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# The impact of Artificial Intelligence on justice systems

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# The impact of Artificial Intelligence on justice systems

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ABSTRACT: Nowadays, the emerging of Artificial Intelligence technology has become very relevant for many parts of our lives. Thus, Artificial Intelligence is changing many aspects of our living conditions, including the way in which we work. In this regard, there are predictions that many aspects of human activities will be replaced or supported by newer technologies. Moreover, the creation of advanced machinery is changing the practice of law and the way in which judges make decisions in a judicial process. The aim of this paper is to analyze the impact of AI on justice systems and the problems concern the use of Artificial Intelligence in Court, especially in the criminal justice system.

KEYWORDS: Artificial Intelligence; Courts; Judges; Criminal justice

SUMMARY: 1. Introduction – 2. The use of Artificial Intelligence in Court – 3. Judges and Artificial Intelligence – 4. Artificial Intelligence and Criminal Justice – 5. Conclusion

## 1. Introduction

The prospect of creating intelligent computers have fascinated many people for as long as computers have been created[1]. The traditional ways of designing intelligent systems have achieved a perfect result since engineers have started to realize that computers could be used for more than just calculating numbers. In our modern world, many computer systems are equipped with Artificial Intelligence and scientists have been trying to imitate human intelligence behavior with computer programs.

The promises of Artificial Intelligence to improve our lives are vast[2]: in fact, nowadays, AI- based systems have outperformed medical specialists in diagnosing certain diseases. Also, AI has allowed institutions to more while spending less with concomitant benefits for the availability and accessibility of all kind of services.

But, what do we mean by the word "Artificial Intelligence"? Artificial intelligence is a «science and a set of computational technologies that are inspired by the way people use their nervous system, body, senses and how they learn, reason and take actions»[3]. However, there is an immense discussion about the precise definition of Artificial Intelligence. For example, *The New International Webster's Comprehensive Dictionary of the English language* (Encyclopedic Edition) offers four definitions of Artificial intelligence:

- An area of study in the field of computer science. Artificial intelligence is concerned with the development of computers able to engage in human- like thought processes such as learning, reasoning and self-correction.

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[1] J.N. KOK, E.J.W. BOERS, W.A. KOSTERS, P. VAN DER PUTTEN, *Artificial intelligence: definition, trends Techniques and cases.*

[2] F. RASO, H. HILLIGOSS, V. KRISHNAMURTHY, C. BAVITZ, L. KIM, *Artificial intelligence and Human rights,* 1, September 25, 2018, 7

[3] B.J. GROSZ, C. RUSS, A. ERIC, H.A. MACKWORTH, T. MITCHELL, D. MULLIGAN, Y. SHOHAM, *Artificial Intelligence and life in 2030,* 1 September 2016, 4.

- The concept that machines can be improved to assume some capabilities normally thought to be like human intelligence such as learning, adapting, self- correction etc.
- The extension of human intelligence through the use of computers in the time past physical power was extended through the use of machinery tools.
- In a restricted sense, the study of techniques to use computers more effectively by improve programming techniques.

Even though there is not a unique definition of Artificial Intelligence most of the definitions share these four features: i) «system that think like humans», ii) «system that act like human», iii) «system that think rationally», iv) «system that acts rationally»[4].

However, Artificial Intelligence can be programed in many ways, but the two main program designs are: machine learning and deep learning. The former process consists on the capacity of a computer program to adopt new data without human interferences. Specifically, machine learning is «the process by which a computer is able to improve its own performances by continuously incorporating data into an existing statistical model»[5]: precisely, the machine receives an amount of data and afterwards it modifies the algorithms by using the information it has received. The latter is an Artificial Intelligence function that imitates the workings of the human brain in processing data and creating patterns to use in decision-making. Accurately, deep learning «[…] a subset of machine learning in AI that has networks capable of learning unsupervised from data that is unstructured or unlabeled and it is also known as "deep neural learning" or "deep neural network"[6]». Moreover, the large set of technologies and techniques under the «Artificial Intelligence umbrella» can be classified into two «buckets»[7]: the first, can be synthesized as «knowledge-based systems», which is connected to the notion of generating behavior by means of deduction from a set of axioms[8]and are good in taking optional decisions based on defined rule within a specific domain (but they are not able to learn or automatically leverage the information they have received over the time) . The second is a bucket of technologies that «use statistical learning to continuously improve their decision- making performance». This new wave of technologies has been made possible by the exponential growth of computer processing power, the massive result decline in the cost of storage and the resulting acceleration of data collection efforts. Systems in this category include self-driving vehicles, facial recognition used in policing and natural language processing techniques that are used to automate translation and content moderation[9].

