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上海人民出版社

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Yadong Cui
Shanghai Law Society
Shanghai, China

Translated by Cao Yan and Liu Yan

ISBN 978-981-32-9879-8 ISBN 978-981-32-9880-4 (eBook)
https://doi.org/10.1007/978-981-32-9880-4

Jointly published with Shanghai People's Publishing House
The print edition is not for sale in China. Customers from China please order the print book from: Shanghai People's Publishing House.
ISBN of the China edition: 978-7-208-15700-2

This Springer imprint is published by the registered company Springer Nature Singapore Pte Ltd.
The registered company address is: 152 Beach Road, #21-01/04 Gateway East, Singapore 189721, Singapore

Preface to the English Version

The English edition of *Artificial Intelligence and Judicial Modernization* will be published by Springer Publishing House, Germany. This book is a summary of the theory and practice of Shanghai judicial professionals in pushing forward the reform of the criminal litigation system centering on trials by using modern technology such as AI, solving judicial problems, avoiding the occurrence of cases in which people are unjustly, falsely, or wrongly charged or sentenced, and realizing fairness and justice.

In early 2014, China's judiciary launched a profound reform of the judicial system, aiming at "speeding up the construction of a fair, efficient and authoritative socialist judicial system through deepening the reform of the judicial system, safeguarding the rights and interests of the people, so as to make the public experience fairness and justice in each judicial case."[1] The reform of judicial system is not only a profound revolution but also a great challenge. Shanghai High People's Court has been established as the first pilot of judicial system reform in China. It has taken the lead in promoting the reform and achieved positive results. It has created a replicable and popularizable "Shanghai Experience" for the national judicial system reform.

In March 2016, starting from the man-machine competition between AlphaGo and Lee Se-dol, the development of AI gained a considerable momentum, and a new upsurge of AI was set off in the world.

We are seeing a historical interaction between justice and technology.

President Xi Jinping pointed out that **we should follow the law of justice, combine the deepening of judicial system reform with the application of modern science and technology, and constantly improve and develop the socialist judicial system with Chinese characteristics**.

[1]See the Third Plenary Session of the Eighteenth Central Committee of the Communist Party of China *Decision of the Central Committee of the Communist Party of China on Several Major Issues Concerning the Comprehensive Deepening of Reform.*

Science and technology is an important means to realize judicial modernization. Combining modern science and technology such as AI with judicial creativity provides a great opportunity for solving judicial problems, promoting judicial reform, and realizing judicial modernization.

In February 2017, the Shanghai High People's Court again undertook the task of developing "trial-centered litigation system reform software" assigned by the central government of China. By pioneering the integration of modern science and technology such as AI and judicial practice, we pushed forward the reform of the criminal litigation system centering on trials, and avoided the occurrence of cases in which people are unjustly, falsely, or wrongly charged or sentenced.

After 2 years of endeavor, the third version of "Shanghai intelligent assistive case-handling system for criminal cases" (aka "the 206 System 3.0") has been available online since December 2018, which enables the complete case-handling procedures of criminal cases in Shanghai to be dealt with online—**from case filing, investigation, approval for arrest, review, prosecution, court trial, conviction, to commutation and parole, representing a breakthrough in the deep application of AI technology in judicial field**.

The 206 System, with 26 functions, has been granted 6 intellectual property rights in China. Its four distinctive functions are as follows: **(1) Evidence standards and evidence rules guidance**. This function provides the case-handling personnel with **standardized, digitalized, and checklist-styled guidelines** in evidence collection and fixation, which are easy for them to grasp and follow, so as to prevent the prominent problems in this procedure, such as lack of uniformly applicable evidence standards among public security organs, procuratorates and courts, nonstandard case-handling conduct, etc. **(2) Evidence review**. The 206 System can review, verify, and supervise both the single evidence and the evidence chain of the whole case, and remind the case-handling investigators and officers about the problems in evidence timely, so as to ensure the factual evidence of the cases under investigation, review, and prosecution can stand the test of law. **(3) Interrogation guidance with key elements**. With its questioning/interrogating models for different types of cases, the System can provide guidance to police officers during questioning or interrogating. Besides, it can help users to detect contradictions of the confessions in time, so as to guarantee the comprehensiveness, legality, and accuracy of interrogation transcripts. **(4) Intelligent court trial assistance**. Through the use of AI and other high-techs to assist the court trial, the 206 System can ensure that "the facts of the case are ascertained in court" and "the evidence is determined in court", so as to truly implement the substantiation of court trials, and to protect the litigant's right of action, as well as the people's right to know, participate, express and supervise, etc (see Chap. 5 of Practice for more functions of the System). It can be said that the development and application of this System are in the leading position in the world.

In February 2019, the book *Artificial Intelligence and Judicial Modernization* (Chinese Edition) was published by Shanghai People's Publishing House, which has been highly recognized and praised by all sectors of society. This book has not only become a hotspot in the research of AI and its judicial application in China but

also attracted great attention from relevant institutions, experts, and scholars abroad. As a participant in this project and author of this book, I gave a keynote speech at the 2018 World AI Conference on "AI and Judicial Modernization". At the "2018 Shanghai Yearbook International Academic Forum" and "2019 China-US High-end Forum on Civil Diplomacy", I gave keynote speeches on "AI Empowering Justice". I gave speeches and introduced the project on many occasions, including the National People's Congress Law Commission, Tsinghua University, China University of Politics and Law, Shanghai Jiaotong University, East China University of Political Science and Law, Shanghai School of Political Science and Law, Shanghai University, Beijing Foreign Studies University, Northeast University of Finance and Economics, Wenzhou University and Shanghai Lecture Hall of Jurists. I also had exchanges with relevant experts and scholars from Stanford University and New York University on this topic. After the System was put into operation, from 2018 to May 2019, the Shanghai High People's Court had received more than 3497 people in 133 groups from domestic and foreign delegations, including 142 people in 11 groups from overseas. The System has caught wide attention and received positive comments. At present, it has been popularized and applied in several provinces and municipalities in China.

Springer and Shanghai People's Publishing House agreed to publish the English version of *Artificial Intelligence and Judicial Modernization*. Springer Publishing House is one of the largest science and technology publishing houses in the world. It has a history of more than 170 years and is famous for publishing academic publications. On the occasion of the publication of the English version, I would like to thank Springer and Shanghai People's Publishing House for their strong support for the publication of this book. I am also sincerely pleased to have the opportunity to introduce to the world the latest achievements of China's judicial reform and the application of judicial science and technology, and to let the world know about China's judicial system, judicial justice, judicial civilization, and judicial progress. My team and I are more than willing to share with judicial professionals in the world the significant achievements of the reform of the judicial system and the innovative application of science and technology in judicial practice in China. Reform never ends. So does scientific and technological innovation. We look forward to working with you in the future on the way to promote the deep application of modern science and technology such as Ai in judicial field.

Shanghai, China Yadong Cui
June 2019

Gist of the Book

As the core competitiveness of a new round of scientific and technological revolution, AI is seen as a strategic resource and has been made a national strategy in China.

The country that controls AI will steer the future.

Science and technology constitute the primary productive force.

Deepening the integration of the judicial system and high technology such as AI is an effective way to realize judicial modernization.

AI, along with other high technology, is the driving force and potent weapon to facilitate China's judicial reform and tackle its judicial problems.

Justice is the last line of defense to safeguard social equity and justice.

The purpose of the trial-centered litigation reform in China is to establish a concept among the case-handling personnel that the way they handle a case should stand the test of law in order to guarantee the quality of the factual evidence of a case which is under investigation, review, and prosecution, and in order to ensure that the trial plays a decisive role in fact-finding, evidence-identifying, litigious-right-protecting, and a fair judgment.

The development of "Trial-centered Litigation Reform Software" is a major decision and arrangement made by the Commission of Political and Legislative Affairs under Central Committee of the Communist Party of China (CCCPC). This software aims to propel the litigation reform with the help of high technology, to reduce the judicial arbitrariness, to avoid the occurrence of cases in which people are unjustly, falsely, or wrongly charged or sentenced, and to ensure judicial impartiality.

As a decision with strategic significance, the development of this advanced and up-to-date software is an unprecedented innovation in China's judicial history. It not only demonstrates the progress of China's judicial fairness, judicial civilization, and human rights protection but also initiates the in-depth application of AI technology in the judicial system of the country.

It is a great honor for Shanghai High People's Court to undertake the arduous task of developing this software.

There is no ready path for the reform and innovation of China's judicial system. Only equipped with initiative, courage, and sense of responsibility, can we blaze a way through all manner of obstacles.

The successful development of "Trial-centered Litigation Reform Software", also known as "AI Assistive System for Criminal Cases in Shanghai" (abbreviated as "the 206 System") indicates two major breakthroughs in terms of professionalism and technology. In professional terms, the System creates the evidence standard as well as a guide to evidence rules for case-handling personnel to follow in the process of evidence collecting and fixing. With such uniformly applicable, standardized, digitalized, and checklist-styled guidance, the outstanding problems such as the nonuniform application of evidence standards and the nonstandard handling of cases in public security organs, procuratorial organs, and people's courts are resolved. Both the criminal procedure theory system and criminal evidence system are improved, making historic contributions to judicial reform. In technological terms, with the application of AI, the 206 System obtains the functions of verifying, checking, and supervising the evidence, reviewing and judging the evidence chain of the whole case. It can intelligently discover the defects in the evidence and the contradiction between the evidence, and offer a timely reminder for the case-handling personnel to make a correction or an explanation, thus ensuring that the factual evidence of the case under investigation, review, and prosecution is solid enough to stand the test of law.

By initiating the application of AI in China's judicial practice, the successful development of the 206 System is an innovation integrating technological rationality, legal rationality, and human rationality. It marks that the application of AI in China's judicial practice is leaping from the entry level to the advanced level, blazing a new way for deepening the judicial reform with the help of high technology.

The realization of dreams requires the unremitting efforts of generation after generation.

It is the dream that many scientists and jurists have been pursuing unremittingly to make justice a real science and to realize the dream of judicial modernization, by combining justice and science and technology, using modern scientific and technological means.

Opportunity determines the future. The advent of AI provides an unprecedented opportunity to realize judicial modernization. Only by firmly seizing this historical opportunity with a strong awareness of strategy and opportunity, and truly making good use of AI technology can we realize judicial modernization.

In order to promote the in-depth application of AI in judicial field, we need to take the initiative to embrace the new technology and keep a close eye on AI technology frontiers, while strictly observing the law of justice and grasping features of AI. In this way, we can effectively promote human-machine collaboration and make AI better serve us in judicial practice.

Judicial practice has its own rules and characteristics, such as impartiality, independence, and openness. When handling cases, judges, prosecutors, and investigators use their experience and intuition when they identify the legal issues

or gather the relevant facts and make a reasonable decision. This means judges, prosecutors, and investigators still remain prominent in judicial practice. Meanwhile, with uncertainties and limitations, the development of AI is still preliminary. Therefore, AI can only be used as **an assistant in handling cases**, serving as AI judge assistant, AI prosecutor assistant, or AI investigator assistant, rather than replace judges, prosecutors, or investigators.

AI is a double-edged sword.

AI is an integration of technical and social attributes. On the one hand, AI promotes the transformation of the economy and society. It has been made a national strategy and becomes new core competitiveness. On the other hand, AI may bring risks and challenges. Once out of control, serious damages will be caused. The advantages of AI should not be exaggerated, nor the use of AI be prohibited. It is viable that we seek advantages and avoid disadvantages, maximizing the benefit of AI.

How to properly handle AI-related issues in fields like law, security, employment, morality, and social management so as to effectively avoid possible risks has become an important concern of society and a new challenge facing us.

It is urgent for us to recognize the potential risks and opportunities of AI in the future, carry out relevant researches, and figure out better solutions by rule of law from a long-term perspective.

