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Human Judges in the Era of Artificial Intelligence: Challenges and Opportunities

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ABSTRACT

In recent years, artificial intelligence technology has been widely used in the field of justice. Compared with human judges, judicial artificial intelligence is more efficient, experience and objective. But artificial intelligence has its limits. Artificial intelligence is still essentially machine intelligence based on big data, algorithms and computing power, not organic intelligence. Subject to the difference between judicial artificial intelligence and human judges in knowledge structure, application scenario and potential ability, judicial artificial intelligence can not completely replace human judges. Therefore, it is important to make it clear that judicial artificial intelligence is only a helper of human judges, not a stand-in. Firstly, it should give full play to the role of judicial artificial intelligence in dealing with simple cases and transactional work. Secondly, the roles and functions of judges should be actively transformed to make them more professional, rational and warm.

Introduction

In 1956, the Dartmouth Conference formally introduced the concept of "artificial intelligence." In recent years, with the rise and development of big data and artificial intelligence technology, human society seems to have entered a new "intelligent era" overnight, and the Chinese judicial community seems to have closely followed the trend of artificial intelligence. Today, China's smart courts, smart inspection and other key projects have been fully rolled out, such as the "smart court navigation system" and "intelligent push system" launched by the Supreme People's Court in 2018, Beijing's "rui judge" intelligent research system, Shanghai's "206" criminal case intelligent auxiliary case system (206 system), Hebei's "smart trial 1.0" trial support system and other local courts launched artificial intelligence products, not only comprehensively improves judicial efficiency, but also provides convenient and efficient technical support for judges to hear cases. In the implementation of these programs, judicial artificial intelligence undoubtedly plays a key role and assumes an important mission, but at the same time, it also faces many problems and challenges.

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Human judges, once considered one of the least likely to be replaced by machines, face the challenge of giving up some decision-making power and artificial intelligence as judicial artificial intelligence continues to improve and is applied in depth. Some scholars have pointed out that if artificial intelligence can make persuasive arguments and surpass human judges in writing judgments, then artificial intelligence that is more reliable and cost-effective than humans should be regarded as a judge (Volokh 2019). At present, the application of some artificial intelligence in judicial practice has shown better accuracy than the prediction accuracy of human judges. For example, an algorithm developed by the Illinois Institute of Technology and the University of South Texas based on the data of the Supreme Court from 1791 to 2015 predicted the decisions and votes of Supreme Court justices from 1815 to 2015 with 70.2% accuracy and 71.9% accuracy, which has surpassed the 66% predictive accuracy of jurists (Katz. et al. 2017; Stanila, 2020). However, judicial artificial intelligence also has its inherent limits. It is not easy for algorithmic decision-making to achieve absolute objectivity and precision, and in the face of complex and difficult cases, artificial intelligence may be able to promote formal justice, but it is difficult to achieve substantive justice. Therefore, it is necessary not only to take a rational view of the challenges brought by judicial artificial intelligence, but also to accept the fact that the era of artificial intelligence is coming, and actively promote the transformation and upgrading of the role and function of judges, to respond to the new demand for the role positioning of judges in the era of artificial intelligence.

Advantages of Judicial Artificial Intelligence

Ethan Cash points out that in the future, very few activities will take place purely offline, perhaps none (Katsh 1995). Justice is no exception. It should be affirmed that judicial artificial intelligence has achieved some results. The direct purpose of artificial intelligence technology in judicial decision-seapply is to solve the problem of fewer cases facing the courts. "litigation explosion" and a surge in the number of cases are common problems faced by courts around the world. As a result, courts have had to change the traditional way of case management and trial, and introduce artificial intelligence technology, to assist the judge to hear the case and solve the dispute quickly and accurately. According to the current application and development prospect of artificial intelligence in the judicial field, artificial intelligence has obvious advantages over human judges.

More Efficient

With the establishment of the concept of rule of law in the world, "litigation explosion" has caused the judicial dilemma of "more cases and fewer people." In China, for example, local people's courts and specialized people's courts at

all levels received more than 5.35 million cases in 2000, but by 2018 that number had soared to 28 million, an increase of 423%, putting courts at all levels under enormous pressure.[1] The pressure of too many cases not only puts the quality of cases to the test, but also accelerates the loss of judges to a certain extent. And the application of artificial intelligence in the judicial field will significantly improve the work efficiency of the case-handling personnel. The logic behind this is to save judicial resources and urge the case-handling personnel to devote more energy to difficult and complex cases, maximizing the efficiency of judicial resources (Zheng. 2020). Therefore, the application of artificial intelligence technology in the judicial field is directly aimed at improving judicial efficiency. With the help of powerful algorithms, calculations and the characteristics of standardization, process and repetition, judicial artificial intelligence can complete the work such as evidence examination, case file production, the generation of elemental adjudication instruments in a short period, to promote the improvement of judicial efficiency in a way that changes the means of production, and effectively alleviate the judicial dilemma of many people in the case.

