Analysis on the Problems and Solutions in Artificial Intelligence-Assisted Sentencing

Yiming Yin*

School of Humanities and Arts, China University of Mining and Technology, Tongshan District, Xuzhou, China

yym1791542570@163.com

Abstract: Over recent years, with its robust development, artificial intelligence has been applied in more diverse and multiple scenes and fields. In judicial practices, artificial intelligence-assisted sentencing system is gradually put into application as well. Based on the premise of its "auxiliary", the penalty measurement of this kind has the advantages of accuracy and uniformity, but there also exist some risks at the technical and legal levels meanwhile, such as algorithmic black box, algorithmic discrimination, mechanism and other problems. These risks can be avoided from the technical and legal levels. First, it is necessary to construct high-quality sentencing models and formulas and ensure the supply of high-quality data sources; second, based on the premise of auxiliary artificial intelligence, it is imperative to establish a corresponding accountability system and adopt institutional innovations, such as the "double cross-review mechanism", in order to construct a set of reasonable artificial intelligence-assisted sentencing systems.

Keywords: Artificial Intelligence-Assisted Sentencing, Sentencing Risk, Sentencing Measures

1 Introduction

In recent years, "artificial intelligence-assisted sentencing" has become the core sector of the application of artificial intelligence technology in the criminal justice in China, and a major field of innovation. In this particular scenario, intelligent sentencing assistance technology can be abstractly summarized as the following basic logic: with the big data and machine learning as the technical basis, it is then to automatically generate sentencing prediction opinions as the goal-oriented, to provide reference for the sentencing adjudicator, to reduce sentencing bias as the value orientation.[1] Artificial intelligence-assisted sentencing with its "auxiliary" as the premise and core orientation, has the advantages of high accuracy, fast update and iteration, strong uniformity of adjudication results, high adjudication efficiency. However, this sentencing system is also facing difficulties: at the technical level, "algorithm black box", "algorithm discrimination" and other problems can hardly be solved; at the legal level, artificial intelligence has a natural tendency to mechanism, thus it easily conflicting with the judge's

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discretionary power. And it is also difficult to draw clear boundaries in the subsequent distribution of legal responsibility. Therefore, how to find a way out for the dilemma faced by artificial intelligence-assisted sentencing is an urgent problem waiting to be solved.

2 Status and Advantages of the Artificial Intelligence-Assisted Sentencing Judicial Practice

2.1 Criminal sentencing reform trends at home and abroad

China's artificial intelligence-assisted sentencing can date back to the early 1980s, when Professor Qian Xuesen systematically demonstrated the feasibility of legal informatization and its realization in the first symposium on the science of legal system and several treatises. This marks the early exploration of artificial intelligence-assisted judicial practice. In 1987, Professor Zhao Tingguang began to explore the technical application of sentencing practice problems, developed to reflect the early application of smart technology "Assisted Sentencing System".[2]

At present, judicial intelligence at home and abroad has entered the primary stage. For example, the U.S. Blackstone Discovery Technology Company developed the "e-discovery" system; the U.S. Columbia University developed the "Sentencing Calculator Guidelines ". Columbia University in the United States has developed the "Sentencing Guidelines Calculator" system; the Wisconsin State Court in the United States has fully promoted the COMPAS system; and the Judicial and Sentencing Commissions of New South Wales in Australia have applied the SIS sentencing system.[3] In China, the Shanghai Higher People's Court has developed a set of intelligent language systems. These systems can be applied in the field of criminal justice by joining hands with Tech Data Xunfei; in January 2020, following the principle of "scientific, intelligent and humanized" in the construction of intelligent prosecution services, the Supreme People's Procuratorate as well as the procuratorates in Guizhou and Hainan Provinces formally went online to run the pilot operation of the National Unified Operational Application System for Procuratorates. Procuratorial organs unified business application system version 2.0. Among them, the intelligent auxiliary sentencing system is a very important plate; designed and innovated by Guangdong Bowei Chuangyuan Technology Co., Ltd., "Xiao Baogong" intelligent conviction and sentencing system, for cases involving guilty pleas and penalties, has a strong intelligent and accurate prediction of the sentencing function. Also, it can better help to promote the standardization of sentencing reform. The system has been used or tried out by more than 200 judicial and procuratorial organs nationwide, and the trial operation has yielded good results.

