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The Application of Artificial Intelligence in China's Criminal Justice System

Zhiyuan Guo[1], Jiajia Yang[2]

[1, 2] China University of Political Science and Law, School of Criminal Justice, 25 Xitucheng Road, Haidian District, Beijing, China 100088,

[1] guozhiyuan@hotmail.com, https://orcid.org/0000-0003-4329-5825

[2] jiajia1023@outlook.com, https://orcid.org/0009-0009-4120-2622
Corresponding Author: Zhiyuan Guo

Abstract

Influenced by the advanced technologies, in recent years, Chinese criminal justice system has begun integrating artificial intelligence (AI) to assist judicial decision-making. AI has entered into various areas such as criminal investigations, prosecution assistance, and sentencing support. However, Chinese legal system has not comprehensively addressed the regulation of judicial AI technology yet. This paper aims to explore the application of AI in Chinese criminal justice system and propose a systematic regulatory framework for its future development. Part I provides an overview of the specific application scenarios of AI in Chinese criminal justice system. Part II analyzes the general characteristics of judicial AI and the benefits it brings to the justice system. Part III examines the challenges limiting the further development of judicial AI and the potential risks associated with its application. Part IV proposes an inclusive regulatory framework to balance the intension and potential conflicts between judicial fairness and technological advancement. This research seeks to enhance the understanding of AI application in Chinese criminal justice system and to identify and prevent potential judicial risks arising from AI application.

Keywords

artificial intelligence; application of judicial AI; Chinese criminal justice; criminal procedure law; algorithm; data.

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Introduction

Human society is currently at the center of an information revolution storm. At the beginning of the 21st century, the pace of technological innovation has accelerated continuously. Advanced technologies such as artificial intelligence, big data, blockchain, and cloud computing have emerged one after another. China does not intend to miss this unprecedented technological revolution. As early as 1982, the Chinese leadership incorporated artificial intelligence research into the **Sixth Five-Year Plan for National Economic and Social Development of the People's Republic of China (1981–1985)**.[1]

Subsequently, the 13th Five-Year Plan for National Economic and Social Development of the People's Republic of China,[2] released in 2016, emphasized the need to overcome key technological challenges related to artificial intelligence. These challenges included breakthroughs in big data and cloud computing technologies, independently controllable operating systems, high-end industrial and large-scale management software. Building upon the 13th Five-Year Plan, China successively introduced several national strategies, including the National Informatization Plan, the National Science and Technology Innovation Plan, and the National Strategic Emerging Industries Development Plan. These policies highlighted the importance of emerging technologies such as the Internet of Things, deep machine learning, blockchain, and bio-genetic engineering. Additionally, they called for strengthening technological development in cutting-edge fields such as quantum communication, future networks, brain-inspired computing, virtual reality, and big data analytics. These efforts aim to promote the intelligentization process of various sectors and lay the groundwork for building a "Digital China."

On July 8, 2017, the State Council released the New Generation Artificial Intelligence Development Plan,[3] which explicitly called for the de-

[1] Available at: https://www.ndrc.gov.cn/fggz/fzzlgh/gjfzgh/200709/P020191029595670483752.pdf (accessed: 03.05.2025)

[2] Available at: https://www.gov.cn/xinwen/2016-03/17/content_5054992.htm (accessed: 03.05.2025)

[3] Available at: https://www.gov.cn/zhengce/content/2017-07/20/content_5211996.htm (accessed: 03.05.2025)

velopment of judicial AI, the establishment of smart courts and the judicial data platforms to achieve court digitalization. Driven by national policies, courts and procuratorates across China began developing their own AI-powered judicial platforms. This marked a nationwide "judicial intelligence movement" gradually unfolding across the country.

In Beijing, the Beijing Internet Court developed the "Mobile Micro Court" platform and an "AI Virtual Judge." The former is embedded within WeChat, allowing users to access online litigation services simply by opening the corresponding program. The latter, created by using speech and image synthesis technology, can assist judges by handling repetitive front-end tasks such as litigation reception.[4] In Shanghai, the Shanghai Higher People's Court developed the "Intelligent Criminal Case Assistance System," which consists of three components: the Shanghai criminal case big data resource, an intelligent case-handling software, and an intelligent case-handling system network platform.[5] Additionally, in the procuratorial system, the Zhejiang People's Procuratorate partnered with Alibaba Cloud to build a big data platform. This platform enables the visualization of case data, presenting it dynamically, intuitively, and in chart form to assist judicial decision-making. Meanwhile, the Beijing People's Procuratorate developed a big data decision-making platform, which integrates information from all litigation stages, allowing case handlers to quickly access legal documents.[6] Besides, other provinces such as Guizhou, Hainan, Yunnan, Jiangsu, and Guangdong are also progressively building their own AI-powered judicial case-handling systems. Overall, the application of AI is widespread in Chinese criminal justice system, covering the vast majority of regions in China.

