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SMART ALGORITHMS AS A PREREQUISITE FOR THE USE OF ARTIFICIAL INTELLIGENCE IN JUDICIAL DECISION-MAKING

The turn-of-the-century advancement of technology opened the possibility of excluding the human factor in many areas. The tendency to speed up the processes in all fields of work can be compared with the tendencies that occurred during the First Industrial Revolution. Education, goods production, services, sports, entertainment, medicine... there is almost no field that does not take the advantage of computer and Internet technologies, especially machine learning (ML) and artificial intelligence (AI). For the purposes of theoretical considerations, starting from the traditional view of the separation of powers into a legislature, an executive, and a judiciary, the question can be raised as to whether and under what conditions AI can be used in the judicial decision-making process, that is, whether, under certain conditions, it can be left to a computer to perform actions or reach decisions in court.

Key words: AI. – Smart Algorithms (machine learning). – Judicial Decision-Making.

1. INSTEAD OF AN INTRODUCTION

At the very start, the distinction between smart algorithms and artificial intelligence (AI) indicated in the title should be explained. It is not uncommon for the public to hear that companies will apply AI to improve their services or to reduce costs. It is believed that the use of AI would replace human staff in many workplaces. One gets the impression that AI is to be applied to almost every device people use, each and every software or work process. Before delving further into the subject of this paper, the author believes it advisable to point out

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the distinction between the terms *algorithm*, *machine learning (ML)* and *AI*.

The above concepts are often used interchangeably in the public. Even at an early age, children acquire the basic idea of an algorithm through the educational systems, which in keeping up with the times, have introduced basic mathematical and logical concepts in primary curriculum. A sequence of clear, well-defined instructions designed to solve a particular problem or perform a calculation, is the most common definition of an algorithm. From the aspect of problem solving, each of the above terms is a type of algorithm in its core, nevertheless the author finds it necessary to make a distinction between the three.

The difference should be made from the aspect of use, and not from the aspect of computer science or mathematics, as Blass and Gurevich (2003) did in their paper.¹

ML is a broader term than algorithm. “Machine learning is a branch of computer science that broadly aims to enable computers to ‘learn’ without being directly programmed. It has origins in the artificial intelligence movement of the 1950s and emphasizes practical objectives and applications, particularly prediction and optimization. Computers ‘learn’ in machine learning by improving their performance at tasks through ‘experience’. In practice, ‘experience’ usually means fitting to data; hence, there is not a clear boundary between machine learning and statistical approaches.”² It can be concluded that ML implies a series of algorithms that improve the result of their actions by studying experiential (statistical) data.³

In explaining the concept of AI, Ertel (2017)⁴ starts from the definition given by the “father of AI” John McCarthy (1927–2011): “The goal of AI is to develop machines that behave as though they were intelligent.” This implies that AI is a broader term than ML. “In

1 Andreas Blass, Yuri Gurevich, “Algorithms: A Quest for Absolute Definitions”, *Bulletin of the European Association for Theoretical Computer Science* 2003, 81.

2 Qifang Bi, Katherine E. Goodman, Joshua Kaminsky, Justin Lessler, “What is Machine Learning? A Primer for the Epidemiologist”, *American Journal of Epidemiology* 188(12)/2019, 2222–2229, fn. 2.

3 The success in applying experiential data depends on the number and type of statistical data in the machine learning module.

4 Wolfgang Ertel, *Introduction to Artificial Intelligence*, Springer, Switzerland 2017, 1.

simplest terms, AI is computer software that mimics the ways that humans think in order to perform complex tasks, such as analyzing, reasoning, and learning. Machine learning, meanwhile, is a subset of AI that uses algorithms trained on data to produce models that can perform such complex tasks.”⁵

Now that the above terms are conceptually distinguished, we can proceed to considering the use of AI in the judiciary.

2. JUDICIARY AS A “PROPER PROBLEM” TO BE SOLVED BY COMPUTER PROGRAMS

Democratic states with separated powers organize the judiciary, or judicature, in accordance with their highest legal act – the Constitution. Using tools and aids to achieve that function, raise the quality of decision-making, and increase efficiency, is certainly desirable. Courts mostly rely on modern computers, software, and printers to perform the technical part of their work: transferring text to paper, editing, sending messages, filing, etc. The introduction of software that would “think” and help in decision-making would be a kind of innovation in the functioning of the judiciary. The replacement of typewriters with computers, or indigo papers with printers, cannot be called a great technological advancement in terms of decision-making, since decisions are still made by people, only they have become neater.

