

# Practical Dilemma and Improvement Path of Artificial Intelligence Assisted Sentencing

Yuehong Wu

School of Politics and Law, Guangdong University of Technology, Guangzhou, 510520, China

## Abstract

**Artificial intelligence-assisted sentencing is a key part of the construction of intelligent justice in China, and the relevant research results have been piloted in some regions. At present, ai-assisted sentencing technology has shown outstanding effectiveness in improving judicial efficiency and reforming traditional sentencing mode, but it also exposes many disadvantages. At present, the application of ai-assisted sentencing is limited by the technical level, theoretical support and deviation of sentencing results in practice, and blocked by the difficulties of insufficient legislative guarantee, fuzzy role positioning and mechanization of sentencing in judicial level. To achieve the effective application of the artificial intelligence auxiliary sentencing system, starting from the problem oriented, complement the shortage of the relevant theory of design, in the construction theory support paths, it is necessary to adhere to the artificial intelligence auxiliary sentencing positioning, a clear "classes case sentenced to" logic judgment, to explore guide algorithm logic design is implemented with legal logic, the pursuit of sentencing justice and sentencing standardization.**

## Keywords

**Artificial intelligence; Supplementary sentencing; Intelligent court; Risk prevention.**

## 1. Introduction

When artificial intelligence emerged for the first time in the 1970s, a lot of discussions and practices on the application of artificial intelligence technology in judicial work have been carried out in the field of legal theory and practice outside the region. [1] As the artificial intelligence technology has gradually developed to have a strong functional and intelligent, how to organically combine the artificial intelligence technology with judicial activities has increasingly become one of the frontiers of China's legal research and practice.

In recent years, our country has made great efforts to promote the construction of intelligent judiciary with the purpose of standardizing sentencing. In February 2019, the Supreme People's Court on deepening the views of the comprehensive reform of the judicial system of the people's court, the people's court for the fifth five-year reform outline (2019-2023), "pointed out that to strengthen the construction of intelligent assistant working system, construction of intelligent aided trial system, perfecting class case, push the result comparison, data analysis, the function such as flaw tip, We will promote unified standards in adjudication and improve the quality and effectiveness of trials. [2] In April 2019, the national procuratorial organs "sentencing proposals accurate, standardized, intelligent" network training, stressed that the procuratorial organs at all levels should implement the revised Criminal Procedure Law, further promote the effective implementation of sentencing proposals, toward the "precision, standardization, intelligent" goal. [3] This fully shows that China's judicial authorities attach great importance to the construction of intelligent trial auxiliary system, and clearly put forward the direction of intelligent sentencing reform. At present, the intelligent auxiliary prediction sentencing handling system applicable to guilty plea cases has been put

online for trial use, such as the "Xiaobaogong" intelligent conviction and sentencing system developed by Guangdong Bowei Chuangyuan Technology Co., LTD., Shanghai "206" intelligent auxiliary case handling system, and the unified business application system 2.0 of national procuratorial organs. Such use of the weak auxiliary working system of artificial intelligence technology depends on prior construction algorithm, sums up the similar case from case database of data, for the judge to push conviction sentencing suggestion, in the case a conviction under the premise of no differences, highlights the artificial intelligence auxiliary sentencing to improve judicial efficiency, and promote the value of the sentencing standardization. [4] However, ai-assisted sentencing system always has some problems, such as limited technical level, insufficient theoretical support and fuzzy function positioning, which make its practical application face many difficulties. Therefore, before the further research and development and promotion of AI-assisted sentencing system, it is necessary to clarify the specific problems faced by ai-assisted sentencing system from the practical level, and then construct a perfect path from the theoretical level.

## **2. Artificial Intelligence Assisted Sentencing Intervenes in the Predicament of Criminal Justice**

### **2.1. Defects of Artificial Intelligence Technology Itself**

At present, the development level of artificial intelligence technology is still in the stage of weak artificial intelligence, and the function realization of all kinds of systems based on artificial intelligence technology has not reached the designer's conception. For example, automatic driving system, image visual recognition system, machine translation system and other common systems using ARTIFICIAL intelligence technology show a high level of intelligence in practice, but there are always poor adaptability, distortion of results and other intractable problems. [5] The AI-assisted sentencing system is no exception. At present, the technical difficulties of ai-assisted sentencing system are mainly reflected in the lack of precision of natural semantic recognition technology, the difficulty of eliminating algorithm problems, and the lack of high enough quality case data. [4]

First, the current natural semantic recognition technology is not accurate enough. Natural semantic recognition (NSM) is a technical means to summarize and organize text information by identifying and screening specific fields in text information. [6] Specifically, in the process of auxiliary sentencing, the ai system can extract the sentencing circumstances in the judgment documents into highly abstract and structured labels, so as to predict the sentencing results of cases with similar "labels". [7] Therefore, artificial intelligence-assisted sentencing system must realize highly accurate natural semantic recognition, in order to realize effective analysis and induction of sentencing circumstances. However, the current natural semantic recognition technology can not achieve the accuracy of natural semantic recognition. [8] Naturally, the artificial intelligence sentencing system is difficult to cope with the diverse verbal expressions in the judgment documents, which cannot meet the practical needs.