Artificial intelligence-assisted sentencing, as a link in the context of judicial intelligence, is both helpful as a requirement for the informatization of criminal trials and conducive to improving judicial efficiency. Artificial intelligence-assisted sentencing promotes the unification of criminal adjudication. On the one hand, the "similar case push" mechanism is likely to become a major highlight of artificial intelligence-assisted sentencing. Supported by big data, AI-assisted sentencing has the technical advantage

that it can retrieve valid information from the case database, run different algorithms at the same time, and finally give the result with the highest matching degree. Once this mechanism is well developed, it will greatly improve the efficiency of the judiciary in handling cases, and to a certain extent, it can promote "the same judgment in similar cases". For example, “Project 206" in Shanghai uses a large and complete database of legal resources, reflecting the trend of uniformity in criminal adjudication within the region under the auspices of AI-assisted sentencing technology; on the other hand, the application of AI-assisted sentencing will effectively promote the standardization of sentencing. Although the sentencing opinions of artificial intelligence have been introduced into judicial trials, it may affect the judge's discretionary power to a certain extent, and its intervention in the sentencing procedure makes the judge no longer the only provider of sentencing opinions, which can then reduce the risk of the abuse of discretionary power and promote the standardization of sentencing.[4]

2.2 Judicial positioning of artificial intelligence-assisted sentencing

First, some scholars have proposed that artificial intelligence can be divided into weak artificial intelligence and strong artificial intelligence according to whether it has the recognition and control ability: weak artificial intelligence products can make judgments and decisions within the designed and compiled procedures, but they can only achieve the designed will of the designer or user. The world is still in the era of weak AI. In the era of weak AI, the so-called "independent learning" and "independent thinking" of AI actually rely on the basic program given by the designer. Such "autonomous learning" and "independent thinking" is only the embodiment of the operation of computer algorithms, which is not the same as the embodiment of human will. Therefore, artificial intelligence in criminal justice cannot realize independent judgment and decision-making. This also means that the "weak artificial intelligence" stage of the technical level cannot reach the artificial intelligence independent sentencing or dominant sentencing standards. It can be seen that artificial intelligence in the judicial trial or sentencing procedures can only play a supporting role. This is determined by the technical level of artificial intelligence auxiliary sentencing status.

Second, from the perspective of constitutional philosophy, both the judicial trial power under the Constitution and the discretionary power of judges essentially derives from the people's authorization. "The judicial power of the courts is the result of a public mandate, the source of which is the sovereignty of the people. People exercise their power to appoint and remove judges through the representative system, and judges are entrusted with judicial power derived from public authorization, and they should use their own judgment to conduct independent trials." Thus, discretion essentially represents the interests of the people. The fact that AI is inferior to judges and the discretionary power they hold in sentencing status essentially reflects that AI serves the interests of the people. Generally, the auxiliary status of AI in sentencing is determined by the sovereignty of the people in the constitutional philosophical sense, and until AI is sufficiently formally empowered by the people to represent their will and interests, it will maintain its auxiliary status in the judicial trial process for a long time.

Finally, the legal status of artificial intelligence in judicial practice and related ethical issues are still controversial. Disputes over the legal status of artificial intelligence and related ethical issues are essentially closely related to the characteristics of the development of artificial intelligence technology. In short, as the world is still in the "weak artificial intelligence" stage, there are still too many technical risks and loopholes. The corresponding law must regulate the more complex problems, and many of the contradictions and conflicts are simply cannot be resolved. This paper argues that the technology and the law have a complementary relationship, and without the law to regulate and constrain the technology, it is easy to evolve into wandering in the gray zone or even cause criminal tools. In other words, jurisprudence is a social science rooted in social existence. It must take social reality as the base. Reflected in the technical level is a technical norm for the regulation of the law if this technology has been developed to a certain level. Unfortunately, with the current artificial intelligence technology, it is difficult to correspond to the establishment of a set of legal system to regulate artificial intelligence-assisted sentencing. If there is no well-developed law as the basis, artificial intelligence dominated sentencing and artificial intelligence independent sentencing cannot exist, which also determines its current stage, only as a tool for the judge's discretion. In this paper, it is believed that the instrumental value of artificial intelligence-assisted criminal adjudication system should always be adhered to. No matter how developed the technology is, it should serve the essential law of judicial adjudication and respect the professional judgment of judges. In contrast, the application of artificial intelligence, such as automatic driving, is more dependent on the maturity of the technology itself and its compatibility with society, while the center of gravity of intelligent assisted adjudication still lies in "assisting" the judge to decide the case in accordance with the law. And even if the sentencing results are given through the analysis of judicial data, it can only be used as an adjudication reference. "[5] The computer cannot replace the judge and become the main body of sentencing, and the relationship between the computer sentencing and the judge's discretion needs to be correctly dealt with".[6] In summary, the artificial intelligence in criminal justice adjudication should serve as the auxiliary tool.