Firstly, in the field of legal question and answer, information processing data. Artificial intelligence legal systems can effectively save labor and time-consuming costs in online filing, online court hearings, evidence review, automatic generation of trial information and other aspects. By 2019, 97.8% of Chinese courts supported online filing, with 100% of the higher courts. About 66.9% of Chinese courts supported online evidence exchange and 58.2% supported online court hearings. The proportion of Chinese high courts disclosing information on the final cases reached 100%, and that of intermediate courts 98.8% and grassroots courts 96.6%, respectively. The parties contacted the judges through the China Executive Information Disclosure Network a total of 73,203 times, and the timely response rate of the judges was 85.2%.[2] These have greatly improved the wisdom and convenience of judicial services, through technology to achieve the goal of "all-round, all-weather, zero-distance, barrier-free service for the masses of litigation." For example, OCR recognition of files, speech recognition of court hearings, evidence recognition and other perceptual intelligence technologies are greatly improved compared with traditional scanning and recording technologies. In the case of speech recognition in court, Iflytek Co.Ltd's speech assistants have specifically optimized for Chinese accents, and the recognition rate has reached more than 90%. Compared with the manual input of text materials by the court clerk in the trial, the trial speech recognition technology will shorten the trial time by 20% to 30% on average, the complex trial time by more than 50%, and the integrity of the trial transcript reaches 100%.[3]

Secondly, in the field of paperwork and automation of case push. Artificial intelligence can deconstruct the relevant materials of the case through text recognition, image recognition, semantic analysis, element association and

other technologies, and recombine them according to the given knowledge graphs, to automatically generate concise writ, element, table and other judgment documents. For example, the "intelligent trial Support" system developed by Hebei High People's Court includes such document-making function, and has handled 110,000 cases and generated 780,000 documents in less than a year.[4] To accumulate and build their case information base, through the classification, matching marks to class retrieval, in the case when the judge automatically screens the case with a high degree of similarity in the past, to achieve push reminder of class cases, it provides the reference for the judge to judge the similar case. In this way, the problems of "different judgments in similar cases" and "inconsistent application of law" can be avoided as far as possible, which is conducive to the unification of local judicial standards and the prevention of unfair judgments (Yang 2017). At present, the automatic generation of judgment documents can greatly reduce the workload of judges in the adjudication of typed cases with clear facts, clear laws and little disputes, such as traffic damage compensation, bank contract lending and government information disclosure (Zhang 2020).

Finally, in the field of case analysis and auxiliary judgment intelligence. The application of artificial intelligence technology is combined with the construction of "Smart Courts" and internet courts, has gradually formed a new trial mode in which Chinese courts extensively use electronic case files, websites for disclosing case information, modern case handling and management platforms, and similar case pushing and evidence review systems. In the initial stage of case analysis, by setting up the principle of triage and adjusting the simple and complicated distinguishing elements, the intelligent case division system can finely handle all kinds of cases, and during the operation of the platform, according to the characteristics of different cases such as criminal, civil and administrative cases respectively, various weight coefficients are integrated to scientifically calculate the power needed to handle each case, to help the court realize the complicated and simple diversion of cases, rational allocation of judicial resources to ease the pressure of "more cases and fewer people." In terms of in-depth case analysis and auxiliary judgment, such as the "wise Judge" system of Beijing Court can automatically sort out the facts to be tried before the trial, generate the trial outline, and push it to the trial system. The biggest highlight of the Shanghai "206 system" is the evidence standard and evidence rule guidance function, which realizes the intelligent examination of evidence data and provides standardized guidance for case handling personnel. In addition, the "AI judge" launched by Ali Co.Ltd has established a complete set of trial knowledge atlas for transaction dispute cases, which can quickly analyze the case and make recommendations to judges within a short period (Chen. and Xiao 2017).

More Experience

Unlike the way humans gain experience through long-term training and trial practice, through the advantages of data storage, reading, algorithm and computing power, artificial intelligence can carry out in-depth analysis and study on the whole sample of massive data, and not only can it master the common experience accumulated by the judge community, and also can get more open legal vision and more abundant judicial practice knowledge, to easily surpasses the "critical point" of the human judge's wisdom (Ma 2020). For example, in fact-finding, when the relationship between the evidence and the facts to be proved is uncertain, judicial artificial intelligence can quantify the probability between the elements of evidence and the conclusions of the facts based on the learning of a great deal of precedent experience, to avoid the uncertain conditions, judges are limited by personal knowledge and experience and ignore some important case information, make unreasonable or even the risk of the wrong decision. In practice, Bayes formula can well describe how to adjust the probability degree of facts according to initial evidence after new evidence is introduced (Hastie 2006). In addition, for cases that are difficult, complex, or novel and for which the individual experience of judges is not sufficient to effectively respond, judicial artificial intelligence can also make a more reliable and stable judgment by exploring the collective life experience and overall rationality of judges, and avoid the uncertainty risk brought by judges individual discretion. In ordinary cases that rely on judicial discretion, the machine can predict the outcome of a case more effectively than in cases that have undergone extensive changes without the declaration of legal principles (Jenkins 2008).