There is a long delay between the rapid development and application of AI and the prevention and handling of possible risks and challenges brought about by it. The current researches lack systematic, targeted, and authoritative guidance, affecting the direction, focus, and application of research results. Efforts should be made to change this situation as soon as possible.

Efforts shall be made to build an AI-assisted rule of law for the future. The rule of law will be used to promote, standardize, and ensure the safe, reliable, and controllable development of AI. In this way, AI will better benefit mankind.

In the new era of AI, we have two missions in terms of judicial practice. On the one hand, we are obliged to seize the opportunity, promoting the in-depth integration of AI and the judicial practice to realize judicial modernization. On the other hand, the system of AI-assisted rule of law should be actively developed so that it can play a unique and irreplaceable role in dealing with the potential risks and challenges in the future.

Reform and technological development never ends, so does “the 206 System”.

Introduction

The Role of AI in Promoting Judicial Reform and Judicial Impartiality

The rapid development of modern science and technology is having a profound impact on human society. In particular, as a disruptive technology, Artificial Intelligence (AI) is being widely used in every aspect of the society, drastically changing the world we live in. **Whoever has an advantage over AI will be able to gain the initiative in the competition to win the future**. The development of AI has been elevated to the status of a national strategy.

February 6, 2017 should be regarded an important day in the history of Shanghai High People's Court.

At around 4 p.m. that day, Meng Jianzhu, the then member of the Political Bureau of the CPC Central Committee and head of the Commission for Political and Legal Affairs of the CPC Central Committee and Han Zheng, the then member of the Political Bureau of the CPC Central Committee and secretary of the CPC Shanghai Municipal Committee and other leaders came to the Shanghai High People's Court (hereinafter referred to as the Shanghai High Court) for a survey. At the Shanghai High Court, Meng Jianzhu presided over a forum of heads of law enforcement and judicial agencies of Shanghai. He deployed three new tasks[2] to comprehensively deepen the reform of the judicial system in Shanghai, one of which was that the Shanghai High Court shall undertake the mission of developing "**Trial-centered Litigation Reform Software**" **(hereinafter referred to as "Project 206")**. He demanded: "We should integrate modern scientific and technological innovation with the reform of judicial system, especially in promoting the

[2]The new three tasks include: First, to identify Shanghai as a pilot area for the comprehensive supporting reform of the judicial system; Second, to draft a document on the full implementation of the reform of the judicial responsibility system led by the Commission of Politics and Law of the Shanghai Municipal CPC Committee. Third, led by the Shanghai Higher Court, other political and legal organs cooperate to develop big data management software to promote the reform of the trial-centered litigation system.

reform of trial-centered litigation system. By strengthening the deep application of big data, we can set the unified evidence standard into the data-based program so as to reduce the arbitrariness of the judiciary, improve the efficiency of trial and promote judicial justice". In his speech, he stressed: "The reform of the trial-centered litigation system is a core reform. Shanghai has the conditions to establish a system of evidence standard in courts, procuratorates, public security organs and relevant judicial and security departments. Through the use of big data methods and techniques, excavate the system of trial-centered evidence standard from the massive judicial data and extract relevant rules. What's more, with technical means such as big data, study and formulate the system of evidence standard through the construction of the data court and the intelligent court. Then, combined with the substantive trial, the trial-centered litigation system reform will be actually completed. **Thus, a new pathway for the reform is pioneered**."

It's a historical opportunity for Shanghai High Court to take this glorious and arduous task.

I was then President of the Shanghai High Court and was soon to get retired (I was going to retire at the end of that year). On the one hand, I felt honored to accept and participate in this huge task. On the other hand, I knew what a great responsibility it was to complete the task in such a short period.

An introduction of a major decision is deeply rooted in a certain background. The major decision by the Commission of Politics and Law of the CPC Central Committee to develop "Trial-centered Litigation Reform Software" must have its profound background and extraordinary significance. First, in my opinion, against the backdrop of deepening reforms, the 4th Plenary Session of the 18th Central Committee of the Chinese Communist Party made the important deployment of "promoting trial-centered litigation reform", the purpose of which was to establish a concept among the case-handling personnel so that the way they handle a case could stand the test of law in order to guarantee the quality of the factual evidence of a case which is under investigation, review, and prosecution, and in order to ensure that the trial plays a decisive role in fact-finding, evidence-identifying, litigious-right-protecting, and a fair judgment. This reform is conducive to enhancing the sense of responsibility of case-handling personnel. The substantive justice of the case judgment can be achieved through the procedural justice, thus cases in which people are unjustly, falsely, or wrongly charged or sentenced can be effectively prevented.[3] Since the 18th CPC National Congress, under the background of comprehensively advancing the rule of law and promoting the reform of the judicial system in an all-round way, the people's courts have corrected the judgments on 46 major criminal cases in which cases, people were unjustly, falsely, or wrongly charged or sentenced in accordance with law, including the case of Nie Shubin, the case of Hugjiltu, thereby greatly enhancing the public's confidence in judicial impartiality. However, the occurrence of unjust and false cases will have a

[3]An Explanation Given by General Secretary Xi Jinping on the Resolution of the CPC Central Committee on Certain Major Issues Concerning Comprehensively Advancing the Law-Based Governance of China.

fatal impact on the rule of law. President Xi Jinping once quoted Bacon's famous saying: "One foul sentence does more hurt than many foul examples. For these do but corrupt the stream, the other corrupts the fountain." The meaning of this is profound. The practice of the judiciary has shown us that if the judicial defense lacks credibility, social justice will be widely discredited, and as a result, social harmony and stability will be difficult to guarantee (see footnote 3). Therefore, it is not enough to just correct these cases. We must make up our minds to solve it from the root and put an end to the occurrence of unjust and false cases. "**We shall endeavor to embody fairness and justice in each legal case**". For this purpose, the 4th Plenary Session of the 18th Central Committee of the Chinese Communist Party made a major decision to promote the reform of the trial-centered litigation system. Second, how can effectively promote the reform of the trial-centered litigation system and prevent the occurrence of unjust and false cases? There are many reasons behind unjust and false cases, among which the unclear facts and insufficient evidence are the most important ones (almost without exception). **Science and technology is the driving force and potent weapon to facilitate reform and resolve difficulties**. Therefore, the CPC Political and Legislative Affairs Committee made the decision to develop "Trial-centered Litigation Reform Software" (TLRS) to solve the difficulties in the reform of criminal procedure system by using modern scientific and technological means. Thus, **big data, artificial intelligence, judicial reform, judicial impartiality, modern science, and technology are closely linked with justice**. We can see that this decision is with strategic significance, the development of this **advanced and up-to-date** software is an unprecedented innovation in China's judicial history. It not only **demonstrates** the improvement and promotion of China's judicial system and the progress of China's judicial impartiality, judicial civilization, and human rights protection, but also **initiates** the in-depth application of AI technology in the judicial system of the country.

Zhou Qiang, President of the Supreme People's Court, once said: Just like **two wheels to a vehicle and two wings to a bird**, judicial reform and informatization are **two indispensable factors** to the development of country's judicial cause and the Shanghai High Court undertook the task of exploring the right way to successfully realize both the two aims for the whole country. I remember when I just began to take the position in the Shanghai High Court in April 2013, the first sentence Comrade Jianzhu said to me was: Priorizing reforms. In fact, I didn't understand it clearly at that time. **In early 2014**, the Shanghai High Court was designated as a pilot unit of national judicial system reform, thus Shanghai High Court became the first to carry out the reform of judicial system in the country, creating a "Shanghai experience" which could be applied in other parts of the country. **In July 2015**, a national meeting was held in Shanghai to promote the work of experiments on the reform of the judicial system and the meeting was regarded an introduction to the reform of national judicial system. **This time**, the Shanghai High Court undertook the important task of developing "Trial-centered Litigation Reform Software". Being a pioneer again, the Shanghai High Court

explored the way to solve judicial difficulties by using AI and other modern technologies, making contributions to promoting judicial reform in the country.

Blazing a new way for reform means there is no ready path for the reform, and we need to explore a new pathway. Just as **Lu Xun** said: what is a road? It is trampled out of a place where there is no road, and it is opened up from a place where there are only thorns. To solve the problem of lacking the unified rule and standardized behavior in the process of collecting, fixing, and determining the evidence with the application AI and other modern scientific means so as to reduce the judicial arbitrariness, to guard against injustice, false, and erroneous cases and to ensure the fair justice is an unprecedented task and there is no prior experience to refer to. **The Shanghai High Court took on a formidable task to explore a new pathway. First, it was extremely difficult**. We needed to create the guide to evidence standard as well as evidence rules and integrate them into the big data system, providing uniformly applicable, standardized and digitalized instructions to case-handling personnel. What's more, through the use of AI and modern technologies, the software should obtain the functions of reviewing, verifying, reminding, checking, and supervising the evidence involved in criminal cases so as to guard against unjust, false, and erroneous cases. These are things that have never been done before, and we had to overcome **the two major difficulties** in **professional** and **technological terms. If the software could be successfully developed, it would be a breakthrough of the application of AI in China's judicial practice. Second, we were fully aware of the heavy responsibility**. Developing the 206 System was not only a task of scientific and technological innovation, it would also play an important role in the success of the implementation of the Trial-centered Litigation Reform put forward by the CPC Central Committee. **Third, we were pressed for time**. We were assigned the task on February 6, and we were asked to finish the development and trial operation of the 206 System in early May and share our experience at the National Conference on the reform of judicial system scheduled in July. There were only 5 months to go. At that time, almost nobody thought it was possible, at least not within the required time. We were **faced with unprecedented challenges and difficulties**. It would take tremendous courage and wisdom to complete such a task. Several people once asked me whether I had ever thought about what to do if we did not succeed. And my answer was "**we have no choice but to go ahead**." **Reforms entail overcoming difficulties**. Only equipped with great courage and sense of responsibility, can we blaze a new way through all manner of obstacles.

Wading across the stream by feeling the way. Under the leadership of the Shanghai Municipal Committee and the Municipal Committee of Political Science and Law, under the guidance of the Supreme People's Court, with the full support of the Municipal Public Security Organs, Procuratorates, Judicial Organs and Municipal Development and Reform Commission, Economic and Credit Commission, Finance Bureau and other departments, we began our reform by cooperating with iFlytek Co., Ltd. to establish a research and development base and form a research and development team. **You never know how difficult a task could be unless you have done it**. We gathered more than 700 technical experts

and professionals to form the R&D team of the 206 System. [By the end of October 2018, more than 700 people (excluding logistical support personnel) had been directly involved in R&D work, and more than 400 professionals had been designated from the public security organs, prosecutorial organs, and people's courts.[4] iFlytek Co., Ltd had appointed more than 300 technicians, including 79 technicians gathered in the Shanghai court base and 226 technicians as backstage supporters in the company headquarter.] Although faced with enormous difficulties, they spent more than 600 days and nights, overcoming difficulties one after another with diligence and perseverance and completed the R&D task on schedule. We were assigned the task on February 6, 2017. The 206 System was completed and put into a trail operation on May 3, 2017. We introduced and demonstrated this system at the Conference in Gui Yang on July 10. Since March 2018, the software has been widely applied in the whole city. In December 2018, filing, investigation, approval of arrest, review, prosecution, trial, and judgment of cases were all operated in the 206 System. And the Three 100% goals had been achieved: Guidelines for Evidence Standards covered 100% of frequently accused cases; 100% of frequently accused cases in the city could be found in the 206 System; public security organs, procuratorates, and courts used the 206 System to handle 100% cases. In the past 2 years of research and development, the 206 System has been continuously improved and is now in good operation. Its usefulness has gradually been proved. At the beginning, some case-handling personnel were unable to understand the operation of the System. But now, the System has become an indispensable intelligent assistant to them. According to statistics, in the past 2 years, the R&D team of the 206 System has developed and innovated 9 application-oriented technologies, overcome 5 major types of difficulties, broke through 4 types of technical bottlenecks, solved more than 800 specific problems, and obtained 6 intellectual property rights. It was extremely difficult to achieve so much in the short period of around 600 days and nights. The huge success embodies the wisdom of all the staff of the R&D team and their continuous dedication.