[4] F. Raso, H. Hilligoss, V. Krishnamurthy, C. Bavitz, L. Kim, *Artificial intelligence and Human rights,* cit.
[5] https://www.merriam-webster.com/dictionary/machine%20learning.
[6] https://www.investopidia.com/terms/m/deep-learning.asp.
[7] F. Raso, H. Hilligoss, V. Krishnamurthy, C. Bavitz, L. Kim, *Artificial intelligence and Human rights,* cit.
[8] N. Cristianini, *On the Current Paradigm in Artificial Intelligence*, in *AI Communications,* 27, 1, January 1st 2014, 3-5.
[9] F. Raso, H. Hilligoss, V. Krishnamurthy, C. Bavitz, L. Kim, *Artificial intelligence and Human rights,* cit.

Nevertheless, newer technologies can be adopted to improve information and communication service in justice systems to help the implementation of legislation on small claims procedures and to increase cross-border cooperation between justice authorities. This can also be useful in terms of development of transparency and of contribution to consistency in case- law. Furthermore, as Thomas Julius Buocz claims «Artificial Intelligence can be used as a tool to analyze court decisions, with the aim to assist the identification of precedents and related case and to provide a preliminary input to the judge on specific legal questions»[10].

According to the *Berkman Klein Center for internet and society at Harvard University*[11], Artificial Intelligence can have both positive and negative impact on Human Rights: indeed, in some case an Artificial Intelligence application can positively impact the enjoyment of a certain human right for a particular class of individuals, while adversely affecting the enjoyment of the very same human right by others. For instance, the use of automated risk scoring systems in criminal justice may reduce the number of individuals from the majority group who are incarcerated and at the same time the flaws in the system may serve to increase the rate of mistaken incarcerations for those belonging to marginalized group. Likewise, AI carries a serious risk of perpetuating, amplifying, and ultimately ossifying existing social prejudices, with the attendant consequences for the right to equality. But, automation decision- making through AI can give the chance to righting social wrongs by designing the systems to beneficial effects, which can be achieved only by seeking the correction for biases in human decision making.

Finally, it shall not be minimized that the process of judicial decision in structured computer databases may pose certain risks and require appropriate safeguards. In fact, there can be some problems related to confidentiality, privacy, protection of personal data. In this manner, in applying Artificial Intelligence in court, it is essential to guarantee the respect of the right to a fair trial and other basic principles.

**2. The use of Artificial Intelligence in Court**

As mentioned before, there is huge development of technology and this has become an important topic in our modern world and the Law is not excluded from this evolution.

According to a few number of scientists, due to the fact that human beings are emotionally conditioned, an exclusive use of Artificial Intelligence in court will help to find a reasonable solution to a dispute. In this case AI will function as a «black box» that turns the «the fact of the case (input) into a legal consequence(output) » and will autonomously decide the solution of the case. On the contrary, other scientists, like Dr Nikolaos Aletras, claim that Artificial Intelligence must be used as an assistive tool in legal

[10] *Ibid.*
[11] *Ibid.*

proceedings[12]. This will help to empower legal researches: especially, law firms will apply e-discovery software to cases that involve many documents to be screened. Also, Artificial intelligence in the judiciary will help to minimize the influence of factors such as weariness and emotional instability.