In addition, the advantage of the experience of judicial artificial intelligence is also reflected in the realization of the goal of similar cases are decided similarly. It is one of the value goals of judicial practice to pursue the substantive justice of individual cases, and the prerequisite to ensure the realization of substantive justice is judicial judgment. The equality and unity of the application of law in the process make the same or similar cases can get the same or similar results, that is to say, a normal judicial decision of "similar cases are decided similarly" should be reached (Gao, 2019). According to Dworkin, what similar cases are decided similarly require is nothing more than that the court acts in the same and consistent way for all people, and extends to everyone the substantive standards of fairness or justice that apply to certain persons (Dworkin 2002). In practice, the phenomenon of similar cases are not decided similarly will lead to the public questioning the legitimacy and legality of the judge's discretion, which will eventually damage the construction of judicial credibility (Zuo 2020). Moreover, with the deepening of judicial reform and the further improvement of judicial openness, the damage caused by similar cases are not decided similarly to judicial authority

and social recognition will be further increased (Shen 2020). Compared with human judges, judicial artificial intelligence has more experience in judicial information storage, inquiry and analysis ability than individual judges. Rich experience in dealing with the same case of different issues is also of great significance. For example, China launched the China judicial documents website in 2013 and has become the world's largest public website for official judicial judgments. Up to now, there are more than 100 million judicial documents on the judicial documents website, making it impossible for individual judges to fully browse these documents, let alone fully grasp the elements of these documents. Based on the deep learning of a large number of precedents, judicial artificial intelligence can carry out deep learning, knowledge measurement, and graphs graphing of these documents with the advantages of algorithms and computing power, and explore the underlying dynamic correlation laws. When the new case information is input, artificial intelligence can extract criteria based on the same case elements, uniform algorithm modeling and standardized pipelining operations, providing the same or similar algorithmic output for the same or similar cases to ensure the consistency of the referee (Li, 2020). With the improvement of judicial automation, judicial artificial intelligence is expected to acquire the whole process of data from filing to execution, which also means that through the learning of massive full sample data, judicial artificial intelligence will have knowledge and experience far beyond the ability of individual judges in a quantifiable dimension.

More Objective

The objective and neutral position is not only an important factor to ensure the fairness of the judicial process, but also a prerequisite for judicial judgment to gain public recognition. However, the practice shows that due to the personal preference, bias, burnout, corruption and other problems of judges, it is also a difficult luxury to expect human judges to keep a neutral, objective, or fair attitude. Human judges are notoriously inconsistent, both as a group and as individuals (Crootof 2019). Compared with human judges, judicial artificial intelligence is more neutral and objective. Firstly, the application of the algorithm not only improves the judicial dispute handling ability, reduces the cost of dispute resolution, but also improves the degree of automation of dispute resolution to a great extent, laying a realistic foundation for closer to justice. Judicial rationality is the legitimate basis of judicial authority, and it is also the requirement of artificial intelligence judicial decision with fact binding force in practice. In terms of procedural justice, substantive justice, and judicial efficiency, artificial intelligence can help balance fairness and efficiency (Zhou and Wu 2019). Secondly, the basic operating mechanism of judicial artificial intelligence is to take the big data of judicature as the sample, through

the semantic analysis and data analysis to build the model, to screen the relevant factors in the data sample one by one that may influence the judgment conclusion, these data are then labeled and integrated into a structured knowledge chain to achieve accurate automated adjudication. A focus on the scalability of each element of the justice, rely on an independent algorithm, can be repeated application of the legal system can effectively get rid of human arbitrariness of discretion of judges, to promote the unification of the law applicable, eliminate the judge value of subjective bias and the influence of outside factors on the predictability and ultimately ensure objectivity and impartiality of the judicial referee.

Although judicial artificial intelligence cannot completely replace judges in making decisions, it has been widely used in the fields of judges' discretion, such as sentencing, calculation of compensation amount and review of the evidence, practice shows that it is effective in avoiding arbitrariness of judges' discretion. For example, from ADR to ODR, it increases the transparency of the judicial process and makes people see the dawn of "digital justice." In recent years, China's judicial organs have also taken advantage of these new technologies to carry out a lot of reform and exploration, committed to building a "network," "sunshine" and "intelligent" judicial pattern of the new era, realizing the optimization and reorganization of physical space-time resources and elements. For example, some states in the United States have used COMPAS to assess the risk of reoffending and determine the length of the sentence. When the defendant Loomis appealed that COMPAS had punished him excessively and violated procedural legitimacy, the Wisconsin Supreme Court rejected his lawsuit. It is also pointed out that the function of the COMPAS system to assess risks and determine the sentence is realized through independent subterms and complex algorithms, which ultimately reach a rating level of 1 to 10, this algorithmic system is neutral and objective, and therefore complies with procedural justice (Slobogin. 2012; Li, 2020). With the development and maturity of artificial intelligence, the judicial operation has moved from offline to online, from the closed and limited "theater" mode to the open and inclusive platform mode, with the whole process visible. Artificial intelligence not only improves judicial efficiency and fairness, but also facilitates public supervision and dissemination of justice. The digitalized presentation of judicial operation makes it increasingly codeable, quantifiable, analyzable and predictable and auditable, to realize the visibility of data of all elements and enter the era of "visual justice" (Ma 2020).