Second, the algorithm problem affects the fairness of auxiliary sentencing results. In foreign judicial practice, the problem of "algorithmic discrimination" and "algorithmic black box" has been exposed in ai-assisted sentencing system. [9] Artificial intelligence systems rely on algorithms to achieve their functions, but algorithms are not summarized and abstracted from data sets, and are still written by humans. Therefore, there may be hidden discrimination risk for a particular group caused by personal subjective emotion in the algorithm. In addition, this risk will form a "self-fulfilling discriminatory feedback loop" with the increase of the number of times the system operates, which will eventually lead to the discrimination of some groups in sentencing results. [10] The problem of "algorithm black box" is caused by the invisibility of algorithm. When the algorithm is separated from the system or program, it is only an abstract

mathematical formula, and it is difficult to observe its influence on the result. However, if the algorithm is put into the system to make it function, it can only learn the input data and the results of calculation from the appearance, as if facing a "black box". In short, both "algorithmic discrimination" and "algorithmic black box" problems may lead to unfair sentencing results in ai-assisted sentencing system, which is unacceptable for criminal justice that strives to be fair, just and open.

Third, artificial intelligence technology is highly dependent on data, and artificial intelligence assisted sentencing system is no exception. When the data is distorted, the artificial intelligence system will not only get high deviation results, but also make the relevant rule model develop "malformed" and no longer adapt to the correct data. At present, the established case database in China is difficult to meet the needs of providing high-quality data samples for the auxiliary sentencing system. The main problems are as follows: first, the number of cases entered into the public database is only half of the actual number of closed cases; Second, there are significant regional differences in the disclosure of judgment data; Third, the existing data quality is not high, there are a lot of redundant data and error data. [11]

## 2.2. Lack of Relevant Laws to Regulate

As mentioned above, ARTIFICIAL intelligence has not been deeply combined with the legal field, but is in the initial stage of mutual contact. Due to the lag characteristic of law itself, it is undoubtedly backward compared with science and technology, and it often needs some time to adapt to the reality of highly scientific and technological life and make corresponding regulations. In this case, the intervention of ARTIFICIAL intelligence in criminal justice and auxiliary sentencing will produce the following risks: First, when judges use artificial intelligence to assist sentencing, there is no legitimate legal basis for their behavior, and the legality of their behavior is questionable, which violates the spirit of "no action without authorization by law"; Second, when judges use ARTIFICIAL intelligence to assist sentencing, they may make inappropriate judgments to the parties because they trust artificial intelligence too much, resulting in sentencing errors and damaging the interests of the parties. Who should bear the legal responsibility at this time? At present there is no law to make clear regulation.

In addition to the above situation, excluding those legal issues that are imagined in the context of the future, such as the legal personality setting of strong artificial intelligence, the application of artificial intelligence technology in real life has generated many questions that need to be answered by law.

## 2.3. Easy to Fall into the Mechanization of Sentencing Errors

In the process of promoting the standardization of sentencing reform, scholars have always called for vigilance against the risk of mechanization of sentencing. In the context of ai-assisted sentencing involving criminal justice, this risk is undoubtedly more urgent. Specifically, it is reflected in the following three aspects:

First, sentencing lacks logical process. Sentencing is a complex logical reasoning process, but ai-assisted sentencing results produce more induction and calculation based on data. Although the scholar Zhao Yanguang advocates the use of quantitative relationship to pursue sentencing justice, and believes that the quantitative relationship between the spatial form of sentencing and sentencing circumstances (reflected social harmfulness degree and doer's personal danger degree) is the theoretical foundation to realize sentencing justice, transparency and full reasoning [12]. But sentencing is not simply a matter of quantity, but of logical reasoning based on complex plots. As far as the development level of artificial intelligence system is concerned, its intelligence level cannot meet the logical reasoning requirement of sentencing.

Second, easy to cause sentencing deviation. Artificial intelligence assisted sentencing itself has great limitations, the sentencing conclusions drawn by it cannot be perfectly applied to the

situation of criminals, but only serve as a reference for judges to draw reasonable conclusions. If the judges excessively comply with the system and do not check the legality and rationality of the sentencing conclusion of the system, the sentencing will be too light or too heavy, resulting in serious sentencing deviation, and then damage the legitimate rights and interests of criminals.