2.3 Advantages of artificial intelligence-assisted sentencing

First of all, artificial intelligence algorithms are built based on the analysis of large amounts of big data, so they naturally carry the gene of precision. This helps to reduce the irrationality of human judges in the process of sentencing and trial, minimize the path dependence of judges based on judicial experience, to improve the accuracy of sentencing. It cannot be denied that human beings, no matter how intelligent they are, are bound to have limitations in their thinking. For human judges, for example, even a senior and experienced judge, their entire career in the overall number of cases is limited. And if they need to maintain professionalism, continuous learning is needed. They need to invest time and energy, and the learning costs are also immeasurable. But on the contrary, artificial intelligence, although the initial training of large models of capital costs invested is also huge. However, once the real establishment of a mature sen-

tencing model, then its extraction and analysis of data is difficult to compare the efficiency of human beings, and its analysis of data, grasp and processing accuracy is higher than that of human beings. Assuming that the data sources in the basic database of the artificial intelligence model are all of high quality, there is no doubt that the accuracy of the artificial intelligence processing will be higher than human beings. As for the massive data support, it will have a stronger persuasive power.

At the same time, the self-iteration and evolution of artificial intelligence is also much faster than the average human level, which is the advantage of science and technology compared to human characteristics of the decision. Artificial intelligence-assisted sentencing not only allows the concept of adjudication to quickly keep up with the latest legal trends. And if all the artificial intelligence sentencing system within a certain common set of databases, it can also narrow the gap between the level of local case handling, and to strengthen the uniformity of the judicial application of the whole country. In China, for example, first-tier cities such as Beijing, Shanghai, Guangzhou and Shenzhen have a sound and developed rule of law environment, as well as a large number of high-quality legal practitioners. They have rich judicial resources. However, the law environment in some economically underdeveloped areas of the country is relatively poor, and the professional quality of legal practitioners is uneven. The introduction of the artificial intelligence-assisted sentencing system will be conducive to narrowing the gap in judicial resources between regions and alleviating the imbalanced judicial status.

Finally, artificial intelligence sentencing will provide a reliable prediction method, based on the premise of judicial big data, etc., in accordance with the operating rules of the "algorithm". And according to the sentencing trend or law of existing cases, it is possible to match, check and verify the new similar cases or the same cases, which can realize the "intelligent and accurate prediction". "This is its most central characteristic. It is one of its core qualities and functions, and is no longer an empirical sentencing practice or a generalized sentencing model based on human intelligence. "Intelligent prediction" is replacing empirical, intellectual, and other normative approaches to maximize the "best fit" of sentencing predictions through intelligent technology. The advantages of algorithms and their judicialization are the most critical underpinnings and institutional safeguards.[7]

3 Difficulties in Artificial Intelligence-Assisted Sentencing

3.1 Technical difficulties in artificial intelligence-assisted sentencing

Problem of "Algorithm black box".

At the technical level, one of the typical defects of artificial intelligence-assisted sentencing is the "algorithm black box". "Algorithm black box" means the artificial intelligence assisted sentencing algorithm is not transparent, and its sentencing decision generation is essentially a "black box judgment" process. It is only possible to control its input, and then view the output. The inner operation process of the decision-making process and mathematical logic is, however, difficult to be present. [8] "Algorithm

black box" in the judicial practice process shows the lack of transparency, which may lead to the plight of judicial credibility. A legal proverb goes, "fair justice should be realized in a visible way". "Open justice" is a consistent and important principle of China's judicial work. However, if artificial intelligence is introduced to assist in sentencing, the problem of "algorithmic black box" will inevitably arise, which will have an impact on the openness and transparency of judicial practice.

