithmic models whose aim is merely to simulate human thinking. At the current time, AI is essentially comprised of a set of technologies that combine data, complex algorithms, and computational capacity.¹¹

Artificial intelligence seeks to reproduce a specific intelligence. Creativity, on the other hand, is a new combination of ideas that suddenly take on a meaningful value.¹² This is a significant distinction. Intelligence is understood to be something beyond deductive or inductive thinking. It is related to the capacity for abstraction, that is, the ability to consider reality, to recognize intertextuality (which includes context), and to arrive at a conclusive position based on logical-linguistic phrases (semantics). This is what Roszak argues, that it is through ideas, not information, that the mind develops thought.¹³ In this sense, he sought to demonstrate the existence of a link between experience, memory, and learning, in order to distinguish human thought from that of machine processes. This perspective will be important to keep in mind when evaluating John R. Searle's proposed distinction which will be set out below.

From Roszak's perspective, the greater the number of ideas we have, the greater our capacity for critical comparison. Thus, a brain capable of producing few ideas does not have the capacity to defend the convictions it adopts with sufficient care and rigor of thought. Thus, it is not the amount of information available to the person which qualifies him or her to perform a certain activity. Rather, it is the quality of the information that allows for the construction of the idea. This is an important characteristic of the human mind which researchers attempt to simplify and mimic through the use of analytical models.

There is an additional point which must be considered. Many events experienced by human beings occur in a fragmentary way and are stored in the memory in that fashion. There is no methodology for storing or categorizing

¹¹ Lucana María Estévez Mendoza, when lecturing on the subject, offers the following: "Be that as it may, AI has sneaked into our lives and is ready to stay in them. Given this eruption of intelligent machines, it seems clear that Law, as a science that intervenes in social conflicts, cannot remain on the sidelines, leaving to the discretion of the parties or groups that partially defend their interests, their resolution, although they can do it more or less legitimately." Lucana María Estévez Mendoza, *Regulación de la inteligencia artificial y protección de los derechos fundamentales en la cuarta revolución industrial*, in MEMÓRIAS DO XXIII CONGRESSO IBERO-AMERICANO DE DIREITO E INFORMÁTICA 265, 267 (Cia do eBook, 2019).

¹² Boden argues that "Creativity is the ability to come up with ideas or artefacts that are *new, surprising and valuable*." MARGARET BODEN, THE CREATIVE MIND: MYTHS & MECHANISMS 1 (2003).

¹³ Theodore Roszak, EL CULTO A LA INFORMACIÓN. TRATADO SOBRE ALTA TECNOLOGÍA, INTELIGENCIA ARTIFICIAL Y EL VERDADERO ARTE DE PENSAR 121 (2006).

the information stored by the central nervous system. Computerized systems also have memory. But the problem is, as Roszak explains, that any comparison would be similar to associating “saw teeth to a person’s teeth”.¹⁴ Intelligent systems store much more information than a human being is capable of, and the way data is captured, and information stored is very different.

Edwina L. Rissland¹⁵ highlights the fact that a machine can beat a world champion in chess by merely using mathematical calculations of probability regarding all possible moves between the black and white domains, and that this operation is relatively simple. In contrast, common communication is much more difficult for machines. The difficulty lies in the interpretation of semantic differences and connections which would allow for the recognition of these similarities and differences in a context composed of diverse sources of information: documents, images, videos, and in the case of the law, judicial decisions.

The question that arises from this line of reasoning is whether human thought activity is capable of being transformed into machine commands via some type of system of approximations.¹⁶ This perspective is related to the view of man as a machine, and envisions the systematic organization and execution of commands using the communication, analysis, and control of logical symbols by rigorous, linear, coded, and predictive programming.¹⁷ This model follows the conception of the complete rationalization of thought formulated by Alan Turing in his well-known imitation game, as well as that of Norbert Weiner’s control-feedback studies (cybernetics). Despite the evolution in the eighties of techniques which led to the construction of the so-called expert machines, that is, machines specialized in solving specific problems or acting as if they were geniuses or very specialized professionals, developers had sought to add high levels of information or knowledge to the artificial intelligence existing at that time. However, all of the information was supplied by the developer, with no self-learning being performed by the computer.

From this perspective, computers work with coded instructions and pre-defined knowledge, and they perform operations supported by structural bases that are created and destroyed with each advance of neuroscience. The human brain, on the other hand, does not employ such linearizable characteristics, but instead, acts more like a network which responds to various

¹⁴ *Id.*, at 129.

¹⁵ Edwina L Rissland, *Artificial Intelligence and Law: Stepping Stones to a Model of Legal Reasoning*, 99 THE YALE LAW JOURNAL 1957-1981 (1990).

¹⁶ JUAN J. ÁLVAREZ ÁLVAREZ, APROXIMACIÓN CRÍTICA A LA INTELIGENCIA ARTIFICIAL. CLAVES FILOSÓFICAS Y PROSPECTIVAS DE FUTURE 62 (2013).

¹⁷ Álvarez states, “[T]he rules the machine follows can only operate with symbols (and not their interpretation), it is essential that the symbolic representation of these aspects be complete, systematic, so that the problem we face - whatever it is - can be effectively resolved.” *Ibidem*, at 18 [authors’ translation].

impulses (signals) of excitation or inhibition. This is to say that the human brain works in parallel (receiving/sending information), which is a model of brain functioning that reveals a greater capacity for both the processing of information and speed. From this perspective, a machine's "intelligence" is not something provided in advance, and its rules of conduct are neither accurate nor predictable. Computer performance is to be oriented towards "learning" based on "experience" and the information that reaches the system so that the performance of the activity may improve.¹⁸ This is what has been called "machine learning." Russell and Norvig¹⁹ assert that even if it is impossible to achieve omniscience, it is possible to apply the so-called "laws of thought" to computers, depending on advances in neuroscience and the technical capacity of applying aspects of neurophysiology to computers, because solving problems in theory does not mean solving them in practice. In other words, the logic used by technologically advanced machines surpasses the limits of the historical syllogism and attempts to approach the complex logic of probabilities precisely because it incorporates the same semantic capacity of information processing that the human brain has.²⁰

In conclusion, according to Searle, computer language is syntactic (logical-formal), whereas human language is semantic (logical-substantial). As a result, it is possible to use robots to translate texts from Chinese or Arabic into any language without the machine knowing the content of the translation, and even when no scientist knows the respective languages. They simply need to know about logic, computing, and statistics – the machine language. The quest to introduce semantic thinking into machines is an advancement of computational science that has generated a great deal of discourse and explains why IBM's Watson has attracted so much interest and praise.

However, in their work *Artificial Intelligence: A Modern Approach*, Stuart Russell and Peter Norvig identify four categories of AI: thinking like a human, acting like a human, thinking rationally, and acting rationally.²¹ Similarly, Enrique Cáceres²² emphasizes that the reproduction of the human way of thinking is crucial²³ and uses the idea of machines imitating human behavior in the game of chess as an example:

¹⁸ Juan Álvarez Álvarez, *supra* note 17, at 20-23.

¹⁹ Russell and Norvig point out "[A]ll computer programs do something, but computer agents are expected to do more: operate autonomously, perceive their environment, persist over a prolonged time period, adapt to change, and create and pursue goals." Stuart J. Russell & Peter Norvig, *Artificial Intelligence: A Modern Approach* 4 (3rd ed., 2016).

²⁰ JOHN R. SEARLE, THE REDISCOVERY OF THE MIND 201, 202 (1990).

²¹ Stuart J. Russell & Peter Norvig, *supra* note 19.

²² Enrique Cáceres, *Artificial Intelligence, Derecho and E-Justice*, 39 (116) BOL. MEX. DER. COMP. 593, 593-595 (2006).

²³ Computers could play chess in 1960, and by 1997 they could easily beat the best chess player in the world. Wolfgang Hoffmann-Riem, when lecturing on the subject, stated, "AI is a transversal technology that aims to empower computers, using large amounts of data (big

[I]n the case of systems that play chess, it is clear that the intelligent universes are very different, because while the human is biochemical in nature, the computer is electromagnetic. However, it is possible to classify the 'behaviors' of said systems as intelligent.