Limits of Judicial Artificial Intelligence

Judging from the current judicial application practice, it seems inevitable that judges will be replaced by artificial intelligence. As James Barratt said, artificial intelligence is a double-edged sword technology, just like nuclear fission,

which can either light cities or burn them down (Barrat 2015). As far as the current situation is concerned, the practical application of judicial artificial intelligence is quite limited in depth and breadth. In terms of depth, at present, judicial artificial intelligence is still limited to acting as an assistant to the decision-making of the legal person in practice, which is only suitable to be an assistant to the judge and can not completely replace the judge. From the point of view of improving work efficiency, it may be more suitable for dealing with technical and auxiliary work. In terms of breadth, judicial artificial intelligence has been relatively successful in the application of mature general technologies (such as face recognition and speech conversion) and in the fields where technical requirements are not particularly high, where appropriate investment has been made and difficulties have been successfully overcome (such as the electronic data). However, there are still some problems in the application of judicial artificial intelligence, such as lack of application, lack of concreteness, and lack of actual effect (Zuo 2018). In short, although the reform of judicial artificial intelligence is the general trend, this does not mean that the current research and application are completely scientific and effective. At present, judicial artificial intelligence still has the defects of knowledge structure, application scenario, and potential ability, which determines that it can only be a judge's assistant, not a substitute. Analyzing and understanding the limitation of the application of artificial intelligence technology in judicial judgment is the necessary premise to realize its standard application.

Efficient Is Not the Same as Quality

Although judicial artificial intelligence has significant advantages in improving the efficiency of adjudication and alleviating the pressure of "litigation explosion," the quality of the judgments produced by it cannot be effectively guaranteed. In addition, the social public's harsh tolerance for the error rate of machine judgment further increases the difficulty for the machine to replace judges.

Firstly, the judicial artificial intelligence decision-making system is a system that makes analyses and predictions by learning the past judge's experience. Therefore, the quantity and quality of judicial data are directly related to the rationality of the decision-making result of the artificial intelligence legal system. However, from practical experience, both the comprehensive and high-quality judicial data are facing many problems. At present, the subject algorithm of judicial artificial intelligence is usually constructed by knowledge graphs and deep learning. The reliability of a knowledge graph that accurately depicts cases in a visualized way depends on the granulation degree of data and model. The finer the model and data are, the better the effect of the knowledge graph will be (Zuo 2018). The difficulty in improving the granulation of data and models lies in the translation between machine language and natural

language. There are natural differences between machine language and natural language. The polysemy, contextualization, and vagueness of natural language make it difficult for machine language, which is based on grasping core morphemes and semantics through word vector transformation and word segmentation technology, to comprehensively and accurately recognize and understand complex semantics in cases.

Secondly, logically speaking, the intelligence of artificial intelligence is limited by the design and input of human programs. The inadequacy of the designer's ability inevitably leads to the inability of artificial intelligence to achieve 100%intelligence. Humans can find some way to make up for deficiencies or find problems and try to solve problems, but artificial intelligence does not have such innovative ability. Even though current artificial intelligence can carry out deep learning, the learning mode and path still depend on the program written in advance by the designer (Wang 2019). Justice is a very complex mechanism to determine division and settle disputes, involving people, property, time and place, subjective and objective state, behavior mode, involved tools et al, just only a single case will produce a large number of judicial data. If someone wants a certain type or a class of cases from the case modeling algorithm, he or she needs to collect a huge amount of data. Data annotation is an important basis for the construction of a judicial knowledge graph. For example, the development of the "206 System" in Shanghai adopts two forms of manual annotation and automatic annotation. In addition to manual data cleaning and annotation, automatic annotation of the machine also needs to be confirmed by the programmer. Similarly, although the accuracy of image recognition, handwriting recognition, illustration signature, smear block detection, and insertion detection can reach 92% to 98%, it still needs manual review and correction, which is undoubtedly a subjective selection process.

Finally, the tolerance of society to the error rate of judicial artificial intelligence can not be ignored. Strong robustness and high fault tolerance enhance the predictability of artificial intelligence in judicial judgment scenarios with certain abstractness and uncertainty (Zhu et al. 2019). In many judicial practices, artificial intelligence has already demonstrated accuracy beyond that of human judges. But the public's demand for the accuracy of judicial artificial intelligence is higher than that of human judges. This is due to both instinctive human concerns about the reliability of emerging things and concerns about the shortcomings of artificial intelligence itself. The existence of algorithmic black boxes makes the cost of detecting and correcting artificial intelligence errors extremely high, and the application of efficient and automated artificial intelligence has a real risk of causing large-scale misjudgments. Some scholars pointed out that in the last line of defense for social justice in the judicial, even if only 1% of the artificial intelligence error is unacceptable, because the artificial intelligence may have to deal with millions of pieces of

criminal cases every year, even a 1% margin of error can result in tens of thousands of wrongful convictions, which is unacceptable to the public (Honorê 1996). Therefore, the inaccessibility of high efficiency and high quality also denies the possibility of artificial intelligence replacing judge's judgment to some extent.