In the future, as AI technology continues to develop in China, its impact on the judicial system will also deepen. As a variable factor intervening in the criminal justice system, AI is bound to increase the risks and uncertainties in current criminal legal framework. To address potential issues and threats, this paper examines the specific application scenarios of AI in Chinese criminal justice system, revealing its operational mode and characteristics. Furthermore, exploring the advantages, challenges,

[4] Available at: https://tech.chinadaily.com.cn/a/201906/28/WS5d156c9ca3108375f8f2cfc9.html (accessed: 03.05.2025)

[5] Available at: https://www.chinacourt.org/article/detail/2019/01/id/ 3713361.shtml (accessed: 03.05.2025)

[6] Available at: https://www.spp.gov.cn/xwfbh/wsfbt/201706/t20170612_192863_2.shtml (accessed: 03.05.2025)

and potential risks AI may bring to the system. Finally, the paper seeks to propose a possible regulatory framework for the application of AI in criminal justice system.

1. The Application Scenarios of AI in Chinese Criminal Justice System

1.1. Crime prediction

In 2015, the General Office of the Communist Party of China Central Committee and the General Office of the State Council jointly issued the Opinions on Strengthening the Construction of the Social Security Prevention and Control System,[7] which stated: "Strengthen the deep integration and application of information resources, fully utilize modern information technology, and enhance the ability to proactively prevent and combat crime." Following this direction, various regions across China have started to strengthen predictive policing efforts.

Predictive policing operates based on two modes: (1) crime trend analysis and forecasting. Chinese polices utilize vast amounts of previously accumulated crime data to build big data platforms. By analyzing crime patterns, frequencies, and high-incidence areas, these platforms can predict future crime trends and help to deploy officers in advance for crime prevention. In sector of routine policing and crime prevention, crime alert prediction systems allow real-time tracking and dynamic monitoring of potential criminal activities. These systems provide valuable insights for daily patrol planning while enhancing proactivity of crime prevention. For example, the crime prediction system used by the police in Suzhou, Jiangsu Province, contains over 13 million records of crime-related data spanning the past decade, along with 780 million records related to entertainment venues, commercial establishments, and other relevant locations. The system's predictive model analyzes 382 variables, including population data, geographic information of specific groups, weather conditions, sunset times, etc. Based on the analysis results, it will send patrol alerts to frontline officers. At the Weitang Police Station in Suzhou, within the first three months of implementing this system, crime-related police reports dropped by 54% compared to the previous period. (2) real-time crime monitoring. Polices integrate existing video surveillance systems across various public areas in cities into a

[7] Available at: https://www.gov.cn/xinwen/2015-04/13/content_2846013.htm (accessed: 03.05.2025)

centralized, internet-connected monitoring platform. This platform is accessible via a mobile app, allowing users to view real-time footage of public areas and detect suspicious activities. If a crime occurs, users can report it immediately through the app. For instance, Sichuan Province's "Xueliang Project" utilizes this approach for real-time crime monitoring, enhancing public security.[8]

The Guiding Opinions of the State Council on Strengthening Digital Government Construction, issued in 2022, explicitly emphasized the need to enhance the construction of public security big data platforms to improve the ability to predict, warn, and prevent various risks.[9] It is foreseeable that Chinese predictive policing will continuingly develop in the future. The frequency of police using big data and AI technologies for early crime detection is expected to increase as well, reinforcing the trend toward the normalization of predictive policing [Wang L., 2024: 55–88].

1.2. Criminal investigation

In China, the development of AI technology has provided new support for criminal investigations. The main roles of AI in criminal investigations include: collecting and analyzing crime clues; rapidly accessing and securing criminal evidence; and accurately identifying criminal suspects.

In terms of collecting and analyzing crime clues, if the police obtain personal identity information such as name, identification number, real-time location, movement trajectory, and biometric data, AI technology can be used to analyze this information or compare it with specific data to uncover criminal clues. For example, the National DNA Database System developed in China in the early 21st century stores a large amount of personal DNA information. Police can compare the DNA of potential suspects with the database to accurately identify the criminal suspects or determine whether they were at crime scene when the crime happened. Similarly, by analyzing movement trajectory and real-time location information, specific crime areas can be identified, enabling police to quickly locate criminal tools or the hiding places of suspects.

In terms of collecting criminal evidence, police can use AI systems to gather and preserve evidence. In crimes involving cyberattacks, illegal

[8] Available at: https://www.gov.cn/xinwen/2015-04/13/content_2846013.htm (accessed: 03.05.2025)

[9] Available at: https://www.gov.cn/zhengce/content/2022-06/23/content_5697299.htm (accessed: 03.05.2025)

fundraising, financial fraud, police can utilize network and data collection technologies to quickly secure relevant evidence.