From the foregoing analysis, it is possible to reconstruct the relevant distinction between weak artificial intelligence and strong artificial intelligence proposed by John R. Searle. First, as a matter of logic, the human mind is not a computer program, which is what separates Searle's thinking from Turing's vision.²⁴ However, operations of the human mind can be reproduced or simulated. The distinction between weak and strong AI, therefore, is determined by the way we visualize the comparison of the mind with artificial intelligence. If we assume the mind has a program to be reproduced, the construction of strong artificial intelligence is sought. If it is assumed that brain processes can be simulated by means of codes executed by machines, then we are talking about weak artificial intelligence. Finally, if the organization of the system is based on equating the brain with computational intelligence, we are talking about cognitivism.²⁵

The line of reasoning brought up here serves to illustrate the *ex-ante* environment of the advancement that computational creativity would require: the possibility of reproducing a model of the brain which approaches that of human beings (strong AI) in search of innovation. The task is not a simple one. The information processing capacity of the human brain reaches one million times the processing capacity of processors in terms of petabytes per second. So, what makes artificial intelligence a useful tool? The question incorporates the view that the algorithms that use machine learning are capable of building complex models, detecting patterns, and inferring rules of behavior of the systems under analysis. Computer applications are able to produce intelligent responses to complex problems very rapidly. In other words, they allow for (i) the detection of similarities in the analyzed situations, and (ii) a prediction of a result based on a statistical analysis of previous results. In the words of Thomas Ramge, "to create an intelligent machine, it takes at least two elements: a robust collection of rules and an apparatus that can process the information originating from the conclusions obtained from this database".²⁶

data), appropriate computational capacities and specific analysis and decision processes, to achieve achievements that approach human capacity or even exceed it at least in some aspects." WOLFGANG HOFFMANN-RIEM, ARTIFICIAL INTELLIGENCE AS AN OPPORTUNITY FOR LEGAL REGULATION 16 RDU 11, 11-38 (2019).

²⁴ NICK BOLSTROM, SUPERINTELIGÊNCIA: CAMINHOS, PERIGOS E ESTRATÉGIAS PARA UM NOVO MUNDO (2018).

²⁵ John R. Searle, *supra* note 20, at 201, 202.

²⁶ THOMAS RAMGE, WHO'S AFRAID OF AI? FEAR AND PROMISE IN THE AGE OF THINKING MACHINES 32 (2019).

AI has also affected the legal profession. John O. McGinnis and Russell G. Pearce, in an article published in the Fordham Law Review, entitled *The Great Disruption: How Machine Intelligence Will Transform the Role of Lawyers in the Delivery of Legal Services*, maintain that common, repetitive legal services, such as searching for legal doctrine and relevant jurisprudence, generating legal documents or petitions, and creating letters and memos will be easily performed by machine learning. The lawyer will be left with activities involving the analysis of complex issues or highly specialized areas of law, as well as courtroom activity and preparatory work for which the lawyer's physical presence is essential. The authors conclude:

The market for electronic legal services is at a relatively early, yet significant, stage in terms of the disruptive effect of machine intelligence in undermining lawyers' monopoly. As machine intelligence in lawyering develops exponentially, it will take an increasingly larger role in five areas of legal practice: discovery, legal search, generation of documents, creation of briefs and memoranda, and predictive analytics. Eventually, machine intelligence will prove faster and more efficient than many lawyers in providing those services. Lawyers will continue to provide services that cannot be commoditized if they are superstars, practice in highly specialized areas of law subject to rapid change, appear in court, or provide services where human relationships are central to their quality. Otherwise, no effective barriers to the advance of machine lawyering in legal practices exist—not even in the law and ethics of lawyering. Lawyers will continue to embrace machine intelligence as an input and fail to prevent nonlawyers from using it to deliver legal services. Ultimately, therefore, the disruptive effect of machine intelligence will trigger the end of lawyers' monopoly and provide a benefit to society and clients as legal services become more transparent and affordable to consumers, and access to justice thereby becomes more widely available.²⁷

Jordi N. Fenoll believes²⁸ the future of artificial intelligence is “promising” and capable of achieving “spectacular” results. The intelligence of the machine will perform work previously done manually, based on the search for keywords selected by professionals, and it will do it more efficiently. A more sophisticated example is IBM's Watson, whose programming substitutes the search for keywords with a semantic search using a semantic network.²⁹ This semantic network is a form of graph comprised of both nodes, which represent concepts (including legal concepts and facts), and arcs, which represent relationships between the concepts.

²⁷ John O. McGinnis & Russell G. Pearce, *The Great Disruption: How Machine Intelligence Will Transform the Role of Lawyers in the Delivery of Legal Services*, 82 FORDHAM LAW REVIEW [S.I.] 3065 y 3066 (2014).

²⁸ JORDI NIEVA FENOLL, INTELIGENCIA ARTIFICIAL Y PROCESO JUDICIAL 28 (2018).

²⁹ IBM WATSON DEBATER, available at: https://www.youtube.com/watch?v=WFR3lOm_xhE.

The usefulness of tools based on machine learning will only be achieved when they are capable of reliably selecting and analyzing past cases given a specific set of criteria. Technological advancement has increased both storage capacity and processing speed, allowing the content of documents to be collected and organized in such a way that it is possible to identify the patterns necessary for the resolution of legal cases (decisions), something which was not available in the eighties and nineties. The regularity of the resulting decision pattern will allow for a probabilistic assessment of what might happen in cases that have not yet been decided. The use of technology would be more reliable in predicting an outcome due to the greater amount of data on which the forecast is based. Without the use of technology, the only available tool for predicting an outcome would be the knowledge and experience of the individual professional, which is not qualitatively measurable and is subject to error.³⁰ The data requiring analysis include fact patterns, jurisprudence (and precedents), as well as the outcomes of cases already decided.³¹ This type of technology would have a particular significance for Brazil due to the considerable volume of laws at the municipal, state, and federal levels, as well as the jurisprudence generated by the different member states and the administrative collegiate bodies. This, combined with the volume of matters previously decided, favor the standardization of the national law in the superior courts, and make the legal field suitable for data mining (information processing).³²

The desire to combine a model of legal reasoning capable of jurisprudential analysis (the use of precedent), together with a rules-based approach, is not new and has generated significant discussion. However, systems designed

³⁰ Amos Tversky & Daniel Kahneman, *Judgment under Uncertainty: Heuristics and Biases: Biases in judgments reveal some heuristics of thinking under uncertainty*, 185 (4157) SCIENCE 6 (2008).

³¹ For example, one form of legal analysis might use patterns of facts and jurisprudence from the Superior Court of Justice based on the Repetitive Demand Resolution Incident to assess the probability of procedural success and possible outcomes that might result from judicial resolution of the conflict. This might be useful for various purposes, including adopting arbitration procedures or the payment of debts or title, with the objective of saving time and financial resources.

³² Ephraim Nissan is illustrative on this subject: “Machine learning is a branch of artificial intelligence (AI, the latter is also called machine intelligence). Machine learning enables AI systems to improve their performance by augmenting their knowledge. Machine learning is prominent in data mining, the pool of techniques for sifting through a huge mass of data to come up with information and patterns. Types of data mining include, for example, predictive data mining (whose aim is to learn from sample data in order to make a prediction and whose techniques include neural networks, rule induction, linear, multiple regression); segmentation (whose aim is to automatically group data into groups/clusters and to discover meaningful groups in sample data and whose techniques include means clustering, self-organizing maps); summarization of the data (to automatically present data in a way that makes interpretation easier, helping the user visualize patterns or find associations within the sample data); time series, for forecasting; and text mining (i.e. data mining whose data are textual corpora).” Ephraim Nissan, *Digital Technologies and Artificial Intelligence’s Present and Foreseeable Impact on Lawyering, Judging, Policing and Law Enforcement*, 32 AI & SOCIETY 444, 441-464 (2017).

for the prediction of judicial results do currently exist. These types of systems are based on the proposition that in-depth research on how judges decide cases (judicial behavior) would be invaluable for the lawyer, helping him better prepare his case or formulate arguments. Jordi Nieva Fenoll, analyzing judicial behavior and its possible integration with systems based on artificial intelligence, points out:

There is no total consensus on what the term artificial intelligence means, but it could be said that it describes the possibility that machines, to some extent, think, or rather imitate human thought, based on learning and using the generalizations that people use to make our usual decisions.³³

Fenoll notes that most of the time the judges act in a quasi-mechanical way in order to reach similar decisions in similar cases, often just changing the names of the parties and adjusting the terms of the judgment (use of models). In this sense, magistrates adopt a particular standard of conduct with the goal of reaching similar decisions in cases having factual identity. Thus, the individual magistrate uses a priori resources and guidelines, either from his own memory (heuristics), or from the jurisprudential data,³⁴ in order to simplify the resolution of cases involving similar fact patterns.³⁵

Jack Copeland emphasizes that his use of the term “think” as applied to machines is nothing more than a metaphor. He says it is merely a comfortable way of expressing himself and is easy to understand.³⁶ Another more recent conception defines AI as intelligence with the ability to perform particular tasks.³⁷ The objective of modern AI, as it is currently defined, includes the ability to achieve pre-established goals, a component inserted in the category of “acting rationally” as defined by Stuart Russel and Peter Norvig. In their work, these authors use the concept of the “rational agent” as a definition of AI, since such an agent “acts as if it were fulfilling the best result”.³⁸ They also

³³ JORDI NIEVA FENOLL, *supra* note 28, at 20.