Meng Jianzhu, head of the Committee of Political and Legal Affairs of the Communist Party of China (CPC) Central Committee, pointed out that although the time was limited and the task was heavy, the Shanghai High Court had vigorously advanced the reform of trial-centered criminal litigation system and had met the high demand. Guidelines for Standards of Basic Evidence had been transferred into a data model and integrated into the AI Assistive System for Criminal Cases, which had initiated the in-depth application of AI technology in the judicial system of the country and explored a new pathway for the development of the criminal judicial civilization.

Guo Shengkun, Deputy Secretary of the Committee of Political and Legal Affairs of the CPC Central Committee, stressed: "It is necessary to conscientiously study the Shanghai experience and make good use of the Shanghai AI Assistive

[4]Among them, more than 220 people were from the courts, more than 80 people were from the procuratorates, more than 100 people were from the public security organs, and more than 10 people were from the judicial organs.

System for Criminal Cases, to develop a new model of criminal justice to meet the actual needs, and avoid duplication."

A number of media have given extensive coverage. Since July 2017 and as of March 2019, more than 133 batches of 3497 people from home and abroad have visited the Shanghai High Court. Among them, 11 batches of 142 people were from judiciary authorities in other countries (a total of 1397 people in 33 batches have been received since November 2018).

Under the leadership of the Commission for Political and Legal Affairs of the CPC Shanghai Municipal Committee, professionals from the organs of courts, procuracy, public security, the judicial system, and other related departments and technical experts from the iFlytek Co., Ltd. have pooled efforts to complete the 206 System. This has been fully recognized by leaders at all levels as well as people from all walks of life. The successful development and wide application of the 206 System have reaffirmed our confidence in the importance of the national AI strategy and the vision of the Central Government. This shows us as long as one takes the initiative and seizes the opportunity, keeping a close eye on the frontier, he will certainly be able to become the front runner.

Through its contest with Li Shishi, AlphaGo has shown us the amazing power of AI. The successful development and application of **the Shanghai AI Assistive System for Criminal Cases** has also shown us the amazing power of AI in judicial practice. **The success of the 206 System is a breakthrough in the integration of technological rationality, legal rationality, and human rationality. It marks that the application of AI in China's judicial practice is leaping from the entry level to the advanced level**, pushing the application of AI in the judicial practice to a new height.

The Shanghai AI Assistive System for Criminal Cases is a product of promoting the reform of judicial system with the help of modern technology. Participation in the whole process of developing the 206 System has made me deeply feel that **ideas play a decisive role in solving difficulties**. I also realized that science and **technology constitute a primary productive force**. In order to make justice a real science, the deep integration of judicial practice and science and technology is the only way out. We should have **a strategic vision** and take the initiative to embrace new science and technology, using modern science and technology such as AI to solve judicial problems and promote judicial progress. We should also have **a strong sense of opportunity**. Opportunity is fleeting; **seizing the opportunity is seizing the future**. To be specific, with the advent of the era of AI, we should firmly seize the opportunity of using AI for a better future. It is necessary to **follow the rules of judicial practice and keep a close eye on the forefront of science and technology at the same time, thus achieving an integration of these two**. Everything has its inherent laws; any violation of these inherent laws would lead to failure. Justice has its own unique laws, whereas science and technology also has its magic power, as well as characteristics and limitations. Only by combining the two effectively can we give full play to the magic power of science and technology. **Reform is overcoming difficulties**. **It takes tremendous courage and considerable initiative to overcome these difficulties**. Since the implementation of the

reform, we have weathered numerous obstacles and withstood so much pressure. Looking back on the process of the reform, a multitude of feelings surge up. Chairman **Mao Zedong** once said: "On a blank sheet of paper free from any mark, the freshest and the most beautiful characters and pictures can be written and painted."[5] "The 206 System" is just the latest and most beautiful words, the latest and most beautiful picture.

The realization of dreams requires the unremitting efforts of generations after generations. It is the dream that many scientists and jurists have been pursuing unremittingly to make justice a real science by combining justice and science and technology, using modern scientific and technological means.

Karl Marx once said: "Only when a science succeeds in applying mathematics can it reach a truly perfect level."

As early as October 1979, Prof. **Qian Xuesen**, a famous Chinese scientist, put forward the idea of "**developing legal system engineering**." He came up with a formula: the legal system engineering = a scientific system + Marxist-Leninist Jurisprudence + mathematics + computer technology. He was **the first person** to put forward the concept of legal system engineering in our country. In 1985, Prof. Qian Xuesen again put forward the concrete idea of using artificial intelligence, knowledge engineering, and expert system in legal affairs. He was **the first expert** to put forward "artificial intelligence + rule of law" in our country. In 1986, **Su Huiyu, Zhang Guoquan, and Shi Jiansan**, teachers of the East China Univerity of Political Science and Law put forward the idea of computer-assisted sentencing, and wrote their research result in the book *Sentencing and Computer—Theory of Fair and Rational Application of Sentencing* (1989). The result of the computerized sentencing system formed by its expert experience was almost the same as the result of manual judgment, which had been paid attention and recognized by the judicial practice. However, due to the stage of scientific and technological development and the limitations of conditions (Internet, Big Data, and Artificial Intelligence are not as developed as they are today.), these achievements had not been popularized and widely applied. But their courage to pursue their dream and seek the truth regardless of hardships and difficulties inspired and motivated future generations.

In 1983, Li Keqiang pointed out in the article ***Computerization of the Legal Work***: "although the history of the integration of computer technology and law is not long, its emergence and development have shown new and broad prospects for legal work and legal research." "The application of computer technology in law and its development have brought about fundamental changes in legal practice. On the one hand, legal practice and legal research have to conform to the development of science and technology. On the other hand, legal practice and legal research have to be modernized". "**The computerization of legal practice is an inevitable result of this new era**". This prediction is becoming a reality.

[5]Mao Zedong (1958).

Today, **the advent of the era of AI** has provided **a great historical opportunity** for our generation to realize the dream of judicial modernization through modern science and technology. The successful development and application of the Shanghai AI Assistive System for Criminal Cases is an excellent example.

Reform and development of science and technology never end, so does the progress of the 206 System. We are keenly aware that even the 206 System has achieved the Three 100% goals, it is only the beginning of a long journey. **Reform** never ends, because new situations, new problems, and new needs will continue to emerge. **The development of science and technology never ends**, because new inventions and technologies will continue to emerge. With the development of science and technology, the 206 System needs to be improved continuously, in order to meet new requirements and solve new problems. Therefore, **the improvement of the 206 System never ends**. We should never stop reform, making efforts to keep pace with the times, firmly seize the rare historical opportunity of the new round of scientific and technological development, take the initiative and make good use of AI so as to realize the dream of judicial modernization.

This book is a record of the research and development of the 206 System in Shanghai. The whole book is divided into three major parts: **The first part mainly discusses the theories** related to AI and its application in judicial practice. **The second part focuses on the practice**, which mainly records the development and application of the 206 System, as well as the major breakthroughs in overcoming difficulties. **The third part is about the prospects**, which mainly concentrates on reflections, to be specific, reflections on how to deal with the risks and challenges brought by AI. The idea of "developing the Future AI-assisted Rule of Law" is also put forward in this part. **AI is a double-edged sword**. Faced with this new challenge, **we have two missions to accomplish in judicial practice. On the one hand**, we are obliged to seize the opportunity, promoting the in-depth integration of AI and the judicial practice to realize judicial modernization. **On the other hand**, we need to actively develop **the system of AI-assisted rule of law** so that it can play a unique and irreplaceable role in dealing with the potential risks and challenges in the future. The rule of law will be used to promote, standardize, and ensure the safe, reliable, and controllable development of AI.

In the process of writing the book, Chen Shusen, Cai Yibo, Wu Haiyin, Zhao Chunxue, Gao Jiayun, Pan Yonglu, Zhang Fan, Jiang Hua, Wu Tao, Hu Yixian, and others participated in the writing of some chapters. Wang Tao, Bai Ning, Liu Jiang, Zhang Xin, Liu Yuwei, Hu Rongxin, Sun Li, Yang Fei, Zhao Chunjian, Wu Yanyan, Jin Zemeng, and others participated in the planning of the manuscript and put forward valuable opinions and suggestions. This book can't be completed without the wisdom of these people. I would also like to thank Beijing Gaogao International Culture Media Co., Ltd., Zhejiang Qinghua Yangtze River Delta Research Institute for Rule of Law and Social Governance, Shanghai People's Publishing House for their help and support.

Chairman **Mao Zedong** once said: Among all things in the world, people are the most valuable. Under the leadership of the CPC, any miracle can be created with the people's efforts.[6]

Though history is written by people, not everyone can be written into history.

This book is dedicated to everyone who has participated in and witnessed the development of the 206 System. It is also written to commemorate the 40th anniversary of reform and opening up.

Scientific and technological development never ends. The country that controls science and technology will steer the future.

Shanghai, China Yadong Cui
March 2019

References

M. Zedong, *Introduce a Cooperative Society*, People's Daily, 1958
M. Zedong, Bankruptcy of idealistic view of history (September 16, 1949), in *Selected Works of Mao Zedong*, vol. 4, 2nd edn. (People's Publishing House, 1991)

[6]Mao Zedong (1991).

Contents

About the Author

Yadong Cui Secretary of the Leading Party Members' Group and President of Shanghai Law Society, former Secretary of the Leading Party Members' Group of Shanghai and President of Shanghai High People's Court, Justice (Second Rank) of the People's Republic of China.

He joined the Chinese People's Liberation Army (PLA) in December 1969 and the police in January 1974. As a soldier, he served in the Signal Company of the 74 Division of the PLA. Later on, he was transferred to Hefei Municipal Public Security Bureau. Starting from an ordinary police officer, he served as the Deputy Section Chief of the Political Division, the Deputy Director of the Case Pre-investigation Division, the Director of the Detain for Interrogation Center along the way before being promoted as the Deputy Director, the Director, and then the Secretary of the Communist Party of China (CPC) of Hefei Municipal Public Security Bureau.

After that, he was appointed successively as the Deputy Director-General, the Director-General, and the Secretary of CPC of Anhui Provincial Public Security Department; the First Political Commissar and the First secretary of CPC of Anhui Provincial Corps of Chinese People's Armed Police Forces.

Then, he was assigned to Guizhou Province, holding different positions such as member of the Standing Committee of the CPC Guizhou Provincial Committee, the Head of Subcommission for Political and Legal Affairs under CPC Guizhou Provincial Committee, the Director-General, the Secretary of CPC and the Deputy

Police Supervisor of Guizhou Provincial Public Security Department, the Director of Social Stability Maintenance Office of Guizhou Province, the First Political Commissar and the First secretary of CPC of Guizhou Provincial Corps of Chinese People's Armed Police Forces, as well as the President of Guizhou Provincial Law Society.

In April 2013, he served as the Acting President and the Secretary of the Leading Party Members' Group of Shanghai High People's Court, and in January 2014, as the President and the Secretary of the Leading Party Members' Group of Shanghai High People's Court. He was appointed as the Secretary of the Leading Party Members' Group of Shanghai Law Society in July 2018 and the President of Shanghai Law Society in October 2018.

He is the author of *Emergency Management of Mass Incidents and Social Governance* (published by Press of Party School of the CPC Central Committee), *A Rule of Law Country* (by People's Publishing House), etc. He is also the editor-in-chief of the books including *Exploration and Practice of the Reform of the Judicial System of Courts in Shanghai* (by People's Court Press), and Sunshine Illuminates the Path of Return (by Press of China National School of Administration).