Related to this, in December 2018, the Europe*an Commission for the Efficiency of Justice* settled out the first ethical principles, associated to the use of Artificial Intelligence in a Charter, which provides basic principles that can guide judicial professionals when they confront with the rapid development of Artificial intelligence in the national judicial process. Particularly, the Commission has identified five principles that must be respected in the field of Artificial Intelligence and justice: i) principle of respect of fundamental rights; ii) principle of non -discrimination, which implies that AI must not be used as an excuse to discriminate marginalized individuals or minority groups ; iii) principle of quality and security, with regard to the processing of judicial decisions and data, using certifies sourced in a security technological environment; iv) principles of transparency, impartiality and fairness, which means that the Data processing methods must be accessible and understandable to individuals ; v) the principle of 'under user control' which implies that user must have a clear information about the data processing in order to make their choices. In addition, during a meeting in Warsaw in June 2016 for the election of its new members, the General Assembly of *the European Network of Councils for the Justice*(ENCJ) recognized that the administration of Europe's justice system of the 21st century has radically changed as a result of the use of information and communication technology. Given to this, the ENCJ enhanced that while exercising it function a Council for the judiciary, or an equivalent governance body, should participate in the process of evaluating the quality of justice by: firstly, defining a quality framework which sets out indicators including criteria for the assessment and evaluation of the quality of justice. Secondly, defining methods by which the quality of the judicial decision- making process can be evaluated, maintained and improved. Then, by identifying and implementing good practices, which increase the confidence of citizens in the judicial system and ensuring that these systems do not interfere with the independence of the judiciary, individually or collectively, or the justice system.

Nevertheless, the wave of digital transformation is affecting the European courts very unevenly. Thus, on one hand many western European countries, such as Latvia and Malta, seem to have developed an extremely advanced approach with concrete applications in terms of legal support. On the other hand, in some few States, such as Poland and Estonia, the subject still appears to be in an emergent stage and would be limited the near future to the implementation of an effective information technology management. Besides, among the most innovative technologies at work in the great digital transformation,

12. D.L DALKE, *Can Computer Replace Lawyers, Mediators and Judges*?, in *The Advocate*, 1, 2013.

Artificial Intelligence appears to be both spectacular and discussed[13]. The aim in Europe is to make consultation of the law and cases law more effective, to propose frames of judgment, to review all the documents of the company and detect possible divergent or incompatible contractual clauses: for instance, some private companies aim to anticipate judge's decisions with the so called "predictive justice"[14]. According to those who support this system, these tools would contribute to create transparency and make it easier to predict judicial outcomes, straighten the judicial outcomes.

However, in the United States of America, some judges are using advanced technologies such as COMPAS to analyze an individual's risk assessment[15]. These machines are particularly used in criminal cases to predict a defendant's likelihood to reoffend and are the example of how Artificial Intelligence can form decisions basing itself on statistical information. Some commentators[16] have labeled COMPAS as unfair, claiming that the algorithm can have biases such as racism and discrimination. But, this topic will carefully be analyzed in the fourth paragraph.

In conclusion, in my personal point of view, the application of Artificial Intelligence in a judicial procedure, must be limited and follow some fundamental principles such as the right to a fair hearing, the right of non-discrimination, the right to an equal treatment and the respect of human dignity, especially in the criminal law system.

**3. Judges and Artificial Intelligence**

Judges have a complex role in our society[17]. Indeed, their job can absorb several activities, complex interaction with people, dispute settlements and adjudicative function that might be conducted with other judges or less commonly in some jurisdictions with juries. The ways in which judges are engaged to their activities varies across jurisdiction and between judges: in this context, some judges may be more «responsive» than others, and others may show more compassion or be oriented toward therapeutic justice. So, given to these variations, it may be important to determine how developments in Artificial Intelligence may reshape judges' role in a judicial system.

In terms of developments of AI, are there aspects of the judicial function that will ensure that judging will remain a human activity? This question can be answer only through the examination of the recent changing of how judges are using technology in courts. Nowadays, there is an increase use of AI in the form of

[13] C. BARBARO, Y. MENECEUR, *Issues in the use of artificial intelligence (AI) algorithms in judicial systems*, 1, 2018.