Experience Is Not the Same as Data

The reason why judicial artificial intelligence can copy the experience of human judges is that it can grasp the correlation among the factors by learning the data-based judicial information, and apply those data lessons to decision-making. But the life of the law is not in logic, but inexperience (Holmes, 2009). The judicial activity has its uniqueness, which is the judgment activity that coagulates the wisdom of the legal person. Therefore, if artificial intelligence wants to play a real role in judicial activity, it needs to understand its particularity, and constantly simulate and practice the mind of a legal person. There are still some differences between data-based experience and the experience needed in judicial judgment.

Firstly, not all empirical knowledge can be expressed in the way of data. To make an appropriate decision, not only does the decision-maker need legal knowledge, but they also need to master "the art of speaking in court," "the skill of resolving disputes," "the ability to discover hidden disputes," "the patience of listening to the emotional and psychological needs of the parties," et al, to reasonably deal with the legal disputes embedded in social life. All this knowledge comes from judges' long-term social life and judicial judgment experience, while judicial artificial intelligence based on a single case or law database is often difficult to master such comprehensive, hands-on knowledge that requires element transfer and association. The knowledge that can only be acquired through long-term engagement and active perception of the real physical world is also difficult to reduce in a digital way to "a code that generates binary yes and no options without any additional conditions being met." This determines that the application of judicial artificial intelligence can only be limited to scenarios where there is only a single knowledge structure, there are clear right and wrong answers, and there are discernible underlying patterns and structures (Dommel 2016; Surden 2019).

Secondly, the data experience that judicial artificial intelligence relies on is a kind of one-sided experience. Some scholars point out that artificial intelligence's absorption of trial experience and designers' standardization and standardized summary of experience is only a small part of the experience needed for trial, and artificial intelligence is only the initial stage of imitation of the intellectual part (Pan 2017). One-sided experience will imperceptibly magnify and solidify the bias of judicial artificial intelligence decision-making, and then affect the stability and acceptability of its decision-making. For example, in the judicial application of

artificial intelligence in China, the intelligence systems developed by the judiciary, either individually or jointly, reflect to varying degrees the positions of authority, the logic of action, and geographical characteristics of the departments. Although Shanghai's "206 System" project is huge and complex, it can only use the "crowd-funding" mode of courts nationwide to complete the graphing of the evidence knowledge graph. The arrangement of these applicable rules of law is a refinement of criminal law knowledge, and the editor's logical arrangement, abstraction of the main content, and choice of viewpoints reflect individual value orientation, academic judgment and policy stand.[5] These knowledge graphs will naturally infiltrate some human factors more or less through programmer's code writing and algorithm modeling. Although the code is executed without bias, "bias" is encoded into the system (Calo., Froomkin., and Kerr. 2016).

Objective Is Not the Same as Isolation

Although judicial artificial intelligence itself is objective and neutral, it is doubtful whether judicial artificial intelligence is really as objective and neutral as it claims.

Firstly, the neutrality of artificial intelligence remains constrained. Justice is like the top of a mast, swinging violently at the slightest movement of the hull (Radbruch 1997). In the application of artificial intelligence technology to judicial judgment, the instinct of pursuing efficiency should be emphasized, especially the concept of justice as the foundation, and the pursuit of justice should not be abandoned for the sake of efficiency, otherwise, the cart before the horse will be turned. Under the influence of the law of "bias In, bias Out," judicial artificial intelligence algorithm will inevitably produce value Bias, deviating from the objective and fair track (Mayson. 2019). For example, after a statistical analysis of the refereeing bias of COMPAS, the artificial intelligence system used by the United States justice system to predict a defendant's recidivism and its level of risk, they found that blacks scored 45% higher than whites.[6] The value bias of judicial artificial intelligence based on big data, the internet and autonomous iterative algorithm is often hidden and difficult to be perceived and found, and artificial intelligence lacks the ability of self-reflection and self-correction, therefore, the value bias acquired by judicial artificial intelligence will be further solidified with the repetition of the machine and a lot of practice, these factors determine that judicial ai is not as objective and neutral as imagined. Therefore, to emphasize the value of justice, in addition to the artificial intelligence technology to the case should be paid great attention to the influence of entity justice, more should focus on the relationship between the application of artificial intelligence technology and the procedural justness, especially to the influence of the litigation rights, the parties to the path of the public power, safeguard citizens' rights by limiting the implementation procedure fair and justified.

Secondly, artificial intelligence systems fail to make necessary value judgments. But the so-called value judgment here is in the general sense, that is, value judgment generally recognized by society. The artificial intelligence system itself is not completely devoid of value orientation, the system operates based on the algorithm, and the designer injects his value judgment into the system when setting the system algorithm. This is why the bias of machines or algorithms has begun to attract widespread attention (Xie. 2020). Current practice shows that it is not a feasible way to develop value judgment by judicial artificial intelligence, either for the consideration of human dignity or for the unquantifiable value. As a result, some scholars have pointed out that there may be a debate as to why the case was decided this way and not the other way, these arguments often involve common sense and experience, prior jurisprudence, and concept about fairness and justice, most of which are well beyond the reach of artificial intelligence (Gardner. 1984). In addition to a value judgment, the judiciary embedded in social governance also needs to assume the functions of leading the concept of social justice, resolving the risks of potential social conflicts, and implementing policies and guidelines, which are beyond the understanding and participation of judicial artificial intelligence divorced from the social context.