Part I
Theories: Integrating AI into Judicial Practice—An Effective Way to Realize Judicial Modernization

Chapter 1
AI—A Historical Opportunity for Judicial Modernization

1 The Amazing AI

1.1 Human-Machine Competition—A New Era of AI

Google's AI algorithm AlphaGo defeated South Korean Lee Se-dol, one of the world's top Go players, in a five-game match from March 9 to 15, 2016.

Before his match with AlphaGo, Lee Se-dol had declared that he would definitely defeat Alphao because AlphaGo was inferior to him and the final score would be 5-1 or 4-1. If he did not make mistakes, he would win 100%. However, this human-machine competition that aroused much attention around the world ended with a score of 1:4.

AlphaGo played Go with South Korean Go player Lee Se-dol on March 15, 2016

Y. Cui, *Artificial Intelligence and Judicial Modernization*,
https://doi.org/10.1007/978-981-32-9880-4_1

In May 2017, AlphaGo again defeated Chinese player Ke Jie, who ranked first in the world, in a three-game match. The result was 3:0.

That match aroused much attention.

That reminded us of another marveling match. In 1997, Kasparov, the then world chess champion, was defeated by IBM's Deep Blue supercomputer by a score of 1 win, 2 losses and 3 draws. This result surprised the whole world. From then on, the topics of "AI defeating human beings" and "Machines enslaving humans in the future" were heard everywhere.

In today's view, Deep Blue is far from intelligent enough. Relying on strong computing ability, it enumerated all positions to choose the best strategy. Through computational calculation, Deep Blue could evaluate 12 positions, however, Kasparov could only evaluate 10 positions, which was obviously inferior to Deep Blue. At that time, Denger, the head of the German AI Research Center, said in an interview with Xinhua News Agency, that Deep Blue was a milestone[1] in the history of AI development. However, an AI researcher present at the time said to the developer, "Try to apply AI to Go, don't see me again until AI could defeat human beings in Go matches." We can see that people had never thought it was possible for AI to defeat human beings in Go matches until AlphaGo defeated Lee Se-dol.

Go is the crystallization of human wisdom. Compared to chess, Go is much more complex and is regarded as the most difficult board game for people to play. As an extremely complex competition game, the number of potential moves of Go is unlimited and the possible alternatives to consider per move are far beyond human's calculation ability. It is estimated that the number of possible moves in Go exceeds the total number of atoms in the observable universe. Obviously, in Go matches, AlphaGo can never win using the same ways which Deep Blue has used, including relying on computational calculation to remember positions, making decisions through "fixed" logic program or choosing the best strategy by enumerating all positions.

According to Google's AI Company DeepMind, AlphaGo, which the company has researched and developed, uses deep learning on the basis of neural networks: by simulating human brain neural networks, it has learned 30 million steps of professional Go players through a large amount of data analysis. After playing with itself to consolidate what it has learned, it could defeat human beings by looking for more potential positions than the basic game rule.

The Human-Machine Competitions between AlphaGo and Lee se-dol, AlphaGo and Ke Jie have broken the belief that AI will never defeat human beings in Go matches, fully demonstrating the rapid development of AI: AI is already able to imitate the human brain neural network, enabling the machine simulate the mechanism of the human brain to remember, learn, think and create…

AI is showing human beings its amazing power.

Human-machine competition indicates a new era of AI.

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[1] From Deep Blue to AlphaGo: Those four epoch-making human-machine wars during those years', contained in the Pengpai News: https://www.thepaper.cn/newsDetail_forward_1441068, I visited the website on May 30, 2018.

1.2 AI is Coming into Shanghai Courts

During March 5, 2016 to March 16, 2016, I was in Beijing to attend the 4th National People's Congress. The "Human-Machine Competition" between AlphaGo and Lee se-dol, which caught worldwide attention, would be held on March 9.

I was an amateur Go enthusiast and I loved Go very much (I served as vice chairman of the National Go Association for two sessions). I remembered on March 1, 2016, I had the honor to meet with Lee se-dol, who was participating in the 17th Nongxin Cup World Go Competition in Shanghai. His strong confidence left a strong impression on me. I really believed that AI would never defeat Lee Se-dol. I was quite interested in this competition, and I was looking forward to Lee se-dol's complete victory.

The competition was held from March 9 to 15. I watched the broadcast of the game in my spare time. The result of the "Human-Machine Competition" between AlphaGo and Lee se-dol was 4:1, which shocked the Go world as well as the whole world.

At that time, I knew very little about AI, but the amazing power of AI surprised me and aroused my deep thought. I began to have a sense of crisis and urgency—AI would change the whole world.

Before the competition was over, I invited Cao Hongxing, director of Information of High Court, Zhang Xin, director of Research Office and Liu Yuwei, director of Office to my room at the Jing Xi Hotel in Beijing, where the Shanghai delegation lived. We discussed how to use the latest technologies such as big data and AI to improve the informationization of Shanghai courts. I proposed that **we could build "Data Courts" and "Intelligent Courts"** to promote the intelligent trial work and **I asked relevant departments in courts to come up with a plan as soon as possible.**

Right after that, the Shanghai High Court formulated the *"Data Court" Construction and Development Plan (2017–2019)* (this was the new Three-Year plan, and the *Three-Year Plan for Informationization of Shanghai High People Court (2014–2016)*had been formulated in 2014), establishing the implementation of "One strategy, Two Initiatives", namely Big Data Strategy, "Internet Plus" Initiative, and "AI Plus" Initiative. That was the beginning of the development of "Data Courts" and "Intelligent Courts" in Shanghai, moving forward from Internet to AI.

AI is coming into Shanghai courts

Shanghai courts are advancing to being intelligent

2 The Rise of AI

2.1 What is AI?

The term, Artificial Intelligence, abbreviated as AI, was born at the meeting at Dartmouth in 1956.

Many scholars and institutions have given different definitions and interpretations of AI. Nils J. Nilsson of Stanford University thought "AI is concerned with intelligent behavior that will make machines intelligent so they can appropriately act in environments with perception".[2] Professor Winston of the Massachusetts Institute of Technology proposed "AI is to study how to make computers do intelligent work that only people can do in the past". In *Artificial Intelligence: A Modern Approach*, AI is divided into four approaches: "Thinking Humanly Approach, Acting Humanly Approach, Thinking Rationally Approach, Acting Rationally Approach".[3] Wikipedia defines AI as "intelligence demonstrated by machines", that is, as long as a machine has some "smart" features or performance, it could be counted as AI. The Encyclopedia Britannica states that artificial intelligence (AI) is the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings.

In January 2018, China Electronics Standardization Institute, together with other institutes formulated *White Papers of the Standardization of Artificial Intelligence (2018 Edition)*,stating that AI is a theory, method, technology and application system that use digital computer or computer-controlled machines to simulate, extend and expand human intelligence, perceive the environment, acquire knowledge, and use knowledge to obtain the best results. In fact, AI is an artificial system developed for intelligent activities. It is a process in which machines imitate human beings to use knowledge to accomplish certain tasks.

2.2 The Development of AI

The Dartmouth Summer Research Project on Artificial Intelligence in 1956 is usually regarded as the beginning of AI research. Now it has a history of more than 60 years.

Looking back over the past 60 years, we can find that the development of AI is not smooth. After coming through stages of germination and initial development, it **developed spirally**[4] **from climax to trough and to climax again** (development, stagnation, re-development). **Each trough is followed by a new climax, constantly pushing AI to a new era. The development of science and technology keeps pace with the times and it never ends.**

To sum up, the development of AI can be roughly divided into the following stages:

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[2]Nilsson (1998)

[3]Russell SJ, Norvig P Artificial intelligence: a modern approach, 3rd edn, pp. 4–5, (translated by Jianping Y, En Z, et al.). Beijing: Tsinghua University Press (United States)

[4]The development of spiral is a generalization of the tortuous image that must appear in the process of development of things. It is the philosophical description of negating the expression of law as well as the dialectical unity of the advancement and recovery of things, indicating that the development of things from simple to complex and from low to high is not linear.

(1) Stage of germination (from Mid 17th century to 1930s)

In the mid-17th century, Leibniz, Thomas Hobbes and Descartes put forward the systematic hypothesis of formal symbols, which laid the foundation for the study of Artificial Intelligence (AI). Some important events took place in this period:

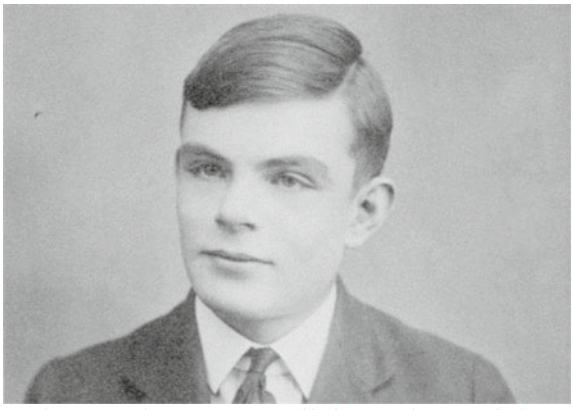
In the early 19th century, Charles Babbage designed a mechanically programmable computer ("Analytical Engine") but failed to complete it.

In the 20th century, *An Investigation of the Laws of Thought* written by George Boole, *Begriffsschrift* written by Gottlob Frege, *Principia Mathematica* written by Bertrand Russell and Whitehead made great breakthroughs in the study of mathematical logic, heralding the emergence of artificial intelligence.

In 1936, according to the Church-Turing thesis put forward by mathematician Alonzo Church and Alan Turing, all calculations or algorithms can be performed using a Turing machine. This thesis is known as one of the foundations of computer science.

(2) The Birth of AI (from 1940s to 1950s)

In 1950, the famous Turing Test was proposed. According to Alan Turing, the father of AI, a machine could be called intelligent if it is capable of carrying on a conversation without being identified by a human interrogator as a machine (via electronic transmission equipment). In the same year, Turing also predicted the possibility of creating machines with real intelligence.



Alan Turing, an English mathematician and father of AI

In 1954, American George Devol designed the world's first programmable robot.

In the summer of 1956, Dartmouth College held the first AI conference in history, which was considered as the symbol of the birth of AI. At the conference, McCarthy put forward the concept of "artificial intelligence" for the first time. Newell and Simon presented the logic theory machine they programmed.

(3) The Flourishing Period of AI Development (from 1950s-to 1970s)

During 1966 to 1972, SRI International developed the robot Shakey, the first mobile robot using AI.

In 1966, Weizenbaum of MIT created the world's first chatbot ELIZA. ELIZA was intelligent because she could understand simple natural language following the rules and directions of the scripts and generate human-like interactions.

On December 9, 1968, Doug Engelbart of the Stanford Research Institute in California invented the computer mouse and conceived the concept of hypertext linking, which became the foundation of the modern Internet decades later.

(4) The Trough of AI Development (from 1970s to 1980s)

In the early 1970s, the progress of AI encountered a bottleneck. At that time, the limited memory and processing speed of computers were not enough to solve any practical AI problems. Researchers quickly found that the requirement for computer programs to have a child-level understanding of the world was too high: no one could make such a huge database in 1970, nor did anyone know how a program can learn so much information. In the absence of progress, AI funding agencies (such as the British Government, the US Defense Department's Advanced Research Projects Agency and the National Science Council) gradually stopped funding directionless AI research. The National Science Council (NRC) stopped funding after allocating $20 million.

(5) The Revival of AI (from 1980 to 1987)

In 1981, the Ministry of Economy, Trade and Industry of Japan allocated $850 million to develop the fifth generation computer project, which was then called AI computer at the time. That inspired British and the US governments to restore substantial funding for research in the field of information technology.

In 1984, under the leadership of American Douglas Lenat, the Cyc (Encyclopedia) project was launched with the goal of enabling AI applications to work in a manner similar to human reasoning.

In 1986, American inventor Charles Hull created the first 3D printer in human history.