3.2 "Algorithmic discrimination" problem

"Algorithmic discrimination" refers to the fact that current artificial intelligence-assisted sentencing algorithmic techniques are not completely objective and neutral, but it can be affected by factors such as historical data bias, designer bias, or technological imperfections, resulting in sentencing algorithms that may produce discriminatory results. An algorithm is both a method that can be programmed into a computer to solve a problem and a system of rules and guarantees a predetermined goal will be achieved. While an algorithm is an effective method of achieving a predetermined goal and has a composite structural character, it is also characterized by finiteness and abstraction. Obviously, whether the data source itself has deviation discrimination, or the underlying algorithm designers have subjective emotional personal bias or discrimination, or for objective immaturity of the algorithm technology caused by the algorithm in the operation, it is possible to lead to the alienation or deviation in the process of sentencing and the results of the sentencing. This is also a technical risk, which brings impacts and challenges to the fairness and reasonableness of judicial decisions.

Mechanistic tendency.

First of all, as mentioned above, artificial intelligence-assisted sentencing has the advantage of accuracy brought by algorithmic technology. However, this "accuracy" may be a double-edged sword, as here is a risk of leading to mechanistic tendencies. For example, even if a judge finds that sentencing in accordance with the Sentencing Guidelines may not be able to achieve fairness in sentencing, he or she will not dare or be willing to set aside or violate the fixed standards of the Sentencing Guidelines, which is a form of mechanism in the administration of justice and sentencing. Assuming that the existing consensus is to recognize the artificial intelligence in the judicial decision or sentencing procedures in the "auxiliary" status cannot be easily changed, but the auxiliary status is not the same as no status, since the choice of the introduction of artificial intelligence-assisted sentencing system. Then it is imperative to accept the artificial intelligence in the reality of the adjudication process of the advice provided. But precisely because the artificial intelligence assisted sentencing system is based on relatively fixed algorithmic procedures, it is inevitable that there is a tendency of mechanization. In some cases, there may be a lack of flexibility and adaptability, resulting in difficult to cope with the abstract nature of the legal provisions, lagging. And therefore, it is unable to deal with the complexity of the social situation. Moreover, social life is always in flux, specifically in the field of judicial sentencing, and there is bound to be ambiguity or loopholes in the application of the law.[9] At present, the current

artificial intelligence cannot fully reach the level of human-like logical thinking in accordance with the degree of rigorous reasoning, so people turn to the path through the elements of the division of different algorithms (such as additions, deletions and changes in the facts of the different elements of the method) to generate assumptions, and then compared with the new case with the argumentation to reach a result.[10] Therefore, the mechanistic tendency becomes one of the risks that are difficult to avoid in today's AI-assisted sentencing.

Conflict of artificial intelligence auxiliary and Judge's discretion.

Under the premise of artificial intelligence auxiliary, the judge's discretion and the scale of the artificial intelligence's recommendations still have conflicts. How to balance them two in the specific details, is also worthy of research and exploration. As mentioned above, in the sense of constitutional philosophy, a series of judges' powers such as adjudication, sentencing, and discretion in the judicial process come from the people's sovereignty in the final analysis. Therefore, only at this stage, the development of artificial intelligence technology is not well-developed enough, and its own defects determine that it is impossible to shake the dominant position of the judge in the judicial decision and sentencing process. This is also why the above mentioned the auxiliary status of artificial intelligence sentencing is unshakeable at this stage. However, the judicial practice situation is complex and ever-changing, and it is far from enough after just confirming the premise is judge-led and artificial intelligence assisted. In specific occasions and case details, how to determine the boundaries of discretion, and how to allocate responsibility between the two, are all issues that need to be considered and solved.

Allocation of legal responsibility.

Specifically, to the micro level, for example, in a criminal case, it is necessary to convict and sentence the defendant, but the results of the conviction and sentence in this case in essence belongs to the category of miscarriage of justice. Now, how to delineate and allocate the legal responsibility has become an urgent problem to be solved. Assuming the existence of a set of legal solutions, the program for the sharing of responsibility from the perspective of the underlying logic is the substantive sense of the value of the trade-off. If the sentencing opinion is artificial intelligence, accept the sentencing opinion and make a decision is the judge, there is a causal relationship between the two, and the responsibility subject involved is only the judge and the artificial intelligence, and at this time it will extend a lot of complex problems. For example, first, whether the artificial intelligence has the qualification of the subject of legal responsibility is a very worth exploring; Or, assuming that the artificial intelligence has the qualification of the subject of legal responsibility, then between the artificial intelligence and the judge, for the problem, how to confirm and allocate the legal responsibility, it is necessary to carry out the value of the legal sense of judgment and trade-offs. Generally, if the above problems cannot be judged as soon as possible in the value level of judgment and trade-offs to give a relatively fair and reasonable answer, then it

is likely to lead to the corresponding legal risks, which also serves as one of the risks in the current artificial intelligence-assisted sentencing.