When it comes to identifying criminal suspects, AI technologies such as facial recognition, tagged profiling, and vehicle information comparison can help police quickly confirm the appearance, body shape, and vehicle information of suspects, directly identifying the perpetrators of crime. Chinese Tianyan Surveillance System is equipped with powerful facial recognition technology that can accurately identify criminal suspects. With the assistance of this system, Chinese police have apprehended numerous suspects and fugitives, solving many criminal cases.

1.3. Detention and bail decisions

According to Article 81 of the Criminal Procedure Law of China, for criminal suspects or defendants who have evidence proving the commission of a crime and may be sentenced to imprisonment or a more severe punishment, if bail is insufficient to prevent the following social dangers, they should be arrested: (1) the possibility of committing new crimes; (2) a real danger to national security, public safety, or social order; (3) the possibility of destroying or falsifying evidence, interfering with witness testimony, or colluding with others; (4) the possibility of retaliating against the victim, whistleblower, or accuser; (5) the risk of suicide or flight. In judicial practice, when making detention decisions, judicial officers need to consider three conditions: (1) whether there is evidence proving the defendant's criminal conduct; (2) whether the defendant is likely to be sentenced to a fixed-term imprisonment or above according to relevant laws; (3) the social danger posed by the defendant. The first two conditions are relatively easier to evaluate, but the concept of "social danger" is more subjective and may be interpreted differently by various judicial officers. Although criminal procedure law lists five specific risks, it still does not fully guide judicial officers in making detention decisions. Therefore, to ensure the fairness and rationality of the detention decision, some procuratorates and courts have started exploring the use of AI decision models to quantify the social danger factor.

A typical example is the social danger quantification evaluation system developed by the People's Procuratorate of Yuncheng City, Shanxi Province. This system identifies 60 variables that influence the assessment of social danger, categorized into three sectors: the nature of the crime, behavior after committing the crime, and the physical and mental condition of the criminal suspect. These 60 indicators are divided

into five risk levels: high risk, medium-high risk, medium risk, medium-low risk, and low risk. Each risk level is assigned a corresponding score, and based on these scores, prosecutors make decisions regarding detention.[10] In addition, the quantification evaluation system developed by the Shanghai Higher People's Court includes 32 evaluation indicators, while the system in Nansha District, Guangzhou is based on 43 indicators, mainly considering personal danger, social harm, and litigation controllability. Although the number of variables used by these systems varies, the content of the variables consistently involves the suspect's criminal situation and litigation conditions. The working rationale of these quantification evaluation systems is similar: based on the information input by judicial officers, the AI model assigns scores and identifies risk levels according to the corresponding algorithm. Judicial officers then make the final detention decision based on the results.

1.4. Prosecutorial discretion

In China, the Procuratorate plays a critical role in initiating public prosecutions for criminal activities and protecting the legal rights of citizens. In most criminal cases, prosecutors are required to thoroughly understand the situation of the criminal suspect and the facts of the crime, and based on this, file public prosecutions to court. This procedure is similar to many countries around the world. However, in China, prosecutors are also required to present sentencing recommendations to the judges. The use of AI systems to assist with prosecutorial discretion not only enhances the efficiency of case handling but also improves the accuracy of sentencing recommendations, ensuring they align more closely with the judge's final sentencing decision. In 2018, the Supreme People's Procuratorate issued the National Smart Prosecution Action Guide (2018–2020), which outlined improving the infrastructure of procuratorate's big data center, accelerating the development of prosecution data resource system, and promoting the development of intelligent case-handling systems, in order to build a comprehensive smart prosecution ecosystem centered around case handling.[11] Since then, AI has increasingly been used in prosecutorial discretion tasks across China.

A typical example is the Jiangsu province's smart prosecution assistance system. This system helps prosecutors automatically filter out mat-

[10] Available at: https://m.faanw.com/anlizhengji/19686.html (accessed: 03.05.2025)

[11] Available at: https://www.spp.gov.cn/spp/xwfbh/wsfbt/201807/t20180720_385543.shtml (accessed: 03.05.2025)

ters that need legal procedure review, evidence review, case facts review, and criminal behavior information items. This makes the criminal cases review process more intuitive and clearer. Additionally, the system can automatically generate interrogation outlines, supplementary investigation outlines, case review reports, indictments, sentencing recommendations. This can help to save prosecutors' time, allowing them to focus more on evaluating evidence in complex cases. Furthermore, the system can track the number and quality of cases handled by each prosecutor, automatically generating prosecutor's performance results, which can be used for evaluating prosecutors' promotions, and rewards. In essence, this system integrates prosecutorial assistance, case fact review, and evidence review guidance, helping prosecutors efficiently process cases.[12]