(6) Another Trough of AI Development (Winter) (from 1987 to 1993)

The term "AI winter" was coined by researchers who had experienced the funding cuts in 1974. They noticed people's enthusiasm for Expert Systems, predicting that people would be disappointed soon. Unfortunately, the truth was just like what they had predicated. The practicality of Expert Systems was limited to some specific situations. By the late 1980s, the new leadership of the US Defense Advanced Research Projects Agency (DARPA) believed that AI was not the "next wave" and they chose to fund those projects that seemed easier to produce results.

(7) The Third Boom of AI (from 1993 to present)

Some important events during this period include:

In 1993, the US Clinton Administration decisively put forward a report *Technology is the Engine of Economic Growth*, aiming to establish a new type of information network—the information superhighway, thus depicting the blueprint of the Internet revolution, and laying a solid foundation for the explosive development of AI.

On May 11, 1997, IBM's Deep Blue defeated world chess champion Kasparov, becoming the first computer chess-playing system to beat a reigning world chess champion within the standard competition time limit.

In 2011, Watson, an AI Program developed by IBM to answer questions in natural language, competed on an American television quiz competition show against two human champions and won the prize of $ 1 million.

In 2012, the Canadian team of neuroscientists created a virtual brain with 2.5 million simulated "neurons" with simple cognitive abilities, named Spaun, and passed the most basic IQ test.

In 2013, Facebook AI Lab was established to explore the field of deep learning to provide Facebook users with a more intelligent product experience; Google acquired a voice and image recognition company DNNResearch to promote the platform of deep learning; Baidu founded the Deep Learning Institute.

In 2015, Google open-sourced Tensor Flow, a second-generation machine learning platform that directly trains computers to perform tasks with large amounts of data; Cambridge University established the Institute of Artificial Intelligence.

(8) Human-Machine Competition—A New Era for AI (outbreak period)

On March 15, 2016, the last game of the human-machine competition between Google's computer program AlphaGo and the world chess champion Lee Se-dol ended. After five hours of competing, Lee was finally defeated by AlphaGo by a score of 1–4. The result of the human-machine competition subverted the world's perception of AI. The whole AI market seemed to have been ignited, and started a new round of development.

AI shows mankind its amazing power.

Human-machine competition **indicates a new era for AI**

2.3 New Development Trends of AI

After more than 60 years of rapid development, jointly driven by some new theories and technologies such as mobile Internet, big data, supercomputing, sensor networks and brain science, as well as the strong demands for economic and social development, the development of AI has entered a new stage of development, featured by deep learning, cross-border fusion, human-machine collaboration, crowd intelligence and autonomous intelligence. Like the Internet, AI is gradually becoming an indispensable part of human social life, profoundly changing our life and the whole world. AI

is accelerating the leap from digitalization and networking to intellectualization in all fields of economy and society. It shows the following development trends[5]:

(1) AI has become a new focus of international competition.

Major developed countries in the world, such as the United States, Britain, Germany and Japan, regard the development of AI as a major strategy to enhance national competitiveness and safeguard national security. They have stepped up the formulation of plans and policies, focusing on the deployment of core technologies, top talents, standards and norms, striving to take the lead in the new round of international scientific and technological competition.

(2) AI is becoming the new engine of economic development.

As the core driving force of the new round of industrial transformation, AI will further release huge power accumulated through previous scientific and technological revolutions and industrial transformations, promote the emergence of new technology, new products, new industries, new business models and new patterns, trigger major changes in economic structure, profoundly change the mode of production, life and thinking of human beings, and realize the overall rise of social productivity.

(3) AI brings new opportunities for social development.

The wide application of AI in education, medical treatment, pension services, environmental protection, urban operation, judicial services and related fields will greatly improve the accuracy of public services and the quality of our life in an all-round way. AI can grasp people's cognition and psychological changes in a timely manner, and actively make decisions and responses, which would significantly improve the social governance, thus playing an irreplaceable role in effectively maintaining social stability.

(4) Uncertainty in AI development brings new challenges.

As a disruptive technology with wide influence, AI may bring about problems such as changing employment structure, impacting law and social ethics, violating personal privacy, and challenging the norms of international relations. thus having a profound influence on government management, economic security, social stability and even global governance.

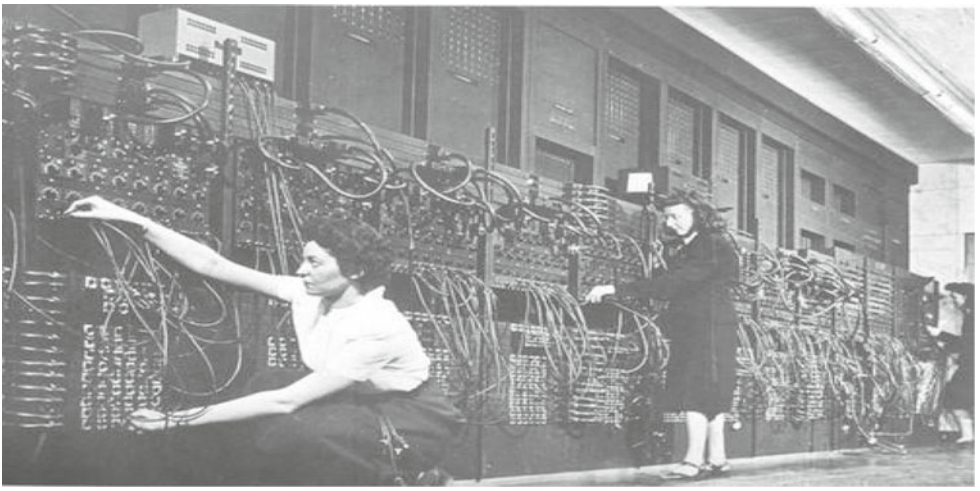
2.4 AI and Chess, Computer, Internet and Military Affairs

Looking back at the development of AI and connecting it with the invention and application of computers and the Internet, I found that the invention of computers and the Internet was all related to military affairs, while the development of AI was related to chess. And there were two important chess competitions.

(1) Computer, Internet and Military Affairs

The invention of the computer and the Internet were all directly related to military affairs.

On February 15, 1946, the world's first general-purpose electronic digital computer **ENIAC** was successfully developed at the University of Pennsylvania in the United States. It was developed at the request of the US military (formerly the Department of Defense or the Department of the Army) for ballistic calculation. At that time, American scientists needed to develop military related technologies. During the Second World War, long-range weapons such as airplanes and artillery became the main weapons to attack enemy military targets, which put forward higher requirements for the accuracy of attack. It was necessary to accurately calculate and plot the trajectory of shells or missiles. Initially, ENIAC was used for military purposes, which enhanced military strength.



The world's first general - purpose electronic digital computer ENIAC mainly helped researchers improve military weapons

The Internet was developed by the United States through continuous improvement and changes on the basis of the military computer network ARPANET (Appa Network). In 1969, ARPA, the Defense Advanced Research Projects Agency, began building a network called ARPANET. The network was initially created out of military necessity. When one part of the network was destroyed, other parts of the network would soon establish new connections. This is generally believed to be the prototype of the Internet.

The beacon tower near the Great Wall of China was used to transmit military messages and is known as the earliest "Internet" in the world.

(2) AI and Chess

All the way through its development, AI is related to chess.

Turing wrote a chess program.

In 1948, Turing wrote a chess program (Some documents recorded it was in 1952). But at that time, no computer had enough computing power to execute this program. Therefore, he imitated the computer and listed a step on paper, called "**paper machine**". It took half an hour to finish each move. The chess playing computer program was called "Turochamp" as it was created by Turing and his friend Champernowne. It competed with another computer program called Machiavelli. Later, based on Turing's theory, a group of researchers at Los Alamos National Laboratory in New Mexico of USA designed the world's first computer program to play chess-like games based on MANIAC.

Deep Blue matched against world champion chess player Kasparov. May 11, 1997 was a historic day in the history of human-computer competition. A computer program defeated a world champion in a match within the competition time limit for the first time. Kasparov was defeated by IBM's computer program Deep Blue by a score of 2.5–3.5 (1 win, 2 losses and 3 draws). The victory of the computer program marked a new era in the history of chess.

AlphaGo matched against World Go master Lee Se-dol.

On March 9 to 15, 2016, in a five-game match between AlphaGo and the world Go champion Lee Se-dol, a 9-dan professional player, Alphago defeated Lee by a score of 4 to 1. It was generally acknowledged by the Go community that the ability of AlphaGo had exceeded the top level of human professional players. The result

of this human-machine competition subverted the world's perception of AI, and AI entered a period of rapid development.

The development of AI has been related to chess. In 1936, Alan Turing, father of AI, wrote a paper *Computable Numbers* (published in 1937), in which he proposed "computation" and described programmable computing machine for the first time. It is recorded that he referred to chess rules (the chess rules were clear) when he was thinking about the meaning of "computable numbers". In theory, they could be used in conceptual program computing machines, but as there was no programmable computer at that time, the Turing system wrote down the Go rules. It 49 years from Turing's chess program in 1948 to Deep Blue's victory over Kasparov in 1997. Then, 19 years later, AlphaGo defeated Lee Se-dol in 2016. The past 60 years (or 80 years since Turing studied the Go rules in 1936, exactly 80 years) have seen the new development and continuous progress of AI. And we can see that **the research and development of AI has always been related to chess.**

Why has Deep Blue and AlphaGo become milestones in the development of AI? Why did chess become objects of study of AI? I guess it's probably because Go is a human intellectual activity. And Go, in particular, is the crystallization of human wisdom. AI is simply an intelligent machine that responds in a similar way to human intelligence. It is inspired by the results of brain science research and specializes in the science of brain intelligence. AI is to enable machines to listen, speak, think and judge. The victory of machine shows that the development and progress of AI, which is closer to human thinking. This may be the reason why AI researchers always use the study of chess to promote the development of AI. As a result, Deep Blue and AlphaGo have become milestones in the process of AI development.

Extended Reading: The Thinking of Go:

Go is a traditional board game originating in China and it has a long history. Go is also a game that requires advanced intellectual activity. According to the FMRI study on the brain mechanism of Go for the first time in the world, it is found that there is a certain right hemisphere advantage in playing Go, which is obviously different from left hemisphere advantage when playing chess. In addition, the general intellectual area of the frontal lobe of the brain does not show strong activation. This surprising result suggests that general intelligence may not play an important role in the layout phase of Go, which means that playing Go may be more dependent on human specific intellectual activities. Nature.com published a special review on this topic, introducing the corresponding research results. This achievement was selected as the outstanding achievement of the National Natural Science Foundation of China in 2003 and the significant achievement of the Chinese Academy of Sciences.[5]

[5]Hefei National Laboratory for Physical Science (2004).

3 AI—A National Strategy

Just like the steam engine in the industrial age and the Internet in the information age, AI plays a vital role in the intelligent age, becoming the foundation to support and guide human society from the information age to the intelligent age. Since 2013, major countries in the world, including China, the United States, the United Kingdom, Germany, Japan and France, as well as the European Union have successively made the development of AI a national strategy.

3.1 China: One of the Earliest Countries to Formulate AI Development Plans

On July 8, 2017, the State Council of China issued ***the Development Planning of New Generation Artificial Intelligence*** (hereinafter referred to as *the Planning*). Thus, China became the second country in the world to formulate and issue AI development planning in the name of the government.

Why did the Chinese government attach so much importance to the development of AI and make it a national strategy?

It was stated in *the Planning* that "The rapid development of AI profoundly changed the human social life and the world. In accordance with the requirements of the CPC Central Committee and the State Council, this Planning is formulated to grasp the strategic opportunity for AI development, gain the first-mover advantage, and build China into an innovation-driven country and a world technology superpower."