4 Localized Construction of Artificial Intelligence-Assisted Sentencing

4.1 Solutions in the technical level response

Establish high-quality sentencing models and formulas.

Artificial intelligence algorithms can accomplish constant machine learning, self-iteration and evolution through the analysis of big data, the essence of which is to establish a set of sentencing formula through the data analysis. And then it can constantly polish and upgrade this set of sentencing formula. Certainly, it is imperative to recognize that artificial intelligence has a huge advantage in this regard, but human intelligence cannot be avoided, especially to the judge as the representative of many years of experience in judicial practice of legal practitioners, with artificial intelligence cannot be compared and replaced by logical thinking and other advantages, which is why even if the artificial intelligence of sentencing is developed, it is difficult to deprive the judge of discretionary power is an important reason. In addition, it is also necessary to enrich and optimize the content of the case database on the judging instruments, so that the data and information presented are more comprehensive and adequate, so that the content generated by artificial intelligence can have practical guidance significance.[11]

Ensuring the supply of high-quality data sources.

The algorithm of the artificial intelligence-assisted sentencing system is based on massive data, and the existence of poor-quality data not only leads to substandard database quality, but also induces the problem of "algorithmic discrimination" to a certain extent. The elimination of algorithmic discrimination requires high-quality data sources as the basis. In this paper, we believe that the judicial case data represented by the referee network is the crystallization of the wisdom of the group of judicial workers, which can provide a professional and authoritative data source for the artificial intelligence-assisted sentencing. Therefore, the data source of the artificial intelligence-assisted sentencing system can be based on data such as judicial decision cases. For example, to create an artificial intelligence-assisted sentencing case database with the referee document network as the core and foundation, and to use high-quality judicial data as the data source of the artificial intelligence algorithm. At the same time, the corresponding data screening mechanism, such as the creation of a senior judge, scholars as the main body of the artificial screening mechanism, as far as possible to reduce the data sources such as the adjudication documents network itself induced by the "algorithmic discrimination" risk. In this way, the combination of high-quality sentencing models, sentencing formulas and high-quality data can, to a certain extent, not only circumvent the risks of algorithmic discrimination and other technical aspects, but also give full play to the benefits of the artificial intelligence-assisted sentencing system in the era of information technology and big data.

4.2 Path construction in the legal field

Clearly auxiliary status is the proper positioning of artificial intelligence-assisted sentencing.

Artificial intelligence technology and its application in the algorithmic level there is still a lot of room for progress, and the traditional judicial personnel as the main body of the exercise of discretionary power has the authority to judge-led criminal justice model is still the current main mode of sentencing. This decision artificial intelligence assisted sentencing system temporarily cannot be directly replaced, mainly to play the role of auxiliary judicial personnel more accurate sentencing, is an efficient means of assisting judicial personnel to handle the case, and cannot completely replace the judicial personnel to handle the case; followed by the judge can exercise discretionary power, so that the conclusion of the sentencing more to meet the requirements of individualization of the penalty.[12] In the macro value judgment level, should be clear that the premise is: at this stage, artificial intelligence in the sentencing process only to undertake "auxiliary" work, in the "auxiliary" position. This characterization is very important, but also for the solution of artificial intelligence-assisted sentencing in the technical and legal aspects of the many problems given the principle and guiding guidelines. For example, the technical level of the "algorithmic discrimination" problem, even if the "algorithmic discrimination" phenomenon really appeared, does not mean that the results of the referee's total rejection, because it must be reserved for the judge's discretionary space, and the power of such a judge must be overriding the artificial intelligence, which is a result of the artificial intelligence-assisted sentencing. Above, this is determined by the auxiliary status of artificial intelligence, thus also for the adjudication of the flexibility of the results, adjustable and remediable to provide a heavy protection. Therefore, at the macro level, the status of artificial intelligence in the field of sentencing should be located in the "auxiliary" status.