³⁴ *Id.*, at 44.

³⁵ Patterns are used by all people. If we take an illustrative case: a person who is thirsty and sees a water fountain. It will be a simple operation to fill his bottle with water (easy case). This would not be the case if his thirst had arisen in the middle of the desert. In that case, the person must make use of plastic or a raincoat to plug a hole in the sand and attempt to capture the moisture (distillation) and gather the water droplets into a pool (rigid box). Experience teaches us that, for a thirsty human being, it is better to be near the water fountain than in the desert. Amos Tversky and Daniel Kahneman argue that “Subjective probabilities play an important role in our lives. The decisions we make, the conclusions we reach, and the explanations we offer are usually based on our judgments of the likelihood of uncertain events such as success in a new job, the outcome of an election, or the state of the market”. Amos Tversky & Daniel Kahneman, *supra* note 30, at 30.

³⁶ JACK COPELAND, ARTIFICAL INTELIGENCE: A PHILOSOPHICAL INTRODUCTION 64 (1996).

³⁷ Matthew Scherer, *supra* note 7, at 360.

³⁸ Stuart J. Russell & Peter Norvig, *supra* note 19.

maintain that AI includes tasks such as learning, reasoning, planning, perception, understanding language, and robotics. We can synthesize the objectives of AI as achieving learning and reproducing the human reasoning process in order to provide answers and facilitate progress in all the areas of knowledge and performance that man may need.³⁹

AI can also be conceptualized as the science and engineering of creating smart machines, specifically, smart computer programs. This would include research and engineering using digital technology to create systems capable of performing activities that usually require intelligence when performed by an individual.⁴⁰ According to Richard Bellman, AI is the automation of activities that we associate with human cognition, such as decision-making, problem solving, and learning.⁴¹ Interestingly, the absence of unanimity in the conceptualization of AI may have actually enhanced development in this field as researchers have not been restricted by any limiting definition.⁴² Thus, AI is an umbrella term. It can encompass many areas of study and techniques, such as computer vision, robotics, natural language processing, and machine learning, among others.⁴³

Artificial intelligence makes use of systems programmed to respond in a specific way given an available database. These systems are called algorithms. An algorithm is a pre-defined action plan to be followed by the computer so that the repeated performance of simple tasks may be carried out with minimal expenditure of human work. The algorithm is a rule used to automate the processing of data, a finite set of instructions that result in the performance of a specific task.⁴⁴ An algorithm is essentially a simple thing: a rule used to automate the processing of data.⁴⁵ As Fabiano Hartmann Peixoto explains, “An algorithm can be defined, in a simplified way, as a set of rules that precisely defines a sequence of operations, for various purposes, such as forecasting models, classification, specializations”.⁴⁶

³⁹ Angie Verónica Rubio Velásquez, *IA en contacto con el Derecho*, in MEMÓRIAS DO XXIII CONGRESSO IBERO-AMERICANO DE DIREITO E INFORMÁTICA 314, 315 (Cia do eBook, 2019).

⁴⁰ NILTON CORREIA DA SILVA, ARTIFICIAL INTELLIGENCE 36 (Artificial Intelligence and Law: Ethics, Regulation and Responsibility / Coordination, Ana Frazão and Caitlin Mulholland) (2019).

⁴¹ RICHARD BELLMAN, IN INTRODUCTION TO ARTIFICIAL INTELLIGENCE: CAN COMPUTERS THINK? (1978).

⁴² PETER STONE ET AL., ARTIFICIAL INTELLIGENCE AND LIFE IN 2030: THE ONE-HUNDRED-YEAR STUDY ON ARTIFICIAL INTELLIGENCE (2016).

⁴³ FABIANO HARTMANN PEIXOTO, ARTIFICIAL INTELLIGENCE AND LAW 75 (2019).

⁴⁴ *Id.*, at 71.

⁴⁵ Wilson Engelmann & Deivid Augusto Werner, *Artificial Intelligence and Law*, in INTELIGÊNCIA ARTIFICIAL E DIREITO: ÉTICA, REGULAÇÃO E RESPONSABILIDADE 149, 157 (Thompson Reuters Brasil ed., 2019).

⁴⁶ FABIANO HARTMANN PEIXOTO, *supra* note 43, 71.

We conclude that artificial intelligence presents itself as the most sophisticated example of an algorithm whose goal is the imitation or simulation of the thought processes of a human agent when confronted by a situation requiring a decision. To this end, a set of routines is designed in order to guide the way the automated system can arrive at a decision (*output*). The more elaborate the programmed routine, that is, the degree to which it goes beyond the mere use of a decision tree or flowchart, the stronger an artificial intelligence is (*strong AI*), whereas the more rudimentary the routine and dependent on human intervention, the weaker the algorithmic model of the automated application is (*weak AI*).⁴⁷

This distinction is important to the question of replacing the magistrate in judicial decision-making because such an innovation would require establishing which tasks could be performed by systems without significant human intervention, and which tasks would require direct human supervision. Having made this brief introduction to the general concept of AI, we will now evaluate the impact it has had on the law, more specifically, its impact on the Courts of Justice.

III. ARTIFICIAL INTELLIGENCE IN BRAZILIAN COURTS: THE CONTEMPORARY REALITY

According to Mariana Amaro, about 30% of the positions that today are occupied by human beings will be claimed by robots.⁴⁸ Another study was conducted in 2017 regarding the probability that specific professions might ultimately be replaced by automation or AI. That study concluded there was a 3.5% probability of replacement for lawyers, however, for judicial activities in particular, the likelihood was found to be 40%.⁴⁹

Artificial intelligence technology has already changed the way in which both law firms and the judiciary operate. Technology, as applied to the law, generally has one objective: to make it easier for legal practitioners to perform simple or repetitive tasks, allowing more time for more complex tasks. For the judiciary, such technology would allow judges more time to judge. In Brazil, experimentation in this area has already begun in several jurisdictions. The Courts of Justice of Minas Gerais, Rio Grande do Norte, and even the Federal Supreme Court, have been using artificial intelligence in an attempt

⁴⁷ This construction has been formulated through the interpretation of Stuart J. Russell & Peter Norvig, *supra* note 19.

⁴⁸ Mariana Amaro, *Find Out What the Professions of the Future Will Be*, EXAME MAGAZINE (July 23, 2017), available at: <https://vocesa.abril.com.br/geral/saiba-quais-sao-as-profissoes-do-futuro/>.