[14] The object is to predict the outcome of a dispute on the basis of criteria previously provided by the user, or to predict the risk of infringement.

[15] D. KEHL, P. GUO, S. KESSLER, *Algorithms In the criminal justice systems: assessing the use of risk assessment in sentencing,* 1, July 2017.

[16] J. LARSON, J. ANGWIN, *How we analyzed the COMPAS Recidivism Algorithm*, 1, May 23 2016.

[17] T. SOURDIN, *Judge vs Robot? Artificial Intelligence and judicial decision- making*, 41, 2018, 1114.

predictive coding[18]. This happens especially in the United States of America, where predictive coding is already being used to determine whether recidivism was more likely in criminal matters and to assist in making decisions about sentencing[19].

In *Justice and Technological Innovation*, Tania Sourdin labels three levels in which technology is reshaping the judicial system: firstly, the most basic level is «supportive technology», where technology is used to help people involved in a justice system. Meanwhile, the second level includes the so called «replacement technology» and can replace activities that were once carried out by humans[20]. The third level, the «disruptive technology» can change the way that judges work and provide for any different form of justice. Today, most justice reforms that are supported by technology have focused on the first and the second level. Moreover, as a result of the first level of supportive innovation, many people now locate justice services online and obtain information about justice processes and the growth of online firms who may provide «unbundled» legal services have been significant over the past years[21]. In addition, in relation to the second level, there is an increase of online court process for some types of dispute and in relation to the criminal justice matters[22]. Other technologies may merge into the «third level» and support negotiations as well as judicial process by giving people more sophisticated online advice that is supported by Artificial intelligence or to consider other options and to engage in other ways. In contrast to traditional rational decision- making approaches, some of the more practical technological programs are designed to encourage the development and number of options, rather than producing one outcome.

In relation to this, in February 2015, the United Kingdom's Civil Justice Council recommended the introduction of *Her Majesty's Online Court* for civil disputes under the value of £ 25.000[23]. It was intended that the court would operate with a tiered system: the first tier would allow disputant to evaluate their problems through inputting information into an online system which will categorize their issue, provide information about their rights and entitlements, and suggest options available to resolve the dispute[24]. A second tier would involve online facilitators reviewing information and documents provided by the disputants and assisting with the resolution of the matter by advising, mediating and encouraging

[18] Predictive coding is «an industry specific term used to describe a Technology-Assisted Review process involving the use of Machine learning Algorithm to distinguish relevant documents from non relevant documents. it is based on a subject matter experts' coding of a training set of documents» https//www.edrm.net.

[19] Many of these current developments may have an impact on judges by removing some tasks related functions but unlikely entirely reshape the judicial function or role.

[20] T. SOURDIN, *Judge vs Robot? Artificial Intelligence and judicial decision- making,* cit.

[21] T. SOURDIN, *Judge vs Robot? Artificial Intelligence and judicial decision- making,* cit., .1117-1118.

[22] In particular, in the bail applications.

[23] D. ASKER, *Online dispute- the future for Civil Claims'* April 2015.

[24] *Ivi,* 19.

negotiations[25]. Similarly, in Netherlands an advanced ADR program, called Rechtwitjerz, has been created to assist couples in separation or divorce process.

Now, as newer technologies can assist people to solve dispute at earlier time and can refine the issues that need to be presented to judges, is it appropriate to talk about replacement of judges? Even though AI can use sophisticated "branching" and data searching to create elaborated decisions that can suggest the outcome of a dispute, it is not suitable to talk about replacement of judges, because there are many factors that have an impact on judicial decision making. *De facto*, the *Australian Law Reform Commission* has enhanced that «such factors include inductions and intuition, as well as the capacity to assess the social impact of decision»[26]. Further, judges do much more than adjudicate or reach an outcome in a relation to dispute: they play a key role in case management, and in the settlement of civil disputes and judicial commentary inform how society can operate and many judges play an important role educative sense. So, Artificial Intelligence systems should be applied to complement current human work and allow for greater efficiencies, instead of replacing judges[27].