Accountability systems of artificial intelligence-assisted sentencing.

First, fairness and transparency are effective ways to eliminate algorithmic bias and prevent alienation of power. Fairness is one of the important values of society, and intelligent sentencing, as an important judicial adjudication measure, must have the value attribute of fairness. U.S. Supreme Court Justice Louis Brandeis (Brandeis.Louis) once said, "Sunlight is the best disinfectant, and light is the best cop."[13] Although it is difficult to completely circumvent the risks posed by algorithmic black boxes with the current level of technology, the entire process of sentencing can be made public through artificial intelligence-assisted sentencing, supervised at the level of the judicial process, and supplemented by a corresponding accountability mechanism, with a view to achieving the effect of sentencing standardization.

Secondly, at the level of legal responsibility allocation, due to the artificial intelligence in sentencing is in the auxiliary position, so the main body of legal responsibility for sentencing errors should still be the judge. Assigning legal responsibility for sentencing errors to judges not only corresponds to the auxiliary status of artificial intelligence at the judicial level, but also reflects the characteristics of the era of "weak artificial intelligence" at the technical level.

Finally, accountability in the judicial sphere can be manifested in many ways. For example, it is necessary to clearly document the specifics of the sentencing opinions given by the artificial intelligence and the judge in the adjudication process, and to establish a supporting mechanism to recover responsibility after the fact; the developer should also be held legally responsible. If it can be proved that the sentencing error has a direct causal relationship with the AI product itself, the developer can also be held legally responsible.

Dual cross-cutting review mechanism.

In this paper, we believe that a double cross-cutting review mechanism can be established, i.e., a review mechanism in which the technical level and the legal level are both reviewed, and in which external supervision and internal supervision intersect with each other. First of all, the external review represented by people's supervision belongs to the necessary part. People's supervision is to regulate and supervise AI-assisted sentencing at the universal social level, which is the embodiment of people's sovereignty in the field of criminal justice trial in the sense of constitutional philosophy.

This paper argues that one of the important characteristics of double cross examination lies in the effect of external supervision in the internal supervision. External supervision, the more common is social supervision, mainly the people's supervision mechanism. Its advantage is that the external third party as a judicial artificial intelligence system with the object of supervision does not have interest entanglements, can be more objective, neutral, rational perspective to judge its effectiveness, but also from the perspective of a neutral third party to provide more diversified ideas and suggestions for improvement. However, the shortcomings of external supervision are also very obvious, as the saying goes, "the line is like a mountain". If the supervisory subject and the supervisory object are not in the same field, the high professional barriers between the industries will often make it difficult for the supervisor to put forward targeted opinions from a professional point of view, and even cause misunderstanding and bias due to the attributes of the industry differences. However, the double cross-review mechanism proposed in this paper can solve the above problems. The meaning of "cross" in this mechanism refers to the intersection of the external supervision of the people and the internal supervision of the judicial system. For example, on the premise that local people supervise local judicial units, the Shaanxi judicial system can supervise the Jiangsu judicial system, the Jiangsu judicial system supervises the Sichuan judicial system, and the Sichuan judicial system supervises the Shandong judicial system. On the one hand, if the model of supervising from above and below is adopted, due to the natural hierarchical difference, many problems and angles are difficult to be detected by the superiors, but by allowing the judicial systems of the same level to supervise each other, problems can be searched for and mistakes can be corrected. On the other hand, the same judicial organs, there is no problem of professional barriers, can directly from a professional point of view to give targeted advice. Therefore, the dual cross-review mechanism essentially combines the advantages of external and internal oversight: firstly, mutual oversight between peers still retains the advantages of objectivity and neutrality; and secondly, the oversight of professional organs by professional organs also has the benefits of specialization and relevance.