According to the Planning of the State Council, China will develop AI in three stages:

Stage 1: By 2020, the overall AI technology and application will reach the world advanced level. The AI industry will become a new important economic growth point, and the application of AI will become a new way to improve people's livelihood and an effective means to realize the objectives of building an innovation-driven country and a moderately well-off society in an all-round way.

The new generation AI theory and technology will achieve great progress, especially in fundamental theories and core technologies of big data intelligence, cross-media intelligence, crowd intelligence, hybrid-augmented intelligence and autonomous intelligence systems. There will be remarkable achievements in AI model methods, core devices, high-end equipments and basic software.

China will have one of the most competitive AI industries in the world. Fundamental AI technical standards, AI service system and AI industrial eco-chain will be developed. There will be several world-leading AI enterprises in China. The scale of AI core industry will exceed 150 billion yuan, leading the scale of related industries to exceed 1 trillion yuan.

The environment of AI development will be further optimized. Efforts will be made to promote innovative applications in key fields, and to gather a group of high-level talents and innovation teams. Codes of ethics, policies and regulations of AI in some areas will be preliminarily established.

Stage 2: By 2025, great breakthroughs will be made in AI fundamental theory. Some AI technologies and applications will reach an internationally advanced level. AI will become a major driving force for industrial upgrading and economic transformation in China. Significant progress will be achieved in building an intelligent society.

The new generation AI theory and technology system will be preliminarily established. Breakthroughs will be made in AI capable of autonomous learning, leading to important research results in many areas.

China's AI industry will move up higher in the global value chain. The new generation AI will be widely used in intelligent manufacturing, intelligent medical, smart city, intelligent agriculture, the building of national defense and other fields. The scale of AI core industry will exceed 400 billion yuan, leading the scale of related industries to exceed 5 trillion yuan.

Laws and regulations, codes of ethics and the policy system concerning AI will be preliminarily established, so as to realize the security assessment and control of AI.

Stage 3: By 2030, the theory, technology and application of AI will reach an internationally advanced level in general. China will become a globally important AI innovation center, and remarkable results will be achieved in terms of intelligent economy and intelligent society, laying a solid foundation for China to rank among the top innovation-driven countries and economic powers.

A relatively mature new generation AI theory and technology system will be established. Great breakthroughs will be made in brain-like intelligence, autonomous intelligence, hybrid intelligence and crowd intelligence, which will have an important influence on international AI research and become one of the leading countries in AI technology.

The competitiveness of China's AI industry will take a leading position in the world. The application of AI will be greatly expanded in social governance and national defense both at a broader and deeper level, forming a complete industrial chain and high-end industrial cluster that includes the core technology, key system, support platform and intelligence application. The scale of AI core industry will exceed 1 trillion yuan, leading the scale of related industries to exceed 10 trillion yuan.

A batch of world leading AI innovation and talent training bases will be set up, and more perfect laws, regulations, codes of ethics and policy system of AI will be formulated.

3.2 United States: White House Issues Strategic Planning for AI Development

The United States has been playing a leading role in the field of AI in the world, and its government has played an important role in supporting the AI development and intelligent robots.

In 2013, the US government invested $2.2 billion of the national budget in advanced manufacturing industry, and the National Robot Program was among the main investments.

In April 2013, the US government launched the innovative BRAIN Program with a 10-year investment of $4.5 billion.

In May 2016, the White House established the AI and Machine Learning Committee to coordinate actions in the field of AI across the United States and to explore the formulation of policies and laws related to AI.

In October 2016, the White House released two reports—*Strategic Planning of National AI Research and Development, Preparing for the Future of AI*, making AI a national strategy, defining strategies for state-funded AI research and development, and identifying seven long-term strategies in the field of AI. These long-term strategies include: making long-term investments in AI research; developing effective methods for human-AI collaboration; understanding and addressing the ethical, legal and social impacts of AI; ensuring the security of AI systems; developing shared public datasets and environments for AI testing; measuring and establishing standards and benchmarks for AI evaluation; Better understanding the demand of national AI R&D talents.

In October 2016, the report *A Roadmap for US Robotics—From Internet to Robotics(2016 Edition)*, sponsored by the National Science Foundation and others, was released, recommendations on research innovation, technology and policy in order to ensure that the United States will continue to take the lead in the field of robotics.

In December 2016, the White House released a report saying that the era of AI was coming, urging members of Congress to try to prepare the US economy for the new era. The number of jobs threatened by AI, for example, would be between 9 and 47% in the next 10–20 years.

On February 11, 2019, the Office of Science and Technology Policy released ***the American Artificial Intelligence Initiative*** which was signed by President Donald J. Trump. Its main purposes include: AI is expected to promote US economic growth, enhance economic and national security, and improve people's livelihood. The United States is a global leader in AI research and development. The sustained leadership of the United States in AI is critical to maintaining the United States economy and national security and shaping the global evolution of AI in a manner consistent with 'US's values, policies and priorities.

3.3 Key Strategies of AI Development in Major Countries of the World

The United Kingdom	In October 2016, the Science and Technology Committee of the House of Commons released a report *Robotics and Artificial Intelligence*, calling on the government to intervene in regulation and establish leadership mechanism. The UK government's Science Office has released a report *Opportunities and Impact of Artificial Intelligence on Future Decisions*, saying it will take the unique advantage of its AI to strengthen the national power of UK
	In January 2017, the British government announced the "Modern Industrial Strategy", stating that an additional £4.7 billion of research and development funding would be spent on AI, "intelligent" energy technology, robotics and 5G wireless. In March, the British government announced its digital strategy, which included assessment of AI to determine how the government and businesses would provide further support
	In October 2017, the British government released the report *Growing the AI Industry in the UK*, which analyzed the current application, market and policy support of AI. This report also put forward some important action suggestions to promote the development of British AI industry from four perspectives, namely, data access, personnel training, application of research results and industry development. This report was later included in the UK government's *2017 White Paper on Government Industry Strategy Guidance*, becoming an important guide to AI development in the UK
	In April 2018, the British government released *AI Sector Deal*. With an aim to promote Britain to become a global leader in AI, this *Deal* involved the topic of promoting research and development by governments and companies, investing in STEM education, upgrading digital infrastructure, cultivating AI talents, and leading global digital ethics exchanges
Germany	Germany's support for AI and intelligent robots was mainly reflected in the *Industry 4.0 Project*, involving machine perception, planning, decision-making and human-computer interaction, which were the key research directions of AI technology In 2012, the German government issued 10 future high-tech strategic plans, among which *Industry 4.0,* focused on "smart factories", was one of the important plans. *Industry 4.0* gave support to technologies such as AI, industrial robots, the Internet of Things, cloud computing, big data, 3D printing, and so on. Both German Ministry of Economy and Ministry of Teaching and Research provided great support to the research of AI, respectively laying emphasis on practical application and scientific research
	In 2015, the German Ministry of Economy launched *the Smart Data Project,* which funded 13 projects with tens of millions of euros, and AI was one of the key projects

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	In October 2016, the German Committee of Experts on Research and Innovation, set up by the German government, launched an annual study report, recommending that the government develop robot strategy
	In July 2018, the German federal government issued a document entitled *Key Points of AI Strategy of Federal Government,* urging the federal government to increase its funding to research and development and innovation transformation in key areas related to AI and to strengthen its cooperation with France in AI development. The document also stressed the importance of strengthening the construction of AI infrastructure so as to upgrade the country's R&D and application of AI to the world leading level. The German government planned to officially launch a national AI development strategy by the end of 2018
Japan	In January 2015, Japan issued the *New Strategy for Robots*, putting forward three core goals: Building World Robot Innovation Base Being the Best Robot Application Country in the world, and Walking towards a New Era of Robots in the World. A five-year plan was also formulated
	In May 2015, the Japan Association for the Promotion of the Robot Revolution was officially established. At the same time, the Japanese government planned to invest 1 billion yen to set up an "AI Research Center" in Tokyo, focusing on the development of AI-related technologies. In September, the Ministry of Economy, Trade and Industry, the Ministry of Education, Culture, Science and Technology and the Ministry of General Affairs planned to work together to set up a "Project Promotion Committee" to actively promote AI research
	In January 2016, in its fifth five-year plan for the foundation of science and technology, the Japanese government put forward a vision for a future society called a "super intelligent society" to develop information technology, AI and robotics
	In May 2016, the Japanese government formulated a plan for the Advanced Comprehensive Intelligent Platform (AIP), which integrated AI, big data, Internet of Things and network security to provide support to researchers carrying out innovative research. The Japanese Government Conference on Industrial Competitiveness summarized the drafts of growth strategy, focusing on the use of robots and artificial intelligence to improve productivity
	In October 2016, the Japanese government held a "Conference on the Thorough Promotion of Structural Reform" to step up the transformation of cutting-edge technological achievements such as AI and robotics

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	In 2017, the Japanese government formulated a roadmap for AI industrialization, planning to promote the use of AI technology in three stages so as to significantly improve the efficiency of the manufacturing, logistics, medical and nursing industries. In the first stage (around 2020), unmanned factories and unmanned farm technology will be developed; the use of AI in drug development support will be popularized; and faults of production equipment will be predicted by AI In the second stage (from 2020 to 2030), the complete unmanned transportation and distribution of personnel and goods will be realized; multi-functional robots and robot coordination will be realized; personal-targeted drug development will be successful; home appliances will be controlled by AI In the third stage (after 2030), care robots will become a member of families; the automated and unmanned mobiles will be popularized and they will "reduce man-made deaths to zero percent"; and "what you want" will be visualized by analysis of potential consciousness through AI
France	In May 2018, French President Macron announced France's AI strategy, aiming to welcome a new era of AI and make France an AI power. The report of *Strategy of AI in France and Europe*, which took seven months of research, was also released, pointing out that AI development in France would focus on four priorities: health, transportation, environment, and defense and security The France's AI strategy includes four important aspects: first, to consolidate and perfect the AI ecosystem of France and Europe; second, to implement the data opening policy; third, to adjust the investment and regulatory framework of France and Europe. The fourth is to identify ethical and policy issues related to AI
The European Union	In January 2013, the European Union selected *the Human Brain Project* as one of the flagship projects of emerging technologies in the future, laying the technological foundation for a new ICT-based research infrastructure for brain research, so as to accelerate the transformation of neuroscience research results
	In December 2013, the European Commission, in cooperation with the European Robot Association, completed the SPARC project to fund robot innovation. By 2020, the European Commission will invest 700 million euros, increasing the annual output value of the European robot industry to 60 billion euros. Its share of the global market will be increased to 42%
	In December 2015, SPARC released a multi-year roadmap for robotics, providing a common framework for describing robotics in Europe and setting a set of goals for market-related technology development. The European Union prepared in advance for AI legislation. In June 2016, it took the lead in AI legislation, arguing that AI robots should also be bound by the law, which meant robots should pay taxes in accordance with the law and robots also enjoy pensions

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	In May 2016, the Legal Affairs Committee of the European Parliament issued *Draft Recommendations to the European Commission on Civil Law Rules on Robots.* In October of the same year, the *Civil Law Rules on Robots* was issued, paying close attention to the legal, ethical, and liability issues of AI. It is suggested that the European Union set up a special agency to supervise robots and AI and formulate AI codes of ethics, giving robots legal status and clarifying AI intellectual property rights. The European Union has been in the forefront of the world in the study of AI ethics and laws, and has become a well-deserved leader in this area
	In April 2018, the European Commission issued a policy document called *AI in EU,* which suggested that the EU would promote AI development from three perspectives: increasing financial support and encouraging the use of AI in public and private sectors; upgrading education and training systems to adapt to the changes brought about by AI in employment; studying and developing codes of ethics for AI and establishing an appropriate moral and legal framework

References

Nilsson NJ (April 15, 1998) Artificial Intelligence: A New Synthesis, Morgan Kaufmann Publishers Inc., 1 edn (United States)

Hefei National Laboratory for Physical Science at Microscale, briefing, issue 6, 2004

Chapter 2
Application of AI in Judicial Practice

1 The Application of AI in Judicial Practice—The Need of the Times

At present, as we live in an era of AI, it is necessary to respond to people's demands for judicial impartiality through AI and other modern technologies. With the integration of science and technology, judicial impartiality will be better guaranteed so that it can better serve the economic and social development.