Although generically designated as “judiciary”, this branch of government is quite a heterogeneous concept in terms of the matter it covers. Courts decide in criminal and civil matters, labor or economic cases, etc. The decisions are reach by individual judges or panels of judges. Courts also decide on legal remedies after hearing the involved parties, witnesses, interested parties, experts, in a word, all the stakeholders in a court case. The court gives orders, make decisions, or cancels the existing ones in a multitude of legal and factual cases involving any number of participants. How is it possible then to think that the human factor, representing the most intelligent being on earth, could be replaced by a machine? The judge is the one who must evaluate a specific situation, apply norms, and based on those norms, make legal

5 Coursera, “Machine Learning vs. AI: Differences, Uses, and Benefits”, <https://www.coursera.org/articles/machine-learning-vs-ai>, accessed 20 November 2023.

decisions. How can a machine fully grasp a situation when it is not capable of thinking, feeling, or drawing conclusions? What would be the elements necessary for a machine to fully understand the context of what is being argued in court?

Decisions of other authorities are also discussed in courts. The court is authorized to assess the legality of decisions, or in the case of the Constitutional Court, regulations. It happens that even among the most elite lawyers in a country that make up the Constitutional Court, individuals have different opinions on a certain issue. A similar situation can be seen before the European Court of Human Rights in Strasbourg. How can all those differences be reconciled and an algorithm produced that would be able to completely, or partially, replace the human factor in court decision-making? In other words, is it possible to bring judicial matter under the unified set of rules that could be translated into software able to produce a decision based on the entered parameters?

We can compare unified rules with clearly given instructions in an algorithm to solve a problem or part of it. It is possible to enter all the regulations into a database, unlike all the circumstances in life. The judge is the one who hears the parties and separates the important from the unimportant towards reaching a decision. To replace the judge in court would mean using a set of machines that would make decisions based on the entered parameters. Is it possible to design specific parameters for any number of life situations or circumstances?

Even if machines were tasked with making first-instance court decisions, how would the criteria for “second-instance court machines” decision-making be devised? Such questions may appear banal, very likely leading to a conclusion that court decisions would never and could never be performed by computers, software, machines. Courts very often decide on human rights, i.e. in matters vitally important for an individual. Therefore, it is justified that people, as the most intellectually developed beings, deal with such important issues.

However, important decisions are also made in medicine, when a person’s life is at risk, and there is already a lot of evidence of AI really helping in the matter or suggesting decisions a person would not be able to make or would probably make a wrong one in specific circumstances. How is it then that the use of AI is justified in medicine, but not in judiciary?

It cannot be said that the judiciary is less important than medicine, although medicine has saved countless lives. Regarding the dilemma, it can be argued that what is compared here is incomparable. Medicine is an entire scientific discipline, while judiciary is one of the branches in the institutional separation of power. This remark is correct but the comparison is made for the sake of illustration and tickling readers imagination so that they might turn towards considering the use of modern technologies, including AI, in court decision-making in specific circumstances, just as in medicine, and not disregarding it altogether.

3. JUDICIAL MATTER AND ALGORITHMS

Theoreticians generally agree that the judiciary, in a system with powers separation, must be independent. Dimitrijević (1975)⁶ pointed out five principles on which the judiciary in the former Socialist Federative Republic of Yugoslavia (SFRY) rested, which have not changed significantly until today: the independence of the judiciary is certainly the first and foremost principle; court hearings are public, and the rulings made by a panel of judges, except in cases where the law stipulates a single judge; the two-instance court system is in place, that is it is possible to re-evaluate the first-instance court decisions; the decisions are implemented in the entire territory of the Republic of Serbia (then SFRY) in accordance with the law. “The judiciary, that is, judicial power, is tied to the state and the law. It is a function performed by state authorities – courts, by applying legal norms. In that respect, courts actually resolve disputes arising from non-compliance with the legal norm and are tasked with preserving the existing legal order.”⁷

The question is: do the courts deal exclusively with dispute resolution? No. A glaring example is the opening of a court deposit in the Republic of Serbia. In this specific case, there is no dispute, but upon the request and in accordance with the rules of non-litigation proceedings, the court opens a court deposit in favor of a certain beneficiary.

6 Momčilo Dimitrijević, “Sudska funkcija i njen položaj u našem sistemu”, *Zbornik radova Pravnog fakulteta u Nišu: tematski broj. Trideset godina pravosuđa u socijalističkoj Jugoslaviji*, Pravni fakultet Univerziteta u Nišu 1975, 17–33.