Finally, the realization of judicial justice does not depend on the calculation of probability embodying relevance. Yutaka Matsuo, a Japanese scholar, pointed out that civil litigation, especially divorce or property inheritance disputes, may be better handled by people because it involves a lot of emotional factors and needs to coordinate the interests of the parties. He said, I suspect that many people would prefer to have a face-to-face conversation with a lawyer, which may be more acceptable to the client, rather than having a machine tell you, "there is a 15% chance that your claim will be accepted by the court" (Yutaka Matsuo 2016). Therefore, the application of artificial intelligence technology in certain areas of the trial is not very appropriate. As Holmes puts it, a time for people to feel the need, the mainstream moral and political theory, intuition in public policy, whether declared or subconscious, even the prejudices common to judges and their fellow-men, when deciding on which management rules of the people of the role of all is much bigger than a syllogism reasoning (Holmes 1963). The judicial judgment of justice needs to be realized by the substantive judgment which considers all kinds of factors synthetically, but it is difficult to be realized by calculating probability, even if the algorithm can be deduced by formal logic, it is impossible to make such substantive judgment.

Role Positioning of Human Judges in the Era of Judicial Artificial Intelligence

With the deepening of the reform of the system of complicated and simple cases triage in China, some courts have been able to use artificial intelligence automation to carry out the work of complicated and simple cases triage, and the accuracy

rate of its identification has reached more than 98%. However, this does not mean that the leading position of judges in judicial decisions has been shaken, because judicial artificial intelligence still can not do anything for difficult, complex and new cases, and can only hand them over to human judges, to get a fair and reasonable decision (Li 2017). Therefore, human judges should try to adapt to the trend of the artificial intelligence era, actively change their roles and functions, and make full application of the "human-computer legal system" to expand the judicial capacity and improve the quality of trials, to effectively respond to the artificial intelligence era of the judge role positioning of the new needs.

More Professional

With the continuous optimization of artificial intelligence technology and the continuous expansion of its application in the judicial field, judges can be separated from a large number of simple cases and repetitive, mechanical affairs, and concentrate on a few difficult, complex, emerging cases. The reduction in the number of cases requiring judges means a reduction in the number of judges required. However, these few difficult, complex, new-type cases on the judge's individual trial quality put forward higher requirements, which means more professional become the future development direction of the Judge Group.

Firstly, in the era of big data, judges need a new perspective and approach to examine the issues in the judicial field. As early as the 1920s, Benjamin N. Cardozo in his book "The Nature of Judicial Process" that the research process that judges must conduct when discovering laws is very similar to the research process required by the legislator's duty, which is to meet the requirements of justice and social utility through appropriate rules. When formal sources of law are silent or inadequate, judges should shape their legal decisions by subordinating themselves to the objectives that the legislator will have to regulate the issue (Cardozo. 2012). Judicial adjudication is a complex professional activity that requires both specialized legal expertise and the cognitive and emotional abilities of judges. Many key concepts in the judicial application, such as "justice," "reasonable attention" and "expression of meaning," are deeply rooted in the rich and colorful life of humans. Judicial reasoning requires a variety of cognitive techniques, such as evaluating facts, interpreting legal texts, engaging in induction and analogy, and engaging in argumentation. These require the legal experience of the referee, as the case involves the vital interests and feelings of the parties, and the resolution of the case affects the expectations of the parties and shapes their understanding of the legal system (Gardner. 1984). To be competent in judicial work, judges should have not only legal expertise, but also nonprofessional knowledge, which may be related to economic, political, philosophical, computer and other fields, for only judges with a deep insight into the state of affairs can deal with cases of novelty, uncertainty or conflict of values.

Secondly, the mastery of artificial intelligence-related knowledge and skills should also become an important aspect of judges' comprehensive quality cultivation. At present, most countries regard legal professional knowledge, legal professional experience and legal professional ethics as the most important evaluation indexes for judge selection. However, judging from the current practice of China's judicial artificial intelligence construction, there is a widespread phenomenon that "those who know technology do not know the law, and those who know law do not know technology," and there are quite a few legal talents who master data algorithm issues and artificial intelligence technology. In practice, many legal workers have little or no knowledge of the technical problems of artificial intelligence, and the algorithmic techniques of data analysis and model building are entirely in the hands of the technical field personnel, the gulf between different fields of expertise is difficult to bridge. Legal workers are used to reviewing and solving problems with traditional legal concepts, even if they want to explore issues in the field of judicial artificial intelligence from a multidisciplinary perspective, the lack of knowledge limits their further research (Gao, 2019). On the one hand, cultivating judges who master both legal expertise and artificial intelligence technology can guarantee the dominant position of judges in judicial decisions, avoid judges' blind reliance on artificial intelligence decision-making, to enhance the efficiency of the judge's decision-making assisted by the artificial intelligence legal system. On the other hand, judges who master artificial intelligence technology can participate in the making and revision of artificial intelligence legal system, supervise the fairness of algorithms, timely discover the problems of artificial intelligence algorithms, and effectively avoid the technical risks of algorithm black box, algorithm hegemony and algorithm discrimination (Mariusz 2020). In addition, because of the shortage of legal talents who master artificial intelligence technology, the training of judges can be strengthened in the short term to improve their cognition, understanding, and operation ability of the artificial intelligence legal system to alleviate this dilemma. In the long run, by reforming the existing training model for legal talents, creating an artificial intelligence undergraduate education and graduate education in legal knowledge, or establishing an artificial intelligence, legal interdisciplinary subject and extending the training period, to fundamentally change the plight of China's lack of complex legal talents, improve the level of elite judges feasible path.