Another example is the Guizhou province's prosecution big data application system, which serves three main functions: (1) establishing crime models based on the elements of various criminal behaviors and using these models to create unified legal standards for application; (2) providing precise data analysis for each case, relying on vast amounts of data to assist in constructing criminal facts, sentencing references, etc. The system can also analyze similar cases, identifying crime characteristics such as the time and location of certain crimes; (3) analyzing overall internal data of procuratorate system, monitoring the quality of prosecutorial work, and evaluating development trends to help the leadership make more scientific and reasonable plans for prosecutorial work.[13]

The two examples above emphasize different aspects. The first highlights the supportive role of AI in case processing, positioning AI as an assistant to the prosecutor. It helps with transactional and repetitive tasks, thus leaving prosecutors with more space for discretion. The second example emphasizes the guiding role of AI, positioning it as a leader in assisting prosecutors to evaluate criminal facts and may potentially influence prosecutors' judgement towards case facts.

1.5. Sentencing assistance

In the 1980s, scholars in China had already raised the issue of using AI for sentencing, and by 1993, the development of an AI-assisted sen-

[12] Available at: https://www.spp.gov.cn/spp/dfjcdt/201803/t20180304_368729.shtml (accessed: 03.05.2025)

[13] Available at: https://www.spp.gov.cn/xwfbh/wsfbt/201706/t20170612_192863_2.shtml (accessed: 03.05.2025)

tencing system was completed. In 2006, the People's Court of Zichuan District in Zibo City, Shandong Province, collaborated with technology companies to develop computer sentencing software. In 2017, the Supreme People's Court released the Opinions on Accelerating the Construction of Smart Courts,[14] which emphasized the use of big data and AI technology to assist case handlers in reducing the burden of non-judicial tasks and to provide intelligent litigation services to the public. Since then, smart court systems have been progressively established across China. For example, the Beijing Higher People's Court built the "Smart Judge" system; Guiyang, Guizhou Province, developed the Guiyang Political and Legal Big Data Case Handling System, which integrates investigation, prosecution, and court functions; the Hainan Province Higher People's Court built the "Sentencing Standardization Intelligent Assistance System"; the Higher People's Court of Yunnan Province established the "Drug Case Big Data Analysis Platform" and the "Yunnan Political and Legal Big Data Case Handling Platform"; and the Guangzhou Internet Court built the "Online Evidence Exchange Platform" and the "Similar Case Intelligent Reference System", etc.

These AI judicial systems typically possess the following functionalities: litigation service reception, case file transfer, pre-trial meetings, trial recording, evidence rule guidance, evidence verification, evidence exclusion, full-case evidence review guidance, similar case reference, sentencing reference, knowledge searching, litigation document generation, case procedure supervision, and case evaluation [Sun D., 2023: 112–116].

Overall, the use of AI technology in criminal trials is the most widespread. AI is positioned as an assistant in various stages of the trial process, primarily because: First, the number of criminal cases in China is enormous, and courts are constantly under pressure due to the shortage of personnel. In order to address the backlog of cases, courts urgently need to introduce AI technology. Second, the trial process involves a significant number of repetitive tasks, many of which are simple and procedural. Using AI to handle these tasks can ease the burden and improve efficiency.

1.6. Execution of punishment

In China, AI is also utilized in the execution of criminal punishment, particularly for supervising incarcerated individuals. For instance, Ji-

[14] Available at: http://gongbao.court.gov.cn/Details/5dec527431cdc22b72163b49fc0284.html (accessed: 03.05.2025)

angxi province established Chinese first special population big data platform to address the challenges of managing inmates, released prisoners, and individuals under community correction. This platform has recorded information on 470,000 individuals, allowing authorities to access real-time data on supervised individuals and monitor their likelihood of reoffending.[15]

Additionally, AI is used in commutation and parole decisions, operating similarly to the social dangerousness quantitative assessment system used for detention decisions. However, the key distinction is that the AI system for commutation and parole focuses on evaluating remorseful behavior and risk of recidivism. It conducts a comprehensive quantitative assessment based on variables such as an inmate's rehabilitation progress, fulfillment of obligations, mental health, criminal history, and family background etc. Based on these evaluations, the system assists in determining whether a prisoner qualifies for commutation or parole.

2. AI Applications in Chinese Criminal Justice System: Characteristics and Advantages

2.1. Characteristics of AI Applications in Chinese Criminal Justice System

2.1.1. Diverse AI Models with a Lack of Unified evaluation Standards

Chinese AI judicial system is being applied across a wide range of fields and is experiencing rapid development. However, different regions have established various types of AI models to address specific judicial issues, leading to a lack of unified evaluation standards for AI model.