⁴⁹ Rachel Hall, *Ready for Robot Lawyers? How Students Can Prepare for the Future of Law*, THE GUARDIAN (Jul 31, 2017), available at: <https://www.theguardian.com/law/2017/jul/31/ready-for-robot-lawyers-how-students-can-prepare-for-the-future-of-law>.

to provide society with more agile and efficient service. One example is a system called Radar. This system was able to resolve 280 cases in less than one second. The system separated the resources that had identical orders. The appellants drafted the standard vote, based on these established by the Superior Courts and by the Minas Gerais Court of Justice.⁵⁰

A second example is Poti, which performs the tasks of blocking, unlocking values in accounts, and issuing certificates related to Bacenjud (the system that links the Justice system with the Central Bank and the banking institutions which was designed to speed up requests for information and the transmission of court orders to the National Financial System via the internet). These tasks once took weeks when performed by officials of the judiciary. Now they are done in seconds. Judge Keity Saboya, from the 6th Tax Execution Court in Natal, explained, “A server was able to execute a maximum of 300 blocking orders per month. Today it takes 35 seconds to complete the task”.⁵¹

According to Keity, the sector that had once handled foreclosures in the Natal region became unnecessary and was eliminated thanks to Poti. He adds that in the 6th Court, there are no pending orders. The robot also updates the value of tax enforcement actions and transfers the blocked amount to the official accounts indicated in the process. If there is no money in the account, Poti can be programmed to retrieve the amount for consecutive periods of 15, 30, or 60 days.⁵²

Two additional systems, Jerimum and Clara, are currently undergoing testing and improvement. Jerimum classifies and labels processes. Clara reads documents, suggests tasks, and recommends decisions, such as the termination of an execution when the tax has already been paid. In this case, a standard decision will be inserted in the system, which will be confirmed by a server or not.⁵³

The president of the Rondônia court (TJ/RO), Walter Waltenberg, assesses that the success of the judiciary will depend on the virtualization of processes and their automation. As a result, he says, the court has invested in technology, and in 2018 created an artificial intelligence nucleus, which developed the Synapses system. With that system, a 60% drop in the processing time of the shares is anticipated. One of Synapses' features is a cabinet module which informs the judge of the necessary steps of a particular process, for

⁵⁰ Demétrio Beck da Silva Giannakos, *O Judiciário e a Inteligência Artificial*. Federasul, FEDERADUL (May 7, 2019), available at: <https://www.federasul.com.br/o-judiciario-e-inteligencia-artificial/>. Demétrio Beck da Silva Giannakos, *A inteligência artificial nos tribunais brasileiros: um redutor de custos de transação*, 3 REVISTA DE DIREITO DA EMPRESA E DOS NEGÓCIOS 91, 86-102 (2019).

⁵¹ *Tribunais investem em robôs para reduzir volume de ações*, Confederação Nacional das Instituições, CNF (March 18, 2020), Financeiras, available at: <https://cnf.org.br/tribunais-investem-em-robos-para-reduzir-volume-de-acoes/>.

⁵² *Id.*

⁵³ *Id.*

example, movement and assistance in the elaboration of sentences based on the suggestion of phrases.⁵⁴

The Federal Supreme Court (STF), in turn, created Victor, which will initially be tasked with reading all the extraordinary resources that come to the STF and identifying which are linked to recurring themes of general repercussion. Victor is in the process of having its neural networks constructed based on thousands of decisions already handed down by the Supreme Court regarding the application of various themes of general repercussion. Victor performs the following tasks: 1) converts images to text; 2) identifies the beginning and end of procedural documents; 3) separates and classifies procedural documents; and 4) identifies the most relevant topics.⁵⁵

The State Court of Rio Grande do Sul (TJ/RS), which uses the electronic e-procurement system, now has one more cutting-edge feature: the use of artificial intelligence (AI) in tax executive processes - judicial collections filed by public entities such as states and municipalities against their debtors.⁵⁶

The solution has already been made available to the Tramandaí District for their opinion and assessment. In the near future, its use will be expanded to other courts, including the 14th Court of Public Finance in Porto Alegre, which has exclusive jurisdiction over state tax executives.⁵⁷

The available AI solution works as follows: the Magistrate, after distributing of the process, uses the tool to classify the order to be delivered. The mechanism processes the documents attached to the initial tax execution and suggests the type of initial order: summons, subpoena, and prescription, among others. In large volumes, as is the case with tax executives, the functionality minimizes the time for analyzing documents, allowing the magistrate to focus on divergent points and other procedural activities.⁵⁸

As the number of actions of tax executives who enter annually is around 150 thousand, the tool will be able to automate the task for 120 thousand that, without AI, require individual human analysis.

In a recent interview, the current president of São Paulo's State Court, Judge Geraldo Pinheiro Franco spoke to the issue of the application of AI in Brazilian courts. Pinheiro Franco highlighted the fact that since the 1988 Constitution, the number of lawsuits in the judiciary paulista has been con-

⁵⁴ Têmis Limberger & Demétrio Beck da Silva Giannakos, *A Inteligência Artificial como garantia de efetivação do processo*, in POLÍTICAS PÚBLICAS NO BRASIL—ENSAIOS PARA UM GESTÃO PÚBLICA VOLTADA À TUTELA DOS DIREITOS HUMANOS 214, 220 (Dom Modesto, 2020).

⁵⁵ *Id.*

⁵⁶ Carlos Alberto Machado de Souza, *Inteligência Artificial acelera a tramitação dos processos de execução fiscal e agiliza a cobrança de receita pelos entes públicos*, TRIBUNAL DE JUSTIÇA DO ESTADO DO RIO GRANDE DO SUL (nov, 21, 2019), available at: <https://www.tjrs.jus.br/novo/noticia/inteligencia-artificial-acelera-a-tramitacao-dos-processos-de-execucao-fiscal-e-agiliza-a-cobranca-de-receita-pelos-entes-publicos/>.

⁵⁷ *Id.*

⁵⁸ *Id.*

stantly increasing, and that “the priority of his management (biennium 2020-2021) will be the investment in computerization and artificial intelligence, to speed up the trials”.⁵⁹

When asked about the São Paulo State Court budget deficit, Pinheiro Franco replied, “Today, it is R\$600 million. Something related to R\$290 million that remained from 2019, and the rest is related to this year, including the decrease in the budget, which was around R\$12 billion for 2020. We are projecting this number ahead of time. In theory, there will be a shortage of R\$300 million for the court to close the accounts in December”.⁶⁰

This is, therefore, another case in which the use of AI is seen as a way to combat the high cost of the judiciary in Brazil.⁶¹ A survey released in August 2018 revealed the total expenditure of the judiciary in 2017 to be R\$90,846,325,160, which was an increase of 4.4% over the year 2016.⁶² There are now 18,168 magistrates, 272,093 servers and 158,703 auxiliaries. The combined cost of the various state judicial systems is extremely expensive in Brazil, costing the respective states a total of R\$52,155,769,079.00.⁶³ In conclusion, the total expense of the nation’s various judicial systems amount to 1.4% of the nation’s Gross Domestic Product (GDP), or 2.6% of total spending by the Union, the states, the Federal District, and the municipalities.⁶⁴

IV. LIMITS ON THE APPLICATION OF ARTIFICIAL INTELLIGENCE: THE DEBATE ON REPLACING JUDGES WITH MACHINES

It has long been conjectured that AI solutions could help solve the well-known problem of the slowness of justice, but it could also result in eliminating the positions of lawyers, servants, and magistrates, culminating in the figure of a robot judge delivering sentences and resolving conflicts.

If someone consults the managers of the justice system, a function legally assigned to a court’s presiding magistrate, one will hear statements such as “AI systems will serve to unburden the courts, allowing the faster administration of justice in the country”, or, “The court he chaired is already investing heavily in AI solutions”.

⁵⁹ Tábata Viapiana and Thiago Crepaldi, “Robôs ajudarão juízes a decidir processos,” diz presidente do TJ-SP, BARBOSA & RAGAGNIN (Feb 23, 2020), available at: <https://www.conjur.com.br/2020-fev-23/entrevista-pinheiro-franco-presidente-tj-sp>.

⁶⁰ Tâmis Limberger & Demétrio Beck da Silva Giannakos, *O princípio constitucional da eficiência e transparência, analisado sob a perspectiva do custo da justiça: como uma melhoria na responsabilidade de entregar a provisão judicial*, 3 REVISTA ELTRÔNICA/CNJ 101 (2019).

⁶¹ *Id.*

⁶² *Id.*

⁶³ *Id.*

⁶⁴ *Id.*

In Brazil, the fact that different judges presiding over cases involving the same factual scenario can often reach widely divergent results is a serious problem. This can even occur in the same court. With the implementation of the Code of Civil Procedure in 2015, the legislature's idea was to introduce the concept of legal precedent into Brazilian reality. This concept was integrated into the Brazilian legal system by the passage and implementation of Articles 926⁶⁵ and 927⁶⁶ of the 2015 Code of Civil Procedure. Nevertheless, the judiciary in Brazil remains strongly opposed to the concept of legal precedent.