More Rational

Judicial adjudication is a rational undertaking, and the introduction of artificial intelligence technology may lead to excessive emphasis on "instrumental rationality" and neglect of "value rationality," which will impact the original balance between "instrumental rationality" and "value rationality" (Weber.

2010). However, there is no dichotomy between right and wrong or black and white in judicial judgment. It requires utilitarian consideration of the purpose, means, and consequences as well as concern for the value of judicial justice and integrity. Although judicial artificial intelligence cannot completely replace judges, it can help judges save a lot of energy by undertaking repetitive clerical work and adjudicating simple cases, to devote themselves to the core work of adjudication, such as fact determination and application of the law is complicated cases. In addition, judicial artificial intelligence can also provide judges with comprehensive reference data and simple decision predictions, to avoid judges being affected by value bias and knowledge structure bias, to make unreasonable or even wrong decisions. Therefore, it should give full play to the role of judicial artificial intelligence in improving the rational level of judges' decision-making, to lay a good foundation for the improvement of judicial credibility and the realization of judgment justice.

Firstly, judges should make full application of the advantages of judicial artificial intelligence in knowledge storage and retrieval, and fully possess and explore the experience of adjudication in laws, regulations, and precedents related to adjudication cases, to reduce the uncertainty of judicial adjudication and improve the fairness and acceptability of judicial adjudication. With the advantage of artificial intelligence algorithms and computation power, the limitation and fuzziness of a judge's original cognition will be greatly changed. When the judge inputs the relevant elements of the case into the system, the artificial intelligence can automatically push relevant legal provisions and similar cases through full data retrieval, which effectively expands the breadth and depth of the judge's understanding of the case and helps the judge become an "enlightened and well-informed person," to avoid judges with one-sided access to data and information making decisions that lack predictability (Honorê. 1996).

Secondly, both pushing precedents and artificial intelligence judgment prediction provide judges with a pre-decision scheme, which makes judges need to change the original thinking mode of "decision-argumentation" and return to a more legitimate decision-making framework and paradigm of "argumentation-decision." Judicial artificial intelligence takes the lead in making judgment conclusions for judges to refer to and refute by pushing precedents and predicting judgment results (Myers 1999; Tversky. and Kahneman. 1974). Take the Shanghai court as an example, the "206 system" alerts judges when there is an 85% difference between the judge's decision and the higher court's decision is more than 85%. When the judge insists on the decision, the case is automatically forwarded to the President for discussion.[7] In this way, the judge's original thinking mode of judgment based on the intuition of the vague impression of the case is radically changed, and the premise and basis of the judge's original confirmation bias are eliminated. Judges need to make efforts to improve the degree of rationalization of judicial

judgment, and strive to demonstrate the conclusions of precedents or the other scheme provided by artificial intelligence, to minimize the possible adverse impact of judges' intuitive bias on fair judgment.

Finally, the application of artificial intelligence to assist judges should also guard against the risk that judges will be tamed by over-reliance on judicial artificial intelligence decisions. Although judicial artificial intelligence can not completely replace judges to make judicial decisions, in specific judicial practice, it may appear that judges voluntarily hand over the decision-making power of judicial decisions to avoid risks and reduce the pressure of judging cases, so it can be tamed by artificial intelligence and become the assistant of judicial artificial intelligence. To avoid this kind of risk, it can mobilize the enthusiasm of judges' independent judgment by rationally distributing judicial responsibility. Although there are many disputes about the attribution of the responsibility of artificial intelligence in the judicial field, after defining the primary and secondary position of judges and artificial intelligence, the main responsibility of miscalculation or misjudging will be assigned to judges, assigning secondary responsibilities to an algorithm provider or a court would be a more feasible and reasonable allocation of responsibilities. When the main responsibility is assigned to the judge, the judge will naturally take the initiative to exert their rationality and carry out judicial activities independently and diligently where the artificial intelligence ability cannot reach, to ensure the legitimacy of the judgment results.