On one hand, this is due to Chinese vast territory and regional cultural differences, which result in varying judicial challenges. To address these localized issues, judicial authorities have developed different AI models. For example, in the southwestern province of Yunnan, which borders the Golden Triangle and has a high incidence of drug-related crimes, an AI platform specifically for drug crime has been established. In contrast, such issues are not prevalent in eastern regions, where similar platforms are unnecessary. On the other hand, differences in the goals, functions, human resources, and financial investments in AI model development

[15] Available at: https://www.chinanews.com.cn/gn/2016/10-13/8030437.shtml (accessed: 03.05.2025)

across regions have also contributed to the disparity. Some areas have built integrated large-scale AI models that serve the needs of investigation, prosecution, and trials, or integrate the functions of document assistance, case handling support, and case monitoring. In contrast, part of regions has only developed single-purpose models with limited functions, such as sentencing assistance or similar-case recommendations.

Due to these factors, China has yet to establish a unified large-scale AI model in criminal justice system, and most regions remain in the pilot phase. Thus, a standardized evaluation system for AI applications is lacking. In the future, as regional disparities in AI judicial models diminish, a unified evaluation framework can be developed to guide AI-driven judicial system construction. Preliminary considerations for this framework may include aspects such as data collection, data analysis, algorithm interpretability, and transparency.

2.1.2. Focused on Handling Administrative Tasks with a Low Level of AI Integration

From the perspective of the functions of AI models, AI in Chinese criminal justice system generally serves five main functions: crime trend prediction, information comparison, information resource integration, non-decision-making administrative task handling, and judicial decision support and assistance. The systems used by investigators mainly focus on the first two functions: crime trend prediction and crime information comparison. On the other hand, the systems used by smart courts and smart procuratorates have similar functions, primarily focusing on information resource integration, non-decision-making administrative task handling, and judicial decision support and assistance.

In China, although prosecutors and courts have different functions, prosecutors handle public prosecutions, while courts are responsible for case rulings and sentencing. They still make decisions on the same aspects of the same case during different stages of the criminal process. For example, decisions on the detention of criminal suspects and sentencing decisions for cases where the facts of the crime are clear. The judicial decision-making process for both entities is similar, involving three main steps: analyzing the case facts and evidence (minor premise), applying and reviewing rules of evidence law, substantive law, and procedural law (major premise), and deciding guilt and the sentencing outcome (conclusion). This decision-making process aligns with the classic structure of syllogism. To assist judicial personnel in complet-

ing this three-step argumentation, the AI model's information resource integration function can capture most legal norms, the judicial decision support function can collect case evidence and factual information, and after judicial personnel make decisions, the system's administrative functions such as document generation can help create the judgment documents.

Based on this, Chinese prosecution discretion support systems and trial assistance systems include modules for online transfer of criminal case files, document generation, evidence standard guidance, legal application prompts, and similar case recommendations. These tasks are essentially preparatory work for judicial decision-making, characterized by simplicity, tediousness, and repetition. The use of AI technology to process these tasks only serves as a procedural aid and does not possess the characteristics of human-like reasoning. Chinese practical use of AI in judicial decision-making, to some extent, can be seen as a "weak-form" application of AI [Zuo W., 2021:7].

2.1.3. Aimed at Decision Support Rather than Replacing the Judicial Decision-Makers

In terms of how AI participates in judicial decision-making, three modes can be identified: (1) judicial AI decision support mode: in this mode, AI analyzes and learns from data to generate potential decision options, but the actual decision-making authority remains with judicial personnel. Judges can confirm or generate new decisions; (2) judicial AI supervisory decision mode: here, AI generates decision options, which are then confirmed by judicial decision-makers before directly generating documents. In this process, judicial personnel play a supervisory role in decision-making and can change the decision if necessary; (3) judicial AI autonomous decision mode: in this mode, AI is integrated into a closed-loop decision-making process, completely removing judicial personnel from control. AI has the authority for independent decision-making, the entire court system will be the central body controlling judicial decisions.

Currently, Chinese criminal justice AI systems incorporate the first two modes: the judicial AI decision support mode and the judicial AI supervisory decision mode. For instance, the intelligent case assistance system used in Shanghai adopts the first mode, providing sentencing references to judges while still retaining their final decision-making authority. AI serves as a technical tool to assist judges in making decisions.

This mode is advantageous in integrating sentencing information but has limitations in quickly processing cases and improving judicial efficiency. In contrast, the system used by Suzhou courts adopts the second mode, where it automatically extracts information from clear and simple cases and generates judgment documents based on existing legal rules, requiring only confirmation from the judge. This mode is more efficient than the first one but partially undermines the judge's autonomy in decision-making [Sun Q., 2022: 164–65].

Overall, China does not have a fully autonomous AI decision-making model yet. Whether using the judicial AI decision support mode or the judicial AI supervisory decision mode, AI has not completely replaced the judge's comprehensive judgment based on experience, logic, and perception. The difference lies only in the extent of technical assistance provided between those two modes.