Unfortunately, we have a juridical reality that is very much based on positivist concepts that are poorly understood by the Brazilian judiciary which manifests itself in judicial functioning that often goes well beyond the principles expressed in the Constitution and current legislation.

We can attribute this to the fact that, over the past 50 years, after many countries have freed themselves from despotic and arbitrary regimes, more and more judges have been empowered to control the way in which the two elected branches of government exercise their authority with respect to the coercive power of the State. It became the responsibility of the judiciary to determine whether politicians and other government officials had exceeded the limits of their authority.⁶⁷

⁶⁵ Brazilian Code of Civil Procedure, Art. 926: "Courts must standardize their jurisprudence and keep it stable, complete and consistent. § 1 In the established form and according to the assumptions established in the internal regulations, the courts will edit summary statements corresponding to their dominant jurisprudence. § 2 When editing summary statements, the courts must adhere to the factual circumstances of the precedents that motivated their creation".

⁶⁶ Brazilian Code of Civil Procedure, Art. 927: "Judges and courts observe: I. the decisions of the Federal Supreme Court regarding concentrated control of constitutionality; II. the statements of the binding summary; III. the judgments incident assumption of competence or resolution demands repetitive and repetitive trial of extraordinary and special features; IV. the statements of the summaries of the Supreme Federal Court in constitutional matters and of the Superior Court of Justice in infraconstitutional matters; V. the orientation of the plenary or the special body to which they are linked. § 1 Judges and courts will observe the provisions of art. 10 and in art. 489, § 1, when they decide on the basis of this article. § 2 The alteration of the legal thesis adopted in a summary statement or in the judgment of repetitive cases may be preceded by public hearings and the participation of people, bodies or entities that may contribute to the rediscussion of the thesis. Paragraph 3. In the event of a change in the prevailing jurisprudence of the Federal Supreme Court and the higher courts or that arising from the judgment of repetitive cases, there may be modulation of the effects of the change on social interest and legal security. § 4 The modification of the summary statement, pacified jurisprudence or thesis adopted in the judgment of repetitive cases will observe the need for adequate and specific reasoning, considering the principles of legal security, protection of trust and isonomy. § 5 The courts will publicize their precedents, organizing them for a decided legal matter and disseminating them, preferably, on the world wide web".

⁶⁷ Dominique Rousseau, regarding the term Constitution, states, "The Constitution is, in fact, a text, that is, a set of written words; words that undoubtedly manifest values - freedom,

However, even with the creation of constitutions and the assimilation of countries into a general democratic state of law, these constitutional texts, in practice, often do not delimit or even mention the manner in which judges should make decisions in certain situations.⁶⁸

According to Freddy Escobar and Eduardo Nieto, “Modern law is the product of an act of the will and of human reason and, in that sense, it is precisely a matter of knowing what is the end and purpose of said will”.⁶⁹

It ends that the judicial voluntarism practiced by Tribunais hairs, not the moment in which a scale of common and uniform decisions on certain matters is not created, leaving only judicial “decisionism” to a specific case. Such a problem is rooted in the moral use of the hairs in the hour at the foundation of their decisions.

Brazil, being a developing country, has been unable to provide a significant part of the population with basic and fundamental rights, resulting in the constant increase in lawsuits in an attempt to enforce those rights listed in the Federal Constitution. With the intensification of judicial activity, a culture developed, and strengthened, to the point that judicial activism was viewed as necessary⁷⁰ for the realization of rights. Essentially, a legal imaginary was

equality ... words that, equally undoubtedly, have the ambition to be the bearers of norms, but that are, above all, words. This “discovery” logically led the constitutionalists to open up to other disciplines and in particular to the different philosophies of language to understand the ways of determining the meaning of words. If, whatever the writing efforts, the words always carry different meanings, it is necessary, in order to know what the obligation of behavior prescribes this or that statement, to decide on the meaning of that statement; it is necessary, by means of an intellectual operation, to give it a meaning that allows ordering this behavior. In other words, it is the meaning that makes the norm, not the word”. Dominique Rosseau, *Continuous Constitutional Law: institutions, guarantees of rights and utopias*, 8 RECHTD 261, 263 (2016).

⁶⁸ David Beatty, in his work “*The Essence of the Rule of Law*”, stresses the fact that significant gaps exist in most Constitutions: “The problem is that the constitutional exhortations that proclaim the inviolability of life, freedom and equality, which are the nodal pieces of almost every bill of rights, in reality tell the judges very little about how to resolve the intricate real-life disputes they are called upon to decide. The excellent and grandiose expressions characteristic of all constitutional texts provides little practical guidance on controversial issues, such as women’s right to abortion or the right of gays and lesbians to marry people of the same sex. Whether or not religious communities have the right to found separate schools and to seek state support for them and whether those schools can refuse to admit and / or employ people whose customs and/or religion are different from theirs... Likewise, when the Constitutions contain positive guarantees such as, for example, emergency medical treatment or access to adequate housing, the text does not tell the Court whether a person who is dying of renal failure is entitled to receive dialysis treatment or if one homeless is entitled to a shelter against the cold; at least, not explicitly.” DAVID M. BEATTY, THE ESSENCE OF THE RULE OF LAW 7 (2014).

⁶⁹ Freddy Escobar & Eduardo Nieto, ¿Es el análisis económico del derecho una herramienta válida de interpretación del derecho positivo? 52 THEMIS REVISTA DE DERECHO 341, 346 (2006).

⁷⁰ Georges Abboud and Guilherme Lunelli, discussing judicial activism, state, “The idea of judicial activism finds its roots in American law, relating to the hermeneutical difficulties in the interpretation and application of the American Constitution, known to be synthetic and abstract”. Georges Abboud & Guilherme Lunelli, *Judicial Activism and Instrumentality of the Process*,

created in which Brazilian law became dependent upon judicial decisions, or rather, dependent upon judicial definitions about the most important issues in society.⁷¹ The judiciary became the necessary and indispensable branch for the fulfillment of the constitutional text.⁷²

Lenio Streck strongly criticizes the doctrine and jurisprudence that insist on the thesis that the “product” of this hermeneutic process “should be in charge of the judge’s conviction,” a phenomenon that appears under the alibi of arbitrariness. It is as if the Constitution allows itself to be “complemented” by any investor, in spite of the regulatory legislative process.⁷³

The activist role of the judiciary inevitably encouraged a large number of lawsuits across the country, leading to a considerable diversity of decisions on identical legal matters.⁷⁴

242 REVISTA DE PROCESSO 21, 21 (2015). The authors continue, “And it is at this point that the problem of discretion, personal convictions, and, consequently, judicial activism emerges: can the meaning of the constitutional text (or even the laws) be summed up to a mere judgment of convenience of the judge? Is the meaning of the texts available to the interpreter, so that this “pince” –or even creates– the one that, depending on his ideological convictions, pleases him most?... For no other reason, the understanding of judicial activism always leads us to discussions about the normal and adequate function / performance of judges. When we talk about activism, it is mandatory to clarify that we are talking about exceeding the limits of the judiciary activity”. *Id.*, at 21, 24.

⁷¹ CLARISSA TASSINARI, JURISDIÇÃO E ATIVISMO JUDICIAL: LIMITES A ATUAÇÃO DO PODER JUDICIÁRIO 26 (2013).

⁷² There are authors, however, who have a different perspective on the role of the judiciary in resolving conflicts, including the process as representative of democracy itself. In this sense, Darci Guimarães Ribeiro explains, “[T]he State must provide that, the essential element of democracy, is exercised in its broadest fullness. However, citizenship is up to the active citizen himself to pressure institutions to realize his interests. In this perspective, the judge appears as a determining actor in the effective creation of the law and in the solution of legitimate social concerns, so that democracy itself is realized when the case presented to the judiciary is resolved.” DARCI GUIMARÃES RIBEIRO, DA TUTELA JURISDICONAL ÀS FORMAS DE TUTELA 96 (2010). Mauro Cappelletti defends a more creative role for the judge, “It is implicit, in other words, the recognition that a certain degree of creativity is inherent in the judicial interpretation of legislative law. The point, moreover, became explicit by Barwick himself when he writes that even the best art of drafting laws, and even the use of the simplest and most precise legislative language, always leave, in any case, gaps that must be filled by the judge and always allow ambiguities and uncertainties that, ultimately, must be resolved via the judicial process.” MAURO CAPPELLETTI, JUÍZES LEGISLADORES? 20-21 (1999). The same author, at a given moment, makes a reservation to this creative power of the judge: “Discretionary does not necessarily mean arbitrariness, and the judge, although inevitably the creator of the law, is not necessarily a creator completely free of ties. In fact, every civilized legal system has sought to establish and apply certain limits to judicial freedom, both procedural and substantial”. MAURO CAPPELLETTI, JUÍZES LEGISLADORES? 23-24 (1999).