More Warm

Judicial artificial intelligence is certainly conducive to making more efficient and consistent judicial decisions, but they can not calculate emotions, can not interact with people's minds, can not care for humanity, and can not flexibly and creatively safeguard justice values according to specific scenarios. There is a danger that more and more robotic enforcement and adjudication, and less and less human interaction and communication, will turn citizens into "tame bodies." Therefore, in the process of realizing judicial justice through algorithmic decision-making, humans are required to provide necessary emotional and resonance elements for the system (Calo., Froomkin., and Kerr. 2016). Compared with artificial intelligence, which lacks autonomy, ruthlessness, valuelessness, introspection, and the inability to detect that they will make mistakes, human judges are temperature-savvy, and as participants in social life, they have the same ability to empathize with the general public, and are committed to achieving empathetic justice (Song 2020). Against the backdrop of artificial intelligence's full penetration into the judiciary, the concern is not that "machines are starting to think like humans, but that humans are beginning to lose their unique ability to think and become vassals of machines." "everyone and every case is unique. Each

requires human judgment, and the vital and very natural ability to empathy that artificial intelligence systems cannot provide. "[8] The irreducible human nature of the trial lies precisely in the unpredictability of humanity's examination of the legal elements of facts and contradictions, which depends more or less on different circumstances. At present, most countries have positioned algorithmic decision-making as an auxiliary system, and case officers must be in a dominant position to prevent the brain drain caused by algorithmic decision-making. It can be seen that judicial artificial intelligence can only bring "visual justice" and "digital justice" with conditions. Even though judicial artificial intelligence has been widely applied, "the" feelings "and" ingenuity "of lawyers cannot be copied and replaced in the pursuit of judicial justice.[9]

De-emotionalization and de-value judgment are the basic characteristics of artificial intelligence technology used in judicial adjudication. However, judicial judgment is different from the logic of technology. Judicial judgment is beyond formal rationality, the judgment of right and wrong, good and bad, good and evil in the judicial judgment itself contains the content of value judgment. In addition, each case that the court faces has different circumstances and demands, and it is necessary to clarify the legal principle and settle the dispute through the specific hearing case, this series work is impossible to use a set of pre-set artificial intelligence algorithms to calculate the conclusion of the case. From the historical experience, it is great progress in the history of human judicature to admit the characteristic of transcending formal rationality and emphasize the system of free psychological evidence based on the judge's free discretion. In the face of possible conflicts between abstract rules and complicated cases, as well as possible conflicts between legal principles and human feelings in specific cases, respecting the independent jurisdiction of judges is an inevitable requirement for realizing substantive justice and also in line with the basic principles of justice (Zheng. 2020). Comparatively speaking, for the treatment of difficult and new cases, the judge's conscience undoubtedly determines the legitimacy and acceptability of the final verdict, and the ability to explore the conscience and justice concept behind the law is difficult to simulate and replace by judicial artificial intelligence. Drawing experience and wisdom from social life and fully considering individual cases in the social life background are the basic conditions for human judges to gain the public's trust and approval, what is truly moving is the freshness of the facts and the warmth of the human heart, and it is the positive response to the just demands of human warmth that has allowed the judicial function to flourish and endure (Cardozo. 2012). Therefore, in the era of artificial intelligence, judges should give full play to the unique value of human judges, and strive to confirm and maintain the ethical order and good feelings that the society hopes for, to fully care for the dignity and value of humans.

Conclusion

Artificial intelligence can play a variety of application values in assisting judicial case handling or autonomous decision-making process, such as eliminating information asymmetry between departments in case handling, maximizing case handling efficiency, reducing wrong cases, and promoting justice, et al. Although artificial intelligence plays an important role in the trial business, in the trial process, artificial intelligence is in a subordinate position, only assisting the judge to handle the case, the judge is the key and core of the trial work. The extent to which judicial decisions can be determined through statistical modeling, analysis and calculation, and controlled by rules and standards, will be the extent to which artificial intelligence can be applied. However, the judicial judgment is not one-dimensional reasoning, it is in essence a complicated activity open to the universal practice, that is, to the moral, ethical, and practical reasons. At least for now, in the face of such complex judicial activities, the computer is still unable to completely replace the human referee. The challenge that the artificial intelligence era brings to the judicial profession does not mean that the transformative influence that artificial intelligence brings to the judge profession can be ignored. While using artificial intelligence to help improve the fairness of judicial judgment, judges should also try to adapt to the changing needs of the role of judges in the era of artificial intelligence and become more professional, rational, and warm judges.

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Notes

1. Please see www.gov.cn.
2. Please see https://baijiahao.baidu.com/s?id=1668446713046958451&wfr=spider&for=pc
3. Please see 12309.gov.cn.
4. Please see https://www.faanw.com/zhihuifayuan/486.html
5. Please see http://oppo.yidianzixun.com/article/0LwDyU3F?s=oppobrowser&appid=oppobrowser
6. Please see https://github.com/propublica/compas-analysis/blob/master/Compaspercent20Analysis.Ipynb
7. Please see https://www.thepaper.cn/newsDetail_forward_1746283
8. Please see https://www.sohu.com/a/283435221_100069278
9. Please see http://oppo.yidianzixun.com/article/0LwDyU3F?s=oppobrowser&appid=oppobrowser

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