7 *Ibid.*

If the specific procedure for opening a court deposit is abstracted for a moment, the following can be concluded: Person A wants to deposit money or valuables in the court deposit for the benefit of Person B. Upon the submitted request, the court approves the deposit of funds, provided the costs are advanced beforehand. This action corresponds to a banking deal. Person A, as an authorised signatory for an account, deposits money in the bank in favor of Person B, the holder of the account. Person A does not have to go to the bank to make a deposit, but can use an ATM instead. An ATM is controlled by algorithms, as the most basic forms of software engineering. The question arises as to why the out-of-court procedure of opening a court deposit could not be exempted from the jurisdiction of court and entrusted to machines? Even without excluding it from the court's jurisdiction, why not put machines to work?

In order to relieve the burden on the judiciary, it would be advisable to delegate to the machines the repetitive tasks that can be brought under general rules of conduct, beyond reasonable fear that a situation might arise in which the prescribed rules could not be applied. To exclude the possibility of machine error, it would be necessary to provide a human factor that would revise the decisions made.

The judiciary could also be relieved of disputes based on objective facts that can be brought under the same rules of conduct. To illustrate this, let us take an out-of-court procedure for the division of possessions or property. In dividing immovable property, for example, two cases are possible: it is either possible to divide the property or it is not. The decision is reached by the agreement of the parties or based on the findings and opinions of civil engineering experts. Provided the division is possible, the court would have to take into account the “justified demands and interests of co-owners”⁸, that is, parameters that cannot be determined by a simple algorithm. In that case, the solution could be reached by means of machine learning. A large database of numerous court practices could provide a set of “special needs of a particular participant”⁹, which justify the decision that property should belong to him. In that way, the machines could simplify, accelerate, and make the

8 The Law on Non-Litigation Procedure (*The Official Gazette of RS*, no. 25/82 and 48/88 and *The Official Gazette of RS*, no. 46/95 – other law, 18/2005 – other law, 85/2012, 45/2013 – other law, 55/2014, 6/2015, 106/2015 – other law and 14/2022), Article 153.

9 *Ibid.*

procedure more accessible, and what should definitely be highlighted, they would reduce the number of cases in which a human decision-making is necessary.

Both of the above illustrations mean that certain judicial tasks could be entrusted to machines, which would very likely produce a satisfactory result. Judicial principles of independence, publicity, first- and second-instance courts, and enforceability would certainly be applied, even improved. By entrusting court affairs to machines, statistical data processing would rise to an enviable level. By studying the data, it would be possible to get absolutely accurate picture of the type of case, its duration, the resolving method, costs, etc. This would also allow for a greater degree of connectivity between the state administration and automatic implementation of changes.

In the specific case of property division, should the division be entrusted to machines, after the court decision takes legal effect, the machine could forward the decision to another machine (the Republic Geodetic Authority – the Real Estate Cadastre Service), which would change the holder of the right to the specific property. Furthermore, the same document could be automatically forwarded to a third machine – the Tax Administration within the Ministry of Finance, so as to record the right holder as a taxpayer.

In this specific case, the use of algorithms and ML (smart algorithms) would have multiple benefits. On top of it, it would be necessary to relieve the judiciary of all the tasks that do not require AI. The use of AI in all the matters, as it is now defined, would make the process more complicated, forcing courts, that is humans, to deal with matters that could completely be left to machines. Therefore, it would be necessary to classify the matter and entrust it to a form of advanced technology that could successfully perform the entrusted task.

4. JUDICIAL DECISION-MAKING AND AI

The introduction of algorithms and smart algorithms (ML) in regular court proceedings makes space for judges to deal only with matters requiring higher degree of intellect.

There are several courts in a country. In courts, judges exercise direct judicial power. Even though they are independent in the performance of their duties, as individuals, human beings before all, they are

exposed to the impact of the surrounding, cultural events, customs. A certain phenomenon, although common in one part of the country, could be quite rare and unusual in the other. A judge who have dealt with the phenomena in question before would have a different attitude to it than a judge who comes across the phenomenon, either directly or indirectly, for the first time. A machine, in that sense, has no “fore-knowledge”.

Diversity of life situation over the years affects people. People of different sex react differently to the same phenomenon, so do people of different age. In their lifetime, people as social beings participate in many life events, which certainly leave a mark on them, and it is not uncommon that, regardless of the high level of professionalism, a judge, as an individual, finds himself of herself in a situation to discuss a case similar to an experienced event, which inevitably provokes certain feelings. Machines, unlike humans, have no feelings.

“However, despite this, the judiciary is not dogmatic, normative, but strongly related to society and human relations, which is especially manifested in the application of law, in conflict resolution.”¹⁰ It can be said that machines can help and use the results of machine learning to provide judges with data to resolve a specific disputed relationship, but a machine without feelings and human instincts cannot be left to apply normative solutions to specific situations.