In conclusion, drawing the boundaries of acceptable Judge AI requires consideration of ethical questions, as well as inquisitions about who produces algorithms and Judge AI and the extent to which discretion on oversight will be maintain within the judiciary. In fact, many technology futurists suggest that it is likely that humans will not necessary be replaced by AI. Instead human intelligence is likely to be supplemented by technological advance. This approach suggested that judges may remain human but be supplemented.

**4. Artificial Intelligence and Criminal Justice**

The criminal justice system is the most fearsome institution through which democratic society may restrict an individual's enjoyment of their fundamental human rights. In view of the severity of its impact on human rights, legislators have evolved a system of procedural rights to protect criminal defendants and convicts from the inconsistency of human decision making, from the intentional abuse of power to unconscious influence ranging from racism to fatigue.

Presently, several justice systems are employing automated decision- making tools in order to reach both fairness and efficiency. For example, as mentioned before, in the United States of America many judges are allowed to use the so called COMPAS to determine an individual's risk assessment. But the operation of such systems can have a bad effect on an extensive range of rights. Such tool automates the analysis of whatever a data has been inputted into the system and relay on manually input of data questionnaires. According to research this kind of tool leverages machine learning techniques to continually rebalance risk factors in response to new inputs.

[25] *Ivi*, 19-20.
[26] Australian Law Reform Commission, *Technology: what is means by federal dispute resolution*, n.23, 1993.
[27] T.J. Buocz, *Artificial intelligence in Court, legitimacy Problems Of AI Assistance in the Judiciary,* 2, 1, Spring 2018.

As the *Berkman Klein Center for internet and society at Harvard University*[28] claims, the first effort to formalize the process of assessing an individual's risk of recidivism date back to the 1920's when stratification began to identify objective factors that are predictive of this risk for parolees. The effort was to avoid unnecessary deprivations of liberty and reduce the incidence of discrimination in the criminal justice system attributable to human bias. As these assessments become more sophisticated, statisticians began to consider both static factor and dynamic factors and over time this led to the development of risk assessment inventories such as the Level of Service Inventory, that are deployed in the field by individuals without much statistical expertise. Furthermore, the data available to actuarial risk assessment systems identify who is at the risk of re-offending and is systematically skewed by the fact that the pre-existing system has sentenced those it believes to pose the high risk to long prison sentences, during which time those inmates cannot reoffend.

Linked to this, risk assessment tools in the United States of America have been critiqued as unfair due to the disproportionate targeting to minority individual and communities by the police. In fact, such tools have miscalculated the risk of recidivism for individual from minority versus majority communities: for example, Brisha Borden, an afro- Americans, was running late to pick up her god-sister from school, when she stopped an unlocked kid's bicycle and a scooter and took them away with a friend. She was arrested with her friend and charged with theft for the items, which were at a total of $80. Compared their case with a similar one, a 41 years old white man, Vernon Prate, was picked up for shoplifting $86.35 worth tools from a nearby Home Depot store. This individual was a seasoned criminal, who had already been convicted of arm robbery and attempted armed robbery for with he served five years in prison. Borden had a record to, but it was for misdemeanors committed when she was a juvenile. These two people's case was analyzed by COMPAS, and the African – American was given a high risk and the White – American a low risk assessment[29].

Additionally, in early 2013, Wisconsin charged Eric Loomis with five criminal counts related to a drive-by shooting in La Crosse. Loomis denied participating in the shooting, but he admitted that he had driven the same car involved later that evening. Loomis was pleaded guilty to two of the less severe charges: «attempting to flee a traffic officer and operating a motor vehicle without the owner's consent». The Wisconsin Department of officer made an investigation using COMPAS to evaluate Loomis' risk assessment. The trial court referred to the COMPAS assessment in its sentencing determination and sentenced Loomis to six years of imprisonment and five years of extended supervision[30].