1.1 The Application of AI is the Requirement of Judicial Development

Judicial development has its own strong demands for modern technology. As Zhou Qiang, President of the Supreme People's Court of China once said: "Just like wheels to a vehicle and wings to a bird, judicial reform and informatization are two indispensable factors to the country's judicial cause." The application of technologies to judicial practice is conducive to the improvement of judicial capacity and the realization of justice in an efficient way.

On the one hand, technology is the key to solving judicial difficulties. For example, in recent years, with the increasing number of cases accepted by the people's courts, the contradiction between the large number of cases and the limited number of judges has become one of the major bottlenecks affecting and restricting the development of people's courts. To overcome this prominent difficulty, Shanghai Court integrated AI technology into the 12368 (Judicial Service Hotline), serving the masses in **an all-round, all-day manner without any distance and barriers**, thus effectively solving the **difficulties people face in contacting judges, case inquiry and litigation consultation**.

Y. Cui, *Artificial Intelligence and Judicial Modernization*,
https://doi.org/10.1007/978-981-32-9880-4_2

On the other hand, science and technology are good tools to guarantee justice. Currently, cases in which people are unjustly, falsely or wrongly charged or sentenced still exist and they reflect injustice. They are one of the main problems affecting the judicial credibility and authority. In order to effectively prevent the occurrence of these cases, we have developed Shanghai AI Assistive System for Criminal Cases, through which evidence can be checked, examined and verified, and flaws in the evidence and the contradiction between the evidence could be discovered in time, thus effectively avoiding the occurrence of cases in which people are unjustly, falsely or wrongly charged or sentenced from the very beginning. In this way, judicial corruption is prevented and justice is guaranteed.

1.2 The Possibility of the Application of AI in the Judicial Practice

In the era of AI, the rapid development of modern science and technology such as Internet, big data, cloud computing and artificial intelligence has provided more possibilities for the deep application of modern science and technology such as AI in the judicial field, and injected scientific and technological power into judicial activities. Especially in recent years, AI has presented new features such as deep learning, transboundary integration, human-machine collaboration, crowd intelligence and the like. Legal information retrieval system and legal expert system have been widely used, laying a technical and empirical foundation for the application of AI in the judicial practice. At the same time, with the remarkable progress of AI algorithms represented by deep learning in the field of image recognition and speech recognition, it is no longer far to realize "digital rule of law" and "intelligent justice" by using AI technologies such as machine learning. For example, the improvement and iteration of deep learning algorithm pushes the application of AI in the judicial practice to a deeper level. Multi-source, multi-type, real-time and massive judicial data make the description of judicial activities more vivid and comprehensive.

1.3 Many Countries in the World have Applied AI in Judicial Practice

With the development of modern technologies such as AI, many countries in the world are actively studying and exploring ways to apply AI in judicial practice.

(1) **The United States**. In the United States, AI is continuously being applied in judicial activities. According to a report, on June 6, 2017, judges of the San Diego Superior Court of California proposed to the Congress that Chatbots be widely used in courts to assist judges and promote court building. The main contents of the proposal are as follows: Firstly, Chatbots can be used to promote

judicial openness and improve services. The proposal held that Chatbots could undertake simple daily work of courts and they could serve the public well. The use of Chatbots would improve the efficiency of the court work and save judicial resources. Secondly, Chatbots can be used to assist the court in its daily work. Currently, some courts in California have used robots for their daily work. For example, some courts use this technology in hotlines to answer simple advisory questions, and transmit daily work information. Thirdly, the division of work of the court could be optimized. Courts use robots to do simple and repetitive work, so that judges could focus on more complex work, which is conducive to changing the traditional concept of work, to achieve the benign cooperation between judges and robots.

(2) **The United Kingdom**. The British Association of Law and Computing put forward proposals and plans for building online courts to the British government. The online court system focused on "dispute resolution", "dispute control" and "dispute prevention" to realize the combination of ADR (Alternative Dispute Resolution Mechanism) and EDR (Early Dispute Resolution Mechanism). The University of Sheffield in the United Kingdom has released a new AI system, which can help to handle legal cases and predict the results with an accuracy rate of 79%. Imperial College of the University of London has successfully conducted the man-machine dialogue in the practice of nationality law with the help of the reasoning function of PROLOG program language. Hodge Jones & Allen, a London-based law firm, had long been using a "case outcome prediction model" to assess the likelihood of success in personal injury cases. This led directly to the Jackson civil litigation reform in 2013, which greatly reduced the litigation costs of personal injury cases.

(3) **The European Union**. The communication *Building a European Data Economy* of the European Commission was aimed at removing barriers to cross-border access to and sharing of data. This communication includes a provision allowing the free flow of non-personal data. Under the premise of complying with the Competition Law, the European Commission can facilitate the sharing of data among European companies. The European Commission of Legal Affairs submitted a motion requesting the European Commission to identify at least the most advanced automated robots as "electronic humans" and to grant them "specific rights and obligations". The motion also recommended the establishment of a register for intelligent automated robots to open financial accounts covering legal liabilities for these robots. The European Union was committed to giving AI legal and ethical status to help AI better serve the judiciary and the public.

(4) **Japan**. In Japan, traffic accidents caused by self-driving technology are not uncommon, which puts forward new requirements for the formulation of laws and policies. Gen Goto, associate professor of the Department of Law and Political Science at the University of Tokyo, raised **the issue of legal regulation of self-driving vehicles**, providing systematic knowledge support for the development of AI technology and its corresponding legal theory and practice.

2 The Application of AI in Judicial Practice in China

After several years' efforts, the development of application of AI in the law enforcement and judiciary is much faster than people expected. The construction of **"Intelligent Courts", "Intelligent Procuratorial work" and "Intelligent Public Security"** has been further promoted, assisting judicial staff in handling cases in an all-round and integrated way. The integration of them into comprehensive social governance, social security management and service has greatly improved the quality and efficiency of justice and the level and efficiency of comprehensive governance, management and service.

2.1 Incorporating AI into National Planning

In China, the application of AI in the judicial practice has been incorporated into national planning and has become an important part of the national strategy.

In July 2016, *the Outline of the National Informatization Development Strategy* issued by the Chinese government incorporated the construction of the "Intelligent Courts" into the national informatization development planning, making it clear that efforts should be made to construct "Intelligent Courts" to improve the level of informatization in all steps of judicial practice, including the acceptance, trial, execution, and supervision of cases.

In July 2017, ***the Development Planning for the New Generation Artificial Intelligence*** issued by the Chinese government put forward specific requirements for the application of AI in the judicial practice:

"Efforts should be made to promote the application of AI in public administration, **judicial management**, urban management, environmental protection and important areas in social governance, thus **promoting the modernization of social governance**."

The Development Planning clearly states in "*3. Building a Safe and Convenient Intelligent Society*" that "**The Building of Intelligent Courts** is to establish a data platform which integrates judgment, personnel, data application, judicial openness and dynamic monitoring to promote the application of AI in evidence gathering, case analysis, reading and analysis of legal documents so as to **make the judicial system and judicial capability more intelligent**."

2.2 Obvious Effects of AI Application

The effects of AI application are mainly reflected in the following aspects:

The first is perceptual intelligence. It mainly covers speech comprehension, visual recognition and even emotion recognition. For example, a large number of speech recognition systems have been incorporated into judicial, procuratorial and

public security systems all over the country to improve the quality and efficiency of the production of interrogation or trial transcripts.

The second is cognitive intelligence. It mainly includes the use of knowledge maps and natural language processing capabilities. For example, cognitive intelligence is used by public security organs in public security management, traffic management, and large-scale security.

The third is computational intelligence. Based on big data, cloud computing is used to improve the use of data computing applications. For example, the judicial organs use AI to provide social risk assessment and sentencing reference.

The fourth is decision intelligence. The problems in practice are transformed into data models and solved by optimal algorithms. For example, the public security organs analyze the problems existing in the law enforcement and make special management modules as well as setting up early warning red line for related problems to prevent similar situations from happening again. In addition, relying on the judicial database, the judicial organs set up a big data analysis platform to analyze the trends and situations of trial operations from the massive trial data, in order to discover the rule of trial operation, and make a special analysis report, thus promoting the scientific decision-making of the court, improving the social governance and contributing to social and economic development.

2.3 Construction of Intelligent Courts

In 2015, the Supreme People's Court of China set the goal of constructing "Intelligent Courts".

In April 2018, both the report issued by the Supreme People's Court of China and the third-party evaluation report showed that "Intelligent Courts" had been preliminarily constructed, with intelligent assistance functions such as intelligent guide in the filing stage, voice transcription in the court proceedings, automatic generation of documents in the trial process.

At present, the application of AI in the court system of China is mainly reflected in the following three aspects:

Firstly, AI is used to assist document processing. Legal documents can be processed through AI, such as voice transcription in court, judgment generation, etc. The indictment and judgment can be automatically generated: some court platforms, such as Hangzhou Internet Court, can use AI to automatically generate the indictment and judgment. The parties only need to input relevant materials, and they can quickly generate indictments through intelligent platforms. After the court's judgment, the platform can automatically generate part or all of the written judgments, greatly improving the efficiency of judges.

Secondly, AI is used to assist trial transcription. In the past, the clerk needed to make a large number of written records of the statements of the parties in the course of trial proceedings. At present, some courts have begun to apply the intelligent voice

conversion system in the trial proceedings to assist the recording of the clerk in order to reduce the workload of the clerk.

Thirdly, AI is used to assist the handling of cases. Based on big data, machine learning and other technologies and through learning a large number of cases, AI assistive systems learn to extract and verify the evidence information and predict results of the case judgment, providing reference for the judge's decision. AI assistive systems standardize the judgment process, improve the consistency of judgment, reduce the occurrence of cases in which people are unjustly, falsely or wrongly charged or sentenced, and enhance the public credibility of the judiciary.

Fourthly, AI is used to assist judicial services. The courts provide legal advice to the public through intelligent customer service robots, AI or other entities. There are some We chat official-account robots such as the "Legal System Canghai" of Xiamen Court, "Xiao 3i" of Shenzhen International Arbitration Court, etc. and some entity robots such as the "Nan Xiao Fa" of Shenzhen Nanshan Judicial Bureau and so on. The technology of intelligent consulting is the same as the technology used in the intelligent customer service of law firms and legal consultation of clients. There are also robots such as Fa Gougou providing intelligent customer service to the public, law firms, and courts.

2.4 Construction of "Intelligent Procuratorial Work"

Aiming to establish the overall framework of Intelligent Procuratorial work featuring "intelligent case handling covering all businesses, intelligent management of all elements, all-round intelligent service, and intelligent support in all fields", the Supreme People's Procuratorate of China proposed the construction of intelligent procuratorial work with an emphasis on the development of "three major systems", namely, the theoretical system, the planning system, and the application system. Explicit goals have been set. By the end of 2020, the new generation of information technology should be fully utilized to promote procuratorial work from informationization to intellectualization and to develop key applications of intelligent procuratorial work. By the end of 2025, the development goal of intelligent procuratorial work will be achieved in an all-round way, relieving workload by using machines, and increasing efficiency with intelligence, thus creating a new procuratorial work mode and management mode.

Procuratorial organs in Beijing, Hangzhou and other places have explored the operation of Assistant Systems of Sentencing Recommendation, in which the data of courts' sentences can be inducted, analyzed and intelligently studied through intelligent capture of case facts, statutory and discretionary sentencing circumstances and other structured data, providing a reference for the procuratorial organs on sentencing and serving as a supervision of trials.