⁷³ LENIO LUIZ STRECK, O QUE É ISSO? – DECIDO CONFORME MINHA CONSCIÊNCIA? 48 (4^{st.} ed., 2013).

⁷⁴ Demétrio Giannakos, *A uniformização da jurisprudência: uma justificativa baseada na Hermenêutica Jurídica e na Análise Econômica do Direito*, 288 REVISTA DE PROCESSO 395, 369 (2019).

There are several areas of the law that have become extremely judicialized such that courts have had great difficulty in establishing even minimal guidelines or standards, leaving them with few defined decision-making criteria. The health insurance and private contracts sectors are good examples of this.⁷⁵

To resolve the absence of standards used by the judiciary in its decision-making, study of the standardization of jurisprudence is important, especially in light of the provisions of Article 926 of the Civil Procedure Code. The existence of predictability in court decisions can create necessary disincentives for filing lawsuits. Behavioral economics, as applied to judicial proceedings, focuses on this issue. In the words of Eyal Zamir and Doron Teichman:⁷⁶

A rational plaintiff who considers whether to settle or litigate a case would first calculate the expected return of the case, based on the expected judicial award (or the monetary equivalent of other judicial reliefs), and the probability of attaining it. She would then subtract her expected costs of litigation from the gross expected return, to determine the minimal amount for which she might settle the case—that is, her reservation value. The defendant's reservation value—the maximum amount he might agree to pay to settle the case out of court—would be the expected judicial award plus his litigation costs. Under conditions of full information, accurate assessments of the expected award, and positive litigation costs, a settlement would be Pareto superior to litigation. As long as litigation costs are sufficiently high, even asymmetric information and divergent assessments of the expected judicial outcome do not obstruct settlement.

⁷⁵ Professors Luciana Yeung and Paulo Furquim, in another text written on this subject, address the issue of inefficiency: "Judiciary staff members usually credit inefficiency to the lack of resources. Judges and judicial employees argue that human and material resources at all levels are not sufficient to deal with the large number of cases. In recent years, the greatest concern is the continued underutilization of modern electronic procedures. However, legal experts, who are not involved in the daily operations of the courts, point to different explanations. In their view, knowing how to wisely manage available resources is more important than demanding more. Some high-ranking judges also agree with this argument. Another traditional explanation for court inefficiency is the very bureaucratic procedural law that Brazil inherited from the Portuguese and the civil law traditions. This is unanimously agreed upon as one of the primary reasons for the inefficiency. Slackness, a complex system of procedural rules, and an overemphasis on format are traces still present in the law today. In addition to that, criticisms are often directed to the ease of appealing judicial decisions. Some lawyers consider the large number of appeals unavoidable because, they say, it minimizes trial errors. Yet, this conclusion is not supported by the data. Rosenn (1998) shows that 90% of all decisions made in first instance courts is maintained by judges in the appellate courts. In other words, the high level of appeals simply means more useless work, more slackness, and more waste of resources". Luciana Luk-Tai Yeung & Paulo Furquim de Azevedo, *Measuring the Efficiency of Brazilian Courts from 2006 to 2008: What do the Numbers Tell Us?* (2011), available at: https://www.insper.edu.br/wp-content/uploads/2012/10/2011_wpe251.pdf.

⁷⁶ EYAL ZAMIR & DORON TEICHMAN, BEHAVIORAL LAW AND ECONOMICS 496 (2018).

For example, if we had well-defined decisions on specific matters, filing a lawsuit contrary to that precedent would have a low probability of success. In the words of Joshua D. Wright and Douglas H. Ginsburg, making bad decisions is expensive.⁷⁷

The absence of clear answers inevitably results in opportunism on the part of those involved in the judicial process. Oliver Williamson defines it using a famous formulation: "By opportunism I mean self-interest seeking with guile".⁷⁸ Williamson adds, "More generally, opportunism refers to the incomplete or distorted disclosure of information, especially to calculated efforts to mislead, distort, disguise, obfuscate, or otherwise confuse".⁷⁹ To a certain extent, the economy⁸⁰ can assist the law in identifying and diagnosing problems that cannot be resolved by the law itself.

Faced with this problem of opportunism and the general inefficiency of the judiciary, various alternatives have been proposed, including arbitration, mediation, conciliation, procedural legal affairs, and even the application of artificial intelligence.

However, having identified these problems, the question remains as to how to incorporate AI techniques in the provision of judicial services, and how to guarantee that its use will be guided by the appropriate values of justice and fairness. Here, it is important to highlight the word justice, which encompasses the social value of correct, equitable, and adequate resolution of legitimate disputes, as distinguished from the mere provision of judicial services. Thus, the same word addresses concepts having different meanings and objectives which often do not go together.

Richard and Daniel Susskind⁸¹ stress that countless changes result from technological advances and have an effect on the professional's everyday experience, as is the case with the constant digitization of documents and new forms of communication technology, which are implicated in the convergent points of "automation and innovation". In *Tomorrow's Lawyers: An Introduction*

⁷⁷ Joshua D. Wright & Douglas H. Ginsburg, *Behavioral Law and Economics: Its Origins, Fatal Flaws, and Implications for Liberty*, 106 Nw. U. L. Rev. 1033, 1033 (2015).

⁷⁸ OLIVER E. WILLIAMSON, THE ECONOMIC INSTITUTIONS OF CAPITALISM: FIRMS, MARKETS, RELATIONAL CONTRACTING 47 (1985).

⁷⁹ *Id.* at 47.

⁸⁰ For Adolfo Figueroa, the fundamentals of the economy are as follows: Economic science is concerned with studying particular types of social relationship: those that are established between individuals for the purpose of satisfying needs via the acquisition of goods. These are the economic relations. They give rise to economic activity. The object of economic activity is to produce goods and distribute them among individuals. Because economic activity is constantly repeated, the production and distribution constitute a process, the economic process. This repetition makes it possible to observe certain regularities or laws in economic activity. ADOLFO FIGUEROA, ECONOMIC THEORIES OF CAPITALISM 19 (1996).

⁸¹ RICHARD SUSSKIND & DANIEL SUSSKIND, THE FUTURE OF THE PROFESSIONS: HOW TECHNOLOGY WILL TRANSFORM THE WORK OF HUMAN EXPERTS 109 (2015).

to Your Future, Richard Susskind⁸² analyzes the impact of technology on the legal environment, specifically as it relates to the judge's function:

Looking beyond these rudimentary applications, how profoundly could technology affect the work of judges? In the early 1980s, I came to the conclusion that it was neither possible (technically) nor desirable (in principle) for computers fully to take over the work of judges. My position on this has not changed. Judicial decision-making in hard cases, especially when judges are called upon to handle complex issues of principle, policy, and morality, is well beyond the capabilities of current computer systems. However, I believe that some of the techniques and lessons of this book can be applied to judges as much as to other lawyers.

The legal sciences are substantially evaluative and ontological, that is, they refer to the subject itself, in its unrestricted and indispensable complexity. Ethical behavior is generally defined socially as that which is good and is directly linked to the moral rules of society generated by its own history and culture.

The magistrate is the agent of the judiciary entrusted with making decisions that are both fair and in accordance with the law. He must make decisions that resolve the actual conflict presented while also considering the ethical values and legal principles that underlie all judicial activity (transparency, legality, right to be heard, wide defense, etc.). The magistrate bases his actions and decisions not only on legal doctrine and the application of the positive rules of the legal system, but also takes into account a wide range of historical knowledge consolidated from centuries of experience examining diverse aspects of legal phenomena, including legal sociology, the history of law, philosophy of law, ethics, that is, all of the so-called "legal sciences".

The idea that machines could make legal decisions for the courts is not new and has existed for decades. The main question is how to introduce all of this knowledge, which is part of the theoretical training of all magistrates, into AI systems.