[28] F. RASO, H. HILLIGOSS, V. KRISHNAMURTHY, C. BAVITZ, L. KIM, *Artificial intelligence and Human rights,* cit., 22-23.
[29] www.ProPublica.org.
[30] Case *Loomis vs State*/ 81 N.W.2d 749(2016).

Then, Loomis filed a motion for post-conviction relief in the trial court arguing that the use of COMPASS was in violation of his due process right and he asserted that the court's use of the COMPAS assessment infringed on both his right to an individualized sentence and his right to be sentenced on accurate information. But the trial court denied the post-conviction motion, and the Wisconsin Court of Appeals certified the appeal to the Wisconsin Supreme Court[31].

Now, the American judicial system has frequently lamented the lack of objective measures available in making individualized sentences in criminal cases. Proponents of assessments argue that these evaluations make sentencing more transparent and rational. But the history of using new technological innovations in law has not always been a happy one and the research into COMPAS and similar assessments suggests that the same could be true here. The Loomis opinion, then, failed to answer why, given the risks, courts should still use such assessments.

So, do these machines have a positive impact on the right of criminal defendant? On one hand, these tools may represent an improvement over the situations where judges have essentially discretion regarding bail and sentencing decisions. But on the other hand, the possibility of negative impact exists due to the potential for the misclassification of some number of defendants as high risk, which results in their being sentenced more harshly than they would have been otherwise. Particularly, «there is a substantial risk that the right of minority group to equality and non- discrimination are and will be affected by this kind of tools»[32]. Such tools have a hostile impact on a defendant's right to a fair public trial, to a defense and to an appeal because their predictions are not subject to a meaningful review by court. In this regard, in *Ewert vs Canada* the Canadian Supreme Court noted that «risk assessment tools that are developed and validated based on majority groups my lack validity in predicting the same traits in minority groups. This may have a deleterious effect on the rehabilitation of others from minority communities by impacting their access to cultural programming and their opportunities for people, among other things[33]». Also courts lack the institutional capacity to review the court operation of such tools, but objective veneer that coats the outputs of these tools obscures the subjective determinations that are baked into them[34].

However, as mentioned in the previous paragraphs intelligent machineries are created to make logical decisions basing themselves on statistical information they receive form their creators. A mare application of these tools in the Criminal system will be problematic, especially, for the duty of state reason: in the Loomis' case, for example, one of the problems that was taking into consideration by the defendant was the lack of an efficient motivation by the court. Thus, every judicial system obliges judges to give and appropriate state reason to each sentence they make. For example, article 111 of the Italian Republic

[31] *Ibid*.
[32] Ewert vs Canada, 2018 SCC 30.
[33] *Ibid.*
[34] UDHR arts 10 and 11(1).

Constitution states that «valid reasons must be provided for all legal proceedings»[35]. This means that the right to motivation is guaranteed as a fundamental right, thought which the system assures the right to appeal to the parties in a judicial procedure. This same principle is assured is indirectly assured by the American Constitution[36].

Finally, even if the current generation of automated risk- assessment tools are more sophisticated than men, a superficial use of these tools will provoke disproportional treatment of individuals, discrimination and unfairness.

**5. Conclusion**

The emerging of Artificial Intelligence is a relevant aspect in our society and certainly, the impact of Artificial Intelligence in the justice system cannot be avoided. But Artificial Intelligence machines cannot replace human work, especially, in the justice system. A responsible use of Artificial Intelligence in the legal system will help to improve the work of lawyers, and of Judges. Indeed, Artificial Intelligence must be adopted as an assistive tool to the work of a judge and not as a replacement. Moreover, the use of Artificial Intelligence must follow basic principle, and must not be in violation of Human Rights, especially in the treatment of basic complex cases such as the criminal ones. In particular, in the criminal justice system, were individuals are restricted their fundamental rights, it is important to make a responsible use of Artificial intelligence.

[35] Constitution of the Italian Republic, 1948, art 111.
[36] It is indirectly identified on the Due Process clause indicated in the 5th Amendment of the American Constitution in order to protect the Bill of Rights.