2.2. Advantages of AI Applications in Chinese Criminal Justice System

2.2.1. Optimizing the Utilization of Judicial Resources

The structure of criminal cases in China follows a clear "80/20 rule," where complex cases account for a small proportion of overall crimes. However, in judicial practice, uncovering the truth of these cases, reviewing evidence, and applying the law can be quite challenging. Without sufficient investment in judicial resources, these cases may turn into long-unresolved, suspenseful cases. For the majority of simple cases with clear criminal facts, courts and procuratorates must handle many repetitive, procedural tasks. The application of judicial AI can quickly complete tasks such as providing litigation service guidance, searching for legal norms, and generating documents. This allows the remaining judicial resources to be more effectively dedicated to handling difficult cases. In this way, judicial resources in Chinese criminal justice system can be utilized more efficiently.

2.2.2. Conducive to Crime Prevention and Investigation

With the growth of emerging technologies, new forms of crime have been continuously emerging. These crimes often involve the use of technologies such as the internet and AI, making them difficult to detect and prevent due to characteristics like remote control and sophisticated

methods. Without leveraging emerging technologies for crime prevention and control, a country's criminal prevention system could face significant challenges. However, the use of AI in crime investigation also carries negative effects. Without strict legal regulations, it could infringe upon citizens' legitimate rights and interests [Shi P., 2024: 17–18]. If AI technology is applied in a reasonable manner, it can indeed effectively prevent serious crimes and assist in criminal investigations.

3. AI Applications in Chinese Criminal Justice System: Challenges and Risks

3.1. Challenges of AI Applications in Chinese Criminal Justice System

3.1.1. Challenges of Discourse System Integration

The underlying architecture of AI technology consists of three elements: datasets, algorithms, and computing power. The core of AI lies in the operation process of algorithm models, which is governed by a code-based discourse system. AI's technical language system is precise and concise. However, many legal issues do not have standard answers. Legal interpretation and analysis are fundamentally based on complex trade-offs, value judgments, and consideration of social factors. When AI attempts to engage with the legal system, a fundamental difference between their underlying discourse systems becomes apparent.

If legal language is converted into mere logical judgments and internalized into algorithms and code framework, it will lose its original essence, and the algorithmic decisions may become biased or even lead to incorrect decisions. Therefore, with the increasing use of AI in the judicial field, a divide has emerged between traditional discourse and emerging technological discourse [Wang L., 2018: 140]. The accuracy of algorithmic decisions depends on the accuracy of language translation. However, the fundamental mismatch between the fuzzy logic of human language of and code poses a significant challenge. Future development of AI in the judicial field must address this issue.

3.1.2. Challenges of Judicial Decision-Making Reasoning

The human decision-making process is a long and complex journey, based on the intricate experience system of human society, and premised

on human consciousness and agency. Factors such as emotions, feelings, and wisdom can all influence decision-making. If these factors are incorporated into the AI modeling system, the decision-making framework shifts from being open to closed, narrowing the decision elements. For instance, in evidence reasoning, if AI models are used to uncover the truth of a case, a massive and complex model system need to be established. Even then, it would be impossible to fully guarantee the accuracy of the factual determination. The human brain's decision-making process is akin to a "black box"; simulating this process has no predetermined answer and is, in essence, another black box. Moreover, the conclusions of evidence reasoning are the result of the interaction between the shared knowledge base of society and the judge's own knowledge base. An AI judicial system cannot fully encompass this knowledge, which leads to potential risks in the evidence reasoning process. Currently Chinese judicial AI is still in the weak AI stage, if "strong AI" is applied in the criminal justice system in the future, it will inevitably need to address the challenges of AI judicial decision-making reasoning.

3.2. Risks of AI applications in Chinese Criminal Justice System

3.2.1. Justifiability Risks

The data used by AI systems in the judicial context contains a large amount of personal information, which may infringe upon citizens' privacy rights during its application. If citizens are not informed in advance and do not give consent during data collection or the application of AI technologies, the use of AI will lack legitimacy and potentially violate citizens' constitutional rights. However, due to the vast amount of data involved, it is difficult to trace the data sources or identify the data owners, thus, it's hard for the entities applying AI in the judicial system to obtain consent from data owners, and even when citizens' rights are infringed, it becomes difficult to identify the responsible party, making it challenging for citizens to reasonably defend their rights. In a rule-of-law country, the principle is to protect citizens' legitimate rights and interests, and if these rights are violated, there should be appropriate remedies. The difficulty lies in the legal status of AI decision-making models has not yet been clearly defined. Additionally, identifying the causality between algorithmic technology and the harm results is complex. These potential issues hinder the further expansion of AI applications in the criminal justice system.