Therefore, a possible solution would be a selective application of AI. Namely, it would be possible to use AI to process data collected by machines in the process of ML in specific areas – needed in a specific court case. The judge could then interpret the data processed in this way and compare them with the evidence presented in court and try to reach a proper solution.

However, the application of AI in the judiciary can also be viewed from the opposite aspect – deciding on entering into a dispute. Namely, the parties are often convinced of success before the court and are often disappointed if they do not succeed in the proceedings. In those situations, they often blame the established system and doubt the correctness of the decision, even when it has been confirmed by higher authorities. Frequent changes of positions on certain issues, even by the same court, and the absence of absolute consistency in making

10 Dimitrijević (1975), *op.cit.*, 18.

court decisions contribute to this. In such cases, AI would provide the judge with the exact data from all the courts that tried the same matter with the same factual situation and the outcomes of such disputes in all instances. The availability of such data would certainly help the judge reach a decision and contribute to the consistency of judicial practice across courts, potentially nationwide. At the same time, the existence of such a tool would allow the parties to project the outcome of their dispute. Hardly anyone would get involved in a dispute if the outcome was not favorable.

One of the biggest benefits of AI would be the evident acceleration of procedure. Namely, the use of AI implies a dramatic increase in electronic communication. With the development of the electronic communication culture, the issue of delivering court documents to other instances or institutions, as the most time-consuming part of judicial and administrative procedures, would be forgotten. By solving the issue of delivery, processing times could be incomparably shorter. The notification of all stakeholders would be instantaneous, and the courts, relieved of tasks that could be performed by machines, would have enough time to deal with active cases and control their own workload, for which today there are insufficient resources.

Finally, what should be highlighted here is that the use of AI implies gradual adaptation of the system to the new tendencies. The acquired habits of all the stakeholders in the proceedings cannot be changed in a short period of time. The mere identification of matter that can be assigned to algorithms and smart algorithms takes a lot of time. For judges to get accustomed to the daily use of modern technology tools made possible by AI would also take time. The use of AI implies the introduction of software, which must first be developed. The development of the software itself must go through several stages, and given the sensitivity of the issues it would be programmed to deal with, its testing would probably last for months, even years.

5. CONCLUSION

The judiciary involves dealing with a wide range of matters. The scope of work undertaken by courts is often an obstacle to raising quality and efficiency. Handing over the decision-making in typical cases to machines is a basic prerequisite for courts to use AI in resolving disputes. The scope of work that the courts are currently dealing with must be broken down, and before the application of AI, it would be necessary to relieve the courts of everything that can be entrusted to the independent operation of machines guided by algorithms and smart algorithms. A judicial matter in which smart algorithms, i.e. ML during discussion, cannot give satisfactory results, is precisely the matter to which AI is applicable. However, that matter must first be reached.

The use of AI would bring multiple benefits. First, the introduction of a new software, aiming to help in decision-making, would imply a general transformation of the entire system and the habits of all stakeholders.

Second, with the introduction of machines, the reporting process and securing publicity could be improved many times over as a side effect of the implemented changes.

Nevertheless, although AI is developing at unprecedented speed, it is unrealistic to expect its implementation in the judiciary in short time intervals.

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PAMETNI ALGORITMI KAO PREDUSLOV ZA UPOTREBU VEŠTAČKE INTELIGENCIJE U PRAVOSUDNOM ODLUČIVANJU

Rezime

Tehnološki napredak na prelasku vekova stvorio je mogućnost eliminacije ljudskog faktora u mnogim oblastima. Tendencija da se ubrzaju procesi u svim oblastima rada može se uporediti sa tendencijama koje su se javile tokom Prve industrijske revolucije. Obrazovanje,

proizvodnja robe, usluge, sport, zabava, medicina... gotovo da nema oblasti koja ne koristi prednosti računarskih i internet tehnologija, posebno mašinskog učenja (ML) i veštačke inteligencije (AI). Za potrebe teorijskih razmatranja, polazeći od tradicionalnog pogleda na podelu vlasti na zakonodavnu, izvršnu i sudsku vlast, može se postaviti pitanje da li i pod kojim uslovima se veštačka inteligencija može koristiti u sudskom odlučivanju, odnosno da li se pod određenim uslovima može prepustiti računaru da vrši pojedine radnje ili čak donosi odluke u sudskim postupcima.

Ključne reči: *Veštačka Inteligencija (AI). Pametni algoritmi. – Donošenje Sudskih odluka.*

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