In some countries, such as Spain and France, this topic has been frequently debated.⁸³ In November 2018, Professor Dierle Nunes, in co-authorship with Ana Luiza Pinto Coelho Marques,⁸⁴ published an article entitled *Artificial Intelligence and Procedural Law: Algorithmic Biases and the Risks of Assigning Decision-Making to Machines*. The authors warn of the risks of assigning decision-making to machines, and in particular, to artificial intelligence systems:

⁸² RICHARD SUSSKIND, *TOMORROW'S LAWYERS: AN INTRODUCTION TO YOUR FUTURE* 102 (2017).

⁸³ Marcos Sierra, *El Constitucional prohíbe por primera vez el uso de inteligencia artificial en España*, VOX POPULI (Apr. 24, 2020), available at: https://www.voxpopuli.com/economia-y-finanzas/robots-ahorrarian-cuarta-parte-trabajo-jueces-espanoles_0_1260174449.html.

⁸⁴ Dierle Nunes & Ana Luiza Pinto Coelho Marques, *Artificial Intelligence and Procedural Law: Algorithmic Bias and the Risks of Assigning Decision-Making to Machines*, 285 REVISTA DE PROCESSO 421, 421-447 (2018).

[T]he decisions made by humans are impugnable, since it is possible to delimit the factors that gave rise to a specific response and the decision maker himself must offer the tier that induced him to such a response ... On the other hand, the algorithms used in artificial intelligence tools are obscure for most of the population —sometimes even for their programmers— which makes them, in a way, unassailable. As a result, the attribution of a decision-making function to artificial intelligence systems becomes especially problematic under the law.

Thus, even starting from a comprehensive database and using precedent, a new decision could come to have normative or binding force, causing any later selection and use to generate incorrect results causing a perpetuation of the error and compounding the difficulty of differentiating cases (distinguishing).⁸⁵ The authors continue:

There is no denying that the use of machines can bring several benefits to legal practice. As exposed at the beginning of this work, the implementation of AI systems for conducting research, classifying and organizing information, linking cases to precedents and drafting contracts has been shown to be effective in practice as it provides greater speed and accuracy. However, assigning them the role of making decisions, acting in the same way as a judge, can mean an even greater expansion of inequalities that permeate our Judiciary system, supporting it, moreover, with a technological decisionism. This is because, however biased the decisions made by judges, there is always a certain degree of access to the reasons (even wrong, subjective or biased) that led them to adopt a certain position, because, even if they decide consciously or unconsciously for implicit reasons, their decisions must be substantiated. Thus, in all cases, those affected can challenge and discuss them.⁸⁶

The issues raised by these authors are extremely important to this debate. However, their concerns may be addressed with the evolution of the technology and subsequent advances in AI. There have already been tests conducted comparing the performance of AI with legal professionals which have demonstrated that the machine's success rate tends to be higher than that of a human and that the work can be completed in much less time. In an experiment conducted by LawGeex, for example, a competition was held between its AI and twenty experienced lawyers. The assigned task was to review five terms of confidentiality. The result was surprising: the AI managed to find 94% of the inconsistencies, whereas the average for lawyers was only 85%. One of the human lawyers was able to match the percentage achieved by the AI, that is, 94%. However, another lawyer found only 67% of the inconsistencies. That lawyer missed 27% of the inconsistencies that were present in the terms

⁸⁵ *Id.*

⁸⁶ *Id.*

under examination.⁸⁷ Regarding the time required to complete the activity, the AI finished the activity in less than 26 seconds, while the average human lawyer took an hour and a half to complete the same task.

France has banned the publication of statistics related to court decisions. The penalty for those who disclose this data is up to five years in prison. The rule is contained in Article 33 of the Judicial Reform Law,⁸⁸ which added provisions to other laws as well, such as the Penal Code. The provision establishes that “the identity data of magistrates and judiciary servants cannot be reused with the aim or effect of evaluating, analyzing, comparing, or forecasting their professional practices, real or alleged”⁸⁹

According to the website Artificial Lawyer, French magistrates were uncomfortable with companies using artificial intelligence to systematize public data regarding how magistrates usually decide cases and rule on certain subjects in an attempt to predict the outcome of trials and compare the results with their colleagues.⁹⁰

In practice, the law prohibits analysis of data related to the French judiciary. The change was endorsed by the French Constitutional Council. That court found that French lawmakers sought to prevent mass data collection from being used to pressure judges to decide cases in a certain way or to devise strategies that could harm the functioning of the judiciary.⁹¹

Professor Lenio Streck,⁹² in an article published on the website Consultor Jurídico (Conjur), entitled *Lawtechs, Startups, Algorithms: Law that is Good, Not to Mention, Right?* Asserts:

I have spoken of this and warned of the paradox: if extreme technologization works, it will go wrong. It is like research that seeks to objectify or mathematize the brain and emotions, with electrodes and quejandos: if it works, it will go wrong, because it ends philosophy.

Thus, the use of new technologies in the law has generated significant concern and criticism which will have to be thoroughly addressed. Yet, two questions remain. First, will it be possible, at some point, to replace the human judge with artificial intelligence? And second, are Brazilian legal provisions on this subject satisfactory in light of modern demands? These are

⁸⁷ Wilson Engelmann & Deivid Augusto Werner, *supra* note 45, at 149, 160.

⁸⁸ Sergio Rodas, *França proíbe divulgação de estatísticas sobre decisões judiciais*, CONJUR (Jun 5, 2020), available at: <https://www.conjur.com.br/2019-jun-05/franca-proibe-divulgacao-estatisticas-decisoes-judiciais>.

⁸⁹ *Id.*

⁹⁰ *Id.*

⁹¹ *Id.*

⁹² Lenio Streck, *Lawtechs, Startups, Algorithms: Law that is Good, Not to Mention, Right?*, CONJUR (Apr. 6, 2020), available at: <https://www.conjur.com.br/2019-mai-16/senso-incomum-lawtechs-startups-algoritmos-direito-bom-nem-falar-certo>.

questions that will be answered by the legal community in the coming years. In Brazil, the constant increase in the judicialization of social spheres and the increasing cost of the judicial machinery demonstrate the interplay between the twin interests of “efficiency” and “accuracy” in the application of the law. This is occurring despite the introduction of measures whose aim is to stimulate the self-composition of litigation (mediation and conciliation), and to strengthen arbitration as an alternative to judicialization. Rapid application of the law is not an advantage if the decision is incorrect. Likewise, a correct decision is not a benefit if the decision comes too late. A fertile path facilitates the introduction of new technologies into the Brazilian juridical structures, given the continental conditions of the territory as well as the volume of civil and criminal litigation requiring prompt decisions. Artificial intelligence can provide an acceleration of procedures that do not depend on the immediate performance of the judge and can perform functions that are essentially notarial or mechanical in the sense that they follow a well-established protocol not requiring a deep, probative assessment. Considering the range of technological possibilities available, applications limited to reading petitions or the generic identification of the content of a petition could be adopted in different courts of the Federation in order to expedite judicial processes. Further along the timeline, automated systems might be able to formulate “decision suggestions” for the judge, in order to facilitate the magistrate’s analytical work, without replacing or diminishing the magistrate’s individual responsibility. The gradual reduction in demands on the magistrate would imply (i) a reduction in the cost of the judiciary, and (ii) increased speed on the part of the state in responding to issues involving the protection and enforcement of the rights of persons whose interests are being adjudicated.

V. TECHNOLOGY PROBLEMS AND LACK OF SUPERVISION: THE BRAZILIAN CASE

The judicial process in Brazil, some years ago, started to aim for a virtual life, inside the computer, away from papers and inks, as well as from signatures and stamps, which adorned thick notebooks that contained people’s lives, their struggles and glory, transcribed in a language —sometimes— polished, all in order to (try) to give each one what is his. Today, in addition to the various types of systems, which sometimes make life difficult for users, narratives have become icons that demand clicks; the computer became the procedural notebook, and the stamps became as important as the landline. The pens, distressed, also have an uncertain future.

Bizarre situations, however, have resulted from this procedural virtualization. Recipes for cooking and unorthodox dialogues have entered the record. Memes and emojis, a cultural product of postmodernity, exist alongside coats

of arms. In some cases, decisions have been made as if multiple-choice forms had been used, lacking any demonstration of effective reasoning.