3.2.2. Legitimacy Risks

Currently, there is no well-established legal framework in China to regulate the use of AI in crime prediction, leaving many legal gray areas [Xie Y., 2024: 85–86]. In criminal investigations, the traditional framework of criminal procedural norms struggles to regulate the use of various new investigative technologies by the police. The legitimacy of evidence collected by police is often challenged, and the judicial review system for these AI-based investigative techniques has yet to be established. The use of AI in crime prediction has led to an advancement of time point for initiating investigations, which is in conflict with the traditional presumption of innocence principle. Due to the rapid pace of technological innovation, the law lags behind social development, and as a result, AI-driven investigation and predictive policing increasingly face challenges regarding their legality.

3.2.3. Judicial Fairness Dangers

The traditional criminal litigation structure in China has historically been characterized by an imbalance of power between the prosecution and defense. The introduction of AI systems in the judicial process, has further exacerbated this inequality. The prosecution now holds a significant advantage over the defense in areas such as evidence collection, legal application, and case comparison, making it difficult for the defense to compete with conventional defense strategies. As a result, the defense finds it hard to challenge or undermine the prosecution's criminal accuses. In recent years, China has introduced a sentencing negotiation system, which is based on the premise that the defense has enough leverage to negotiate sentencing with the prosecution. However, the use of AI in criminal justice could intensify the inequality of bargaining power between the prosecution and defense, undermining the fairness of the sentencing negotiation process. The application of AI in the judicial system may challenge the traditional principle of equal arms between the prosecution and defense. Moreover, the initial intention of AI systems in judicial processes was to promote the uniform and equal application of the law, addressing issues such as sentencing unfairness and inequality. However, in practice, the use of AI may not necessarily alleviate sentencing disparities and could potentially exacerbate them.

3.2.4. Decision Accuracy Risks

There is no data that clearly shows that the evaluation accuracy of AI systems in judicial decisions such as detention, commutation, or parole

exceeds the accuracy of judicial officers' evaluations [Xiong Q., 2022: 111]. Therefore, it is difficult to assess the urgency of using AI in the criminal justice system. On one hand, AI relies on past data to assess current outcomes, and the predictions made by AI models may be incorrect, leading to issues such as improper sentencing. On the other hand, AI judicial decision-making systems are closed systems and do not allow for the entire decision-making process to be traced, compared, or evaluated for its accuracy. Additionally, while AI models have scientific characteristics, it cannot guarantee that the decisions it generates will always be rational and accurate.

3.2.5. Data Risks

Data issues are a fundamental challenge hindering the development of judicial AI. Although China has established numerous big data platforms, problems such as data silos, data barriers, data gaps, data flaws, data monopolies, and data asymmetry still exist [Li X., 2021: 47–48]. Firstly, most courts and procuratorates in China have not achieved seamless data communication and flow. A single data platform can create data silos, and judicial decisions based on these isolated data sources may lack synergy, affecting the accuracy of the decisions. Secondly, the data used by AI may be incomplete. It might only cover data from specific periods or under specific conditions, and the data itself may be inaccurate or miss information. This leads to challenges in ensuring data quality, and judicial decisions based on flawed data may lack of reliability. Furthermore, high-tech companies that control the data and algorithms necessary for development gain the access to judicial AI systems. Over time, this can lead to data monopolies, creating an information asymmetry between the prosecution and defense, as well as between the public and tech giants.

3.2.6. Algorithm Risks

Algorithms are created by programmers, and the algorithmic code can be influenced by the programmers' preferences, personalities, and other subjective factors. Therefore, algorithms inherently carry human attributes, making issues such as algorithmic discrimination and bias unavoidable. Additionally, the "black box" nature of algorithms is a significant risk. Even if the technical controllers disclose the source code, the decision-making process of the algorithm is often complex and difficult to explain. Algorithmic bias and the black box problem can lead to

a lack of transparency, fairness, and the undetectable risks in reviewing the accuracy of the decision-making process and outcomes.

3.2.7. Ethical Risks

The application of AI in the criminal justice system raises an ethical issue: whether AI will eventually replace human judges in decision-making. Currently, AI in Chinese criminal justice system is still at the "weak AI" stage and has not fundamentally replaced judges. For example, AI cannot replace the judge's discretion of facts evaluation. However, as AI continues to develop, its influence on judges' decision-making may deepen, potentially eroding the space for judicial discretion and reinforcing the tendency towards strict evidentialism [Xiong Q., 2020: 88]. Once AI technology permeates the criminal justice system, a unique phenomenon will arise, where dual decision-making entities exist simultaneously in the system. How to adjust the relationship between these dual entities and whether to grant AI independent decision-making status will be a critical issue that the criminal justice system will soon face.