The second advantage of the dual cross-review mechanism lies in the "double review", with the first being a review at the technical level and the second being a review at the legal level. First of all, both AI and algorithms belong to the category of science and technology, and many specialized problems must be left to experts or technicians in the field of AI to solve. The first technical level of review, such as security issues, even the establishment of high-level firewalls, it is impossible to completely eliminate the risk of external technical attacks on artificial intelligence-assisted sentencing systems. Therefore, it is necessary to organize experts and technicians in related fields to regularly check and maintain its security performance. On the other hand, the program codes and data formulas at the bottom of AI algorithms can only be supervised by professional technicians with technical capabilities. The first technical level review includes reviewing the legitimacy and neutrality of the database data source, reviewing "algorithmic black box", "algorithmic discrimination" and other common problems of AI algorithms, as well as algorithmic values and algorithmic value orientation; the second is the legal level review, which, of course, also includes the review and maintenance of AI algorithms. The second is the review at the legal level, which of course also includes the review and supervision of values and other aspects. If the technical level review is that AI experts and technicians are deconstructing and analyzing the procedures and formulas of AI algorithms, then the legal level review is that experts, scholars, judges, and other legal professionals in the legal field are reviewing and supervising from a legal perspective. For example, assuming that the operation logic of the intelligent assisted sentencing system is to input "X" at the front end, and the result presented by the artificial intelligence algorithm after analyzing and processing is "Y", the "X" is likely to be a crime in the judicial decision and sentencing activities. In the judicial decision and sentencing activities, this "X" is likely to be the crime plot, factual evidence, etc., and the output "Y" belongs to the reference opinion or trial results. Then, judges and other reviewers who are legal professionals can give professional references and review suggestions from the perspective of setting and optimizing sentencing circumstances. All in all, the advantage of "dual review" is that it can combine the advantages of technical review and the strengths of legal review, combining and maximizing the benefits of both.

In summary, the dual cross-cutting review mechanism proposed in this paper has two main points. The first is "cross", which is essentially a combination of external supervision and internal supervision, in order to give full play to the advantages and strengths of the two, and to jointly reflect the advantages of objectivity, rationality and neutrality of external supervision and the advantages of internal supervision, such as professionalism and strong relevance; the second is "double". The second is "dual", which combines technical and legal review, both from the perspective of algorithmic architecture and code logic for security protection and technical supervision, and from the perspective of judicial practice and actual sentencing to give professional legal solutions and corresponding review and supervision. However, the dual cross-review mechanism is only a preliminary concept and prototype, and there are inevitably many imperfections. For example, the main form of internal supervision is superior and subordinate supervision, superior organs naturally have a greater influence on the subordinate organs, changed to internal level or the same level of organs to supervise each

other, the superior organs due to its natural management and control of the subordinate organs, may still have a greater influence in the supervision process. How to ensure the fairness and reasonableness of the supervisory process under such circumstances, and how to give a set of proper solutions, are also issues worthy of consideration and attention. For example, in the dual review, if the technical attributes collide with the legal attributes, and there are contradictions or conflicts between the views or concepts of the technical personnel and the judicial personnel, how to weigh and consider the value dimension, and how to improve and deal with the specific details are all valuable and need to be explored.

Judicial selection process for artificial intelligence-assisted sentencing.

One of the inherent risks of artificial intelligence-assisted sentencing is the tendency of mechanism, but it is temporarily difficult to completely overcome this disadvantage with the current technical level of "weak artificial intelligence" stage. Therefore, this paper believes that it is necessary to create an artificial intelligence-assisted sentencing judicial selection process, that is, before sentencing to give the parties a certain option, the parties to choose whether or not to introduce the artificial intelligence-assisted sentencing system to provide sentencing advice for the case. If an attempt is made to circumvent the mechanistic tendency brought about by artificial intelligence, the parties will have the right to choose to exclude the AI-assisted sentencing system from the adjudication process. Of course, even if an AI-assisted sentencing system is introduced to participate in the criminal adjudication process, it will not change the major premise of the auxiliary status of AI in sentencing. In the event of sentencing errors, the corresponding accountability system and double cross examination mechanism can also be used as reference ideas for inclusion in the consideration.

5 Conclusions

In conclusion, while artificial intelligence-assisted sentencing enhances the uniformity and accuracy of legal judgments, it also introduces significant challenges such as algorithmic opacity and potential biases. Addressing these challenges requires robust technical solutions, including high-quality data and transparent algorithms, as well as a comprehensive legal framework to ensure AI's auxiliary role and accountability in judicial processes. Ultimately, maintaining a balanced approach between human judicial discretion and AI assistance is crucial for upholding fairness and adaptability in the evolving landscape of criminal justice.

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