The pandemic itself, which showed us how fragile humanity is, combined with cameras and tele presential court sessions, where each person is in the comfort of their home, has already made severe constraints emerge. Such cases are punctual and —sometimes— understandable: we are all human beings. Recently, however, a very disturbing case that demanded our reaction went viral on social media.

The attorney general of a Brazilian municipality filed a tax foreclosure against the agency itself; and urged to clarify the situation, having remained inert, she saw an extinction sentence issued. Against that decision, he filed an appeal for a declaration embargo, upholding a material error and arguing for the suspension of the fact until the location of the defendant (the municipality itself). Then there was a summons from the embargoed, executed party to present counterarguments (the municipality would then respond to the opposing embargoes by itself); and, subsequently, there was a decision canceling such summons and rejecting the appeal, in the absence of any defects in the sentence. Resigned, the municipality appealed, seeking in the Court of Justice the reform of the sentence, so that the fiscal execution of the organ would continue to be processed... against itself. There was a decision recognizing that “referral for counter-reasoning was unnecessary, since the executed party did not” had appointed a prosecutor in the case file and determined that the case file should be sent to the 2nd level of jurisdiction, with the style tributes. On 06/18/2020, the *ex lege* representative of the municipality filed a petition informing that the execution was initiated by “system error” and asked for the extinction of the fact for the withdrawal.

This process has been processed electronically since October 17, 2018 (date of distribution), having taken the space of some other process —criminal or not— as well as consuming public resources, being a paradigmatic and quite embarrassing case. Not only because the public entity filed a lawsuit against itself, but also due to the lack of management of the whole situation, pending its solution quickly and efficiently almost two years after its —already inadequate— start.

Given that Brazil is a developing nation with limited resources, the waste of public money continues to appear in one of its worst manifestations, inefficiency, even though this issue has been specifically addressed by the Brazilian Federal Constitution in its Article 37.⁹³ This case, therefore, had an aggravat-

⁹³ See Brazilian Constitution article 37. The inclusion of the principle of efficiency in the list of principles that bind the Public Administration, provided by article 37 of the Federal Constitution, is linked to the idea of managerial administration and the results of the administrative activity, with a recognition that the public legal regime, being very procedural, “is not able to guarantee the best advantages.” Emerson Gabardo, in turn, justifies the need to use the expression “efficiency of the State,” in order to cover the administrative, legislative, and judi-

ing factor: the continuous and repetitive mistakes were made by public agents, all financed by taxpayers. Due to the lack of adequate supervision, the technology ended up generating more inefficiency. The inefficiency affected not only this case, but also had an impact on other important work of the agency since the hours spent on this case could have been allocated to other cases.

Error is a common part of the human experience and is sometimes necessary for learning and progress. A regular succession of errors, however, demands examination. This reflection calls for prudent action and humility from which the human being, with technologies, ended up breaking free. When used with prudence, technology undoubtedly improves man's life, being imperative that he, as an animal that is, limited and insecure in the face of time and the universe, recognizes itself as small, and, therefore, improves its protocols of performance, continuously supervising himself.

VI. CONCLUSION

There is no doubt that artificial intelligence is here to stay. This also applies its use in the law. Modern society demands faster and more efficient solutions from the judiciary. The positive, preliminary results obtained in the application of AI to the courts suggest the gradual introduction of AI in day-to-day forensics. It will be up to legal practitioners to adapt to the new reality.⁹⁴ Artificial intelligence is the most sophisticated type of algorithm and can be understood as a set of commands which aim to imitate or simulate the human decision-making process. With that objective in mind, a set of routines is designed which direct the course of action an automated system takes to arrive at a decision (*output*). The more elaborate the programmed routine, that is, the degree to which it operates beyond the use of a decision tree or flowchart, the stronger an artificial intelligence is (*strong AI*), whereas the more

cial functions. EMERSON GABARDO, *O PRINCÍPIO CONSTITUCIONAL DA EFICIÊNCIA ADMINISTRATIVA* 18 (2002). Efficiency is the guiding principle for all Public Administration activities, requiring, among other things, speed, and precision, as opposed to slowness, neglect, omission, or negligence. *See also* ODETE MEDAUAR, *DIREITO ADMINISTRATIVO MODERNO* 152 (2000). Not only is compliance with legal procedures necessary for the efficient performance of administrative functions, but also achieving the desired result. It is important to emphasize, in the words of José Manuel Sérvalo Correia, that "Administrative legality may mean, in the first place, that the acts of the administration must not contradict the legal rules that apply." In our legal system, it would be the same thing to say that the public administration must adhere to the principle of legality. *See also* JOSÉ MANUEL SÉRVULO CORREIA, *LEGALIDADE E AUTONOMIA CONTRATUAL EM CONTRATOS ADMINISTRATIVOS* 18 (1987). Stated simply, efficiency achieves a greater result, both in a quantitative and qualitative sense, at a lower cost, by doing more and better with less. Efficiency always seeks to achieve the best result given the economic resources available. This is called resource optimization. Demétrio Giannakos, *O princípio da eficiência e public choice*, 5 *REVISTA LUSO BRASILEIRA DE DIREITO* 573, 579 (2017).

⁹⁴ FABIANO HARTMANN PEIXOTO, *supra* note 43, 71.

rudimentary and dependent on human involvement it is, the weaker the algorithmic model (*weak AI*).

In what sense could a judge be replaced by a tool based on artificial intelligence? Examples of the applications of artificial intelligence presented in this article demonstrate that for repetitive activities (middle activity), or for decision-making in situations where the rules and hypotheses are predictable and identifiable (end activity), the machine tends to exceed the level human performance in accuracy, the time required to carry out tasks, or both.

Nevertheless, the future of the idea of replacing judges with AI remains ambiguous, particularly due to uncertainties attributable to the applications themselves and the databases used by the machine. In addition, the difficulty of formalizing the rules, principles, and ethical values that inform all judicial decision-making adds another layer of complexity. Therefore, what remains for legal practitioners to discuss and validate is the degree to which AI can, or should, be applied to the law, since the debate regarding whether or not AI can be introduced into the legal arena in the first place has already become outdated.

Regarding the Brazilian reality, several issues should be highlighted, particularly for researchers who wish to carry out comparative studies on topics related to the feasibility and practicability of potential applications of artificial intelligence. First, the wide range of judicial demands that are filed in national courts which present recurring and low-complexity issues may be suitable for automated decision-making. Second, artificial intelligence may be able to address the need for increased speed in resolving the growing number of judicial actions brought before Brazilian tribunals. Third, the prospect of replacing the judge with automated systems warrants philosophical debate regarding the parameters and significance of the judge's interpretative activity. Software cannot distinguish social classes or consider the prestige of the lawyer who sponsors a case, such that those who present their cases to the court are treated in a similar, albeit automated, way, without any bias based on appearance or prestige. This implies that the supervision of the work carried out by artificial intelligence will occur later, which suggests a confidence in the technology and an ability to correct any error in the evaluation of the algorithm.

As a result, from a *jus* philosophical perspective, one could argue that judicial replacement by AI could signal the "end of interpretation." This is because an algorithm would not be able to interpret a case (the facts to be decided), rather, it could only associate or connect a ready answer to the case under consideration (a merely legal response). This position has been elaborated by Professor Lenio Streck. In other words, although the system might be efficient, the legal result could be incorrect due to the absence of a principled or contextual analysis that "escapes" the predetermined commands of the routine. This would be a deviation from the judiciary's objective of protecting the rights of litigants. This is clearly not the intended goal

of those advocating the introduction of innovative technological tools to the judiciary.

Therefore, we can conclude that the replacement of the judge by automated algorithmic tools would require the assessment of two principal factors, even if it does promote efficiency and reduce costs. These factors are *(i)* the adequacy and efficiency of the response to the case under consideration and *(ii)* the ability of computerized routines to adapt and improve the quality of their application of the law by accommodating and incorporating possible human corrections of the automated decisions. Since the aim of artificial intelligence is mimicking the human decision-making process, it must be capable of performing judicial activity which includes correctly applying the relevant legislation and jurisprudence to the specific set of facts of a particular case, as well as correcting any inaccuracies in the interpretation of facts and legal texts. With this in mind, the application of artificial intelligence could be relied upon to resolve low complexity cases, or those involving simple, recurring issues, whereas complex cases necessitating judicial intervention might require that AI systems be limited to use as an aid to the magistrate in the decision-making process.