4. Regulatory Framework for the AI Applications in Chinese Criminal Justice System

Chinese basic policy of vigorously promoting technological development determines that the regulation of AI in criminal justice needs to both allow space for its future development and prevent the abuse of AI, which could infringe upon citizens' legal rights and lead to various social issues. This regulation method is regarded as "inclusive regulation model," which essentially balances the need for technological development and the value of judicial fairness. Under this model, the regulatory framework for AI in the criminal justice system includes three aspects: technological regulation, legal regulation, and ethical regulation.

In the technological regulation scheme, the quality and quantity of data used in judicial AI need to be improved, and the transparency of algorithms should be enhanced. First, to address issues such as incomplete judicial data and data silos, a unified cross-regional and provincial data information platform can be established to enable the communication and cross-utilization of data resources. Second, the substantial content beneath the data's surface must not be ignored. Given the mismatch in knowledge backgrounds between judicial personnel and technical staff,

developers should focus on data related to judicial substance issues, enhance data identification capabilities, and make full use of high-quality data resources. Lastly, the transparency and openness of algorithms should be improved by requiring software companies to disclose the AI system's code, and organizing experts from various disciplines such as sociology, computer science, and law to supervise and evaluate the algorithms.

In the legal regulation scheme, the digital rights of the accused need to be constructed. The digital rights of the accused are a comprehensive right protected by a series of technology-related legal procedures. This represents a new challenge to the traditional "rights-power" dual balance framework in the information age [Pei W., 2021: 93–99]. Specifically, the procedural rights of the accused include: the right to procedural information, the right to dispose of the procedure, the right to system access, the right to algorithmic explanation, and the right to obtain professional assistance. The right to procedural information means the accused has the right to know when public authorities use judicial AI and understand the data and algorithms underlying AI tools [Zheng X., 2023: 48]. The right to dispose of the procedure means the accused has the freedom to decide on the initiation, modification, or termination of the AI application procedure [Zheng X., 2024: 161]. The right to system access means the accused has the right to access the data and algorithms used by AI tools. The right to algorithmic explanation means the accused can request an explanation of the algorithm from public authorities or seek remedies when algorithmic decisions are unfavorable to them [Wang Z., 2024: 257–259]. The right to obtain professional assistance is essentially the expansion and extension of the traditional right to legal defense in the digital space, emphasizing that the accused has the right to obtain professional help related to AI in judicial matters. In the field of AI in criminal justice, the power imbalance between the prosecution and defense is further widened, and Chinese criminal procedure law should emphasize the principle of equality between prosecution and defense [Zheng X., 2025: 59].

In the ethical regulation scheme, the development of AI in Chinese criminal justice should adhere to the principle of making judicial personnel the main decision subject, while also clearly addressing the ethical responsibilities of developers, users, and legislators. The former is the ethical baseline and principle for developing AI in criminal justice system. If this principle is breached, the development of AI could fall into disorder and chaos, and potentially trigger a crisis of public trust

towards judicial branch. The latter concerns the distribution of interests among various parties and the incentives for technological development. If responsibility is not equally distributed, it could hinder the steady development of AI technology. Since Chinese AI is still in the flourishing stage and lacks many practical cases and experience in handling similar situations, this issue may have an answer once the conditions mature in the future.

Conclusions

By analyzing the application status of AI in Chinese criminal justice system, the following conclusions can be drawn.

In recent years, driven by top-down national policies, China is undergoing a judicial intelligence movement. Police, procuratorates, and courts across provinces all participating in this judicial reform movement.

In Chinese criminal justice system, AI technology is mainly applied in scenarios such as crime prediction, criminal investigation, pre-trial detention and bail decisions, prosecutorial discretion assistance, judicial decision support for judges, inmate supervision, commutation and parole decisions.

The current application of AI in Chinese criminal justice system exhibits three main characteristics: (1) the types of AI systems are diverse, and there is a lack of unified evaluation standards; (2) AI is mainly focused on handling routine judicial tasks and is still in the stage of weak AI; (3) AI is positioned as a tool to assist decision-making, rather than replacing human judges or prosecutors in making judgment based on experience and perception.

The application of AI in Chinese criminal justice system contributes to strengthening crime control, improving judicial efficiency, and rationally allocating judicial resources.

The further development of AI technology in Chinese criminal justice system is constrained by two factors: the difficulty in integrating the technical discourse system with the legal discourse system, and the challenge of replicating judicial decision-making reasoning process based on experience.

The application of AI in Chinese criminal justice system faces numerous risks, including justifiability risks, legality risks, judicial fairness danger, decision accuracy risks, data and algorithmic risks and ethical issues.

In the future, the regulatory framework for AI in Chinese criminal justice system should include three aspects: technological regulation, legal regulation focusing on protecting the data rights of the accused, and ethical responsibility regulation.

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Information about the authors:

Zh. Guo — Professor of Law.

J. Yang — PhD Candidate in Law.

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