Third, sentencing is too uniform, the pursuit of the same case with the same sentence. The artificial intelligence-assisted sentencing system digitizes all kinds of sentencing scenarios, uses corresponding parameters to represent each scenario, and uses unified formulas to get sentencing results. Uniform sentencing is to achieve the goal of the same case and the same judgment, and the same case and the same judgment means that the same judgment should be made for the same case to achieve the same sentencing result, so as to achieve the justice of sentencing. However, different sentences in the same case does not mean that sentencing is unfair. In a practical sense, "same case" does not exist in reality. Therefore, it is feasible to accept the differences between different cases within a certain range and make similar judgments.

### **3. Improve the Path Direction of Artificial Intelligence-Assisted Sentencing System**

#### **3.1. Define the Tool Positioning of Ai-assisted Sentencing**

The application of artificial intelligence in sentencing is not to replace the judge in sentencing, but to provide the judge with sentencing reference and restrict the judge's discretion reasonably, so as to realize the standardization and scientization of sentencing.

Therefore, no matter how developed and improved the AI-assisted sentencing system is, it needs to be clear that the judge is always in the dominant position in the whole judicial adjudication activities, and the AI-assisted sentencing system is always the judge's tool to decide cases. In the process of sentencing, the choice of the actual circumstances of sentencing and the relevant value judgment and other unquantifiable content should be made by the judge. The core role of artificial intelligence in sentencing is to help judges verify and calibrate their free psychological evidence, assist them to consider their own legal thinking activities, help them to fill their own thinking loopholes, and then assist them to form judgment reasoning.

The status of ai-assisted sentencing tools also means that when sentencing ends up being biased, judges should be held responsible for the wrong case.

#### **3.2. "Class of Cases" Rather Than "Same Case and Same Sentence"**

With the aid of artificial intelligence in sentencing, it is easy to have the same sentencing judgment in all cases that conform to the situation set by the algorithm, which seems fair but is actually unfair. Therefore, when setting the plot of the sentencing system, we should not only pay attention to the corresponding relationship between the behavior pattern shown in the law and sentencing, but also pay attention to the special circumstances and the differences between cases that judges pay attention to when sentencing in practice, so as to make sentencing accurate and reasonable. In addition, as the algorithm requires a large amount of data for training, cases as training data should be screened to remove biased judgments and timely revise data that no longer conform to existing practices with the replacement of new and old laws. It is necessary to sublate the data of "feeding" sentencing algorithm to ensure the rationality of the algorithm results.

Finally, under the combination of appropriate case database and reasonable sentencing logic, the AI-aided sentencing system should be able to achieve the purpose of "classifying cases into categories" and achieve the requirements of scientific and accurate sentencing.

### 3.3. Guide Algorithm Logic with Legal Logic

The traditional view is that the design and development of artificial intelligence is a purely technical problem, and its operation mechanism is to abstract a specific problem into a mathematical problem, and then draw a conclusion through the form of mathematical logic judgment, so is legal artificial intelligence. Therefore, in the past, legal scholars did not pay much attention to the algorithm logic, the core of legal ARTIFICIAL intelligence, which not only led to the inadequate application of legal ARTIFICIAL intelligence assisted sentencing and other legal artificial intelligence, but also led to various difficulties in the practice of legal artificial intelligence system.

On the one hand, the difference in derivation of results between legal logic and algorithmic logic must be acknowledged. On the other hand, we should actively explore the algorithm implementation of legal logic under the condition of weak artificial intelligence, and realize the algorithm logic guided by legal logic. The fundamental purpose of using legal logic-guided algorithm logic is to make the thinking path of legal artificial intelligence highly fit with human's legal thinking. Specifically, in terms of ai-assisted sentencing, it is to achieve the high consistency of thinking between this system and judge's trial. In order to achieve this goal, it is necessary to carry out more extensive and in-depth judicial practice, so as to obtain enough samples to analyze the similarities and differences between legal logic and algorithmic logic in the guidance of trial results; Secondly, it is necessary to invest human and material resources to deeply explore the theoretical model of fitting legal logic and algorithmic logic, and strive to form a scientific and standardized legal logic algorithmic application theory system. Finally, interdisciplinary talents are required to participate in the development and design of relevant systems, explore and verify the specific practice path of relevant theories, so as to realize the perfection of relevant system design.

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Yuehong Wu, Guangdong University of Technology Institute of politics and law teacher, postdoctoral researcher, research direction: litigation law, Hong Kong and Macao basic law, criminology.

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