2.5 The Construction of Intelligent Public Security

To meet the needs of the development of times and the social governance, the public security system actively carries out the construction of "Intelligent Public Security". With the informatization of public security as the core, and supported by modern technologies such as the Internet, the Internet of Things, cloud computing, intelligent engines, video technology, data mining, and knowledge management, this construction aims at promoting the high integration and coordinated operation of various functional modules of the public security system and realizing the "full integration, sharing and deep application" of police information in an interconnected, Instrumented and intelligent manner. The application of AI has brought profound changes to public security work. The changes are mainly reflected in following aspects:

First, AI will change the pattern of investigation and handling cases of public security organs. With the in-depth development of informationization and big data, the modern investigation mode featuring "data plus intelligence" has been continuously developed and improved. AI has been speeding up the "intelligent transformation" of the traditional investigation and case handling mode both in theory and practice. What's more, AI technologies such as face recognition, iris recognition, and gait recognition will profoundly change the way in which public security organs arrest criminal suspects. The AI system, which integrates the functions of crime tendency analysis, case feature analysis and others, can automatically collect all kinds of information and intelligently analyze relevant data, thus, making the investigation and handling of cases more efficient and intelligent.

Second, AI will change the patrol, prevention and control of crimes of the public security organs. Data are used to promote intelligent pre-judgment and early warning. By fully integrating the information of case occurrence and case cracking, intelligently analyzing location and period of high incidence of cases, automatically indentifying important areas and key periods of public security precautions, public security organs can adjust the deployment of police force and the focus of prevention according to needs, thus achieving intensive police use for precision patrol, prevention and control. In this way, the intrinsic value of massive data resources can be intelligently and deeply explored. The new model of intelligent patrol, prevention and control, with big data intelligent application as the core, will effectively improve the intelligent capability of public security organs.

Third, AI will change the information early warning pattern of public security organs. From the social governance of "self-driving" vehicles to the "urban data brains" that control traffic lights intelligently, from using machines to save the man power to increasing efficiency with intelligence, public security organs need to explore and practice the way of modern police which integrates tradition and science and technology, thus further improving the intelligent application of data, making information collection faster , data integration more efficient and information

research more intelligent. The concept of intelligent information study and judgment in the era of "AI Plus" will further enhance the ability of public security organs to predict, issue early warnings of and prevent various potential risks.

2.6 The Xue Liang Project

In recent years, efforts have been made to carry out the "Xue Liang Project" in social governance, to promote the integration and deep application of basic information resources in public security and contribute to the building of a safe China. The so-called "Xue Liang Project" refers to the networking application of public security video surveillance construction, which aims to promote the construction of "whole coverage, network-wide sharing, full-time available, full-process controllable" video surveillance systems in key public areas and key industries, guide and supervise the construction of public security video surveillance systems in key security units, and promote the construction of public security video surveillance systems, integrate all kinds of video and image resources, and develop the application of video and image information in the fields of public security prevention and control, urban and rural social governance, intelligent transportation, serving people's livelihood, ecological construction and protection.

3 The Pioneering Work of Shanghai Court in Building Intelligent Courts

Shanghai Court has established the "**Big Data**" strategic thinking and implemented "**One strategy, Two actions**": Big Data Strategy, "Internet Plus" Action, and "AI Plus" Action.

In 2014, the Shanghai High Court formulated the *Three-Year Plan for Informatization Construction (2014–2016)*; in March 2016, it formulated the *"Data Court" Construction Plan (2017–2019)* (Shanghai High Court [2016] No. 318, the second three-year plan), setting the goal of building **"Data Courts" and "Intelligent Courts"**, establishing and implementing the Big Data Strategy, Internet Plus Action, AI Plus Action. The formulation and implementation of the two three-year plans **marked that Shanghai's informatization construction has entered a new stage—the era of big data, moving from being online to being intelligent**, greatly improving the modernization of the judicial system and judicial capability of Shanghai Court.

The Big Data Information System of Shanghai High People's Court

The intelligence of this system is specifically embodied in following aspects.

3.1 The Big Data Trial Assistive System has Helped to Realize Intelligent Handling of Cases

We have fully utilized the big data, the Internet, AI and other technologies to establish the "Shanghai Court Big Data Trial Assistive System", which consists of 35 subsystems, including AI assistive system for handling cases, AI assistive system for judgment documents, AI terminal APP for handling cases and AI trial system. The System has become indispensable in judges' work, as it provides a diversified, full coverage and convenient intelligent service for judges.

3.2 The Big Data Judicial Openness System Helps to Realize Justice in a Visible Way

We have fully utilized the new technologies of AI such as natural language understanding, machine learning, and graphic and text recognition to create 12 Judicial Openness Service Platforms with characteristics of Shanghai Court, establishing a comprehensive, multi-level, interactive, and intelligent Judicial Openness System. By making justice visible, tangible and measurable, this system guarantees the people's right to know, to participate, to express and to supervise. Up till now, Shanghai Court has disclosed 830 information items in 112 aspects to the public with more than 235 million pieces of information being released.

3.3 The Big Data Litigation Service System Provides an All-Round, Convenient and Barrier-Free Intelligent Service

Adhering to the fundamental purpose of exercising judicial power for the people and the principles of "taking difficulties on ourselves and making things easy for the people", we make full use of modern technology to deal with the problems and difficulties people face. We created "three business cards" of the litigation service with Shanghai characteristics and solved the difficulties people face in litigation.

First, a digital, networked and intelligent "Shanghai Court Litigation Service Center" has been established to provide one-stop, comprehensive and intelligent services for the parties concerned. It has effectively solved the prominent difficulties, making it convenient for parties concerned to consult attorneys, solving difficulties in case filing and enforcement. Thus, we have achieved the goal of "providing all litigation and non-litigation services except trial by the litigation service center". At present, Shanghai Court Litigation Service Center receives an average of 3680 people per day.

Second, a digital, online and intelligent "Shanghai Court 12368 Litigation Service Intelligent Platform" has been established, and AI technology has been incorporated into the platform to serve the people in an **all-round, all-day, convenient and barrier-free** manner. It has effectively solved many difficulties people face, such as **the difficulties in contacting judges, inquiring cases and receiving litigation consultation** and so on. Since the operation of the platform, a total of 4.96 million litigation services have been provided for an average of 3000 people per day. And the satisfaction rate of the people has reached 99%.

Third, a digital, online, intelligent, cross-regional "Shanghai Court Lawyer Service Platform" has been established. Through the combination of the Internet, AI and lawyer services, **lawyers can complete litigation without leaving their homes**. It greatly facilitates the practice of lawyers and is very popular with them. On August 2, 2017, the platform was opened to lawyers throughout the country, realizing cross-regional litigation services.

3.4 Big Data Management System Helps to Realize Visual and Intelligent Court Management

Shanghai Court Intelligent Management System includes 30 subsystems and covers every aspect of court management, including trial process management, trial quality management, court administration, court team management, court security management and others, thus realizing the modernization of court management.

3.5 Big Data Judicial Analysis System Leads to Scientific and Intelligent Judicial Decision-Making

Big data, "Internet Plus" and "AI Plus" are the driving forces of scientific decision-making, and judicial big data is **the strategic resource** of judicial decision-making. Relying on the judicial database, Shanghai Court has established 7 big data specific analysis platforms including case trial trends, financial fraud crimes, P2P financial crimes to analyze and discover the rule of trial from the massive trial data, promote scientific decision-making of the courts, improve social governance and contribute to social economic development. At the same time, through the combination of AI and judicial analysis, the country's first "Innovative Judicial Think Tank" of provincial courts has been established, and the "Shanghai Judicial Think Tank Website" has been created, giving full play to the role of judicial think tanks and providing intellectual support to the modernization of courts.

The work of Shanghai Court has been fully informationized.

The informatization of Shanghai Court has entered the era of big data.

On February 6, 2017, Meng Jianzhu visited the 12368 Litigation Service Center of Shanghai Court.

Chapter 3
AI—An Effective Way to Judicial Modernization

At present, as AI is widely used in every aspect of society, it is profoundly changing the world. AI not only promotes the development and progress of the society, but also **provides a rare opportunity to realize judicial modernization**.

1 Preliminary Theories on the Application of AI in the Judicial Practice

Leibniz, one of the pioneer thinkers in computer science, once described the relationship between reasoning and computation as follows: "We want to produce such a result that all reasoning errors become only computational errors, so that when an argument arises, two philosophers, like two calculators, do not have to argue. As long as they hold the pen in their hands and sit down in front of the abacus, and two people say face to face 'Let's do the calculation!'"[1] If even abstract philosophical reasoning can be transformed into computational problems to be solved, then the quantification of judicial reasoning will inevitably be realized. AI is the simulation of the information process of human consciousness and thinking, including the ability of learning, thinking, language, analysis and judgment. The application of artificial intelligence in the judicial field is an effective way to realize the quantification, refinement and standardization of judicial reasoning, and to make judicial activities more scientific, fair, standardized and efficient. In particular, the development of legal theories such as formalism and realism and the proposition of an eclectic theory have laid a more solid theoretical foundation for the application of AI in the judicial practice.

[1] Scholz (1977).

Y. Cui, *Artificial Intelligence and Judicial Modernization*,
https://doi.org/10.1007/978-981-32-9880-4_3

1.1 The Characteristics of Judicial Activities Provide the Basic Premise for the Application of AI

The essence of judicial activities is the application of law. The characteristics of judicial activities provide foundation and premise for the application of AI in the judicial practice[2]: Firstly, although the legal reasoning is very complicated, the relatively stable object (cases), clear premise (legal rules and facts), strict procedures and definite judgments of judicial activities provide extremely favorable conditions for AI simulation. Secondly, legal reasoning, especially the judicial reasoning in the adversarial system, with its clear rules, rational standards and full debate, it provides a sample for recording and playback to observe the details of thinking activities. Thirdly, the accumulation of legal knowledge and complete archives provide rich and accurate information for incorporating AI in judicial activities and simulating the acquisition, expression and application of legal knowledge. Fourthly, the unique self-awareness and self-criticism of legal activities, along with the tradition of testing legal procedures and hypotheses, provide a good reflection opportunity for simulating legal reasoning.

1.2 Legal Formalism Provides Theoretical Basis for the Application of AI in the Judicial Practice

Originating in ancient Rome, legal formalism is a kind of legal thought that highlights the importance of logic. Its core idea is to firmly believe that the legal system is a closed self-contained conceptual system of logic, following the logical reasoning model of syllogism. In other words, it sets legal norm as the major premise and specific case facts as minor premise, and then deduces judgment.[3] According to this theory, a machine can draw a fair verdict as long as it obeys the logic of legal reasoning. Although this theory is criticized by phenomena such as vending machines,[4] the mechanical interpretation of legal reasoning by legal formalism provides a possible theoretical premise for the judicial application of AI in the sense that AI is a mechanical interpretation of thinking. In the initial stage of the development of judicial application of AI, AI experts chose to simulate with syllogistic deductive reasoning. In the early 1970s, American Walter and Bernhard developed a legal

[2] Baosheng (2001a).

[3] As British jurist J. Austin put it, "the so-called 'rule of law' requires that the conclusion must be the logic result of major premise and minor premise." If the judge violates the logic of syllogism, it undermines the rule of law. Zhu Jingwen, The Challenge to Western Legal Tradition, China Procuratorate Press, February 1996, p. 292.

[4] The vending machine critique of law means that the entire legal operation is like a "machine tool". As long as the materials provided, certain products will be produced. For example, German jurist Savigny has said that "the Roman jurists' methodology has a certain certainty that is exclusive to methematics. It is no exaggeration to say tht they are using their concepts to calculate".

reasoning system,[5] in which computers described syllogism in the way of "if A and B, then C", making machine legal reasoning turn from theory to reality for the first time.

1.3 Legal Realism Provides Theoretical Support for AI T0 Simulate Judge's Thinking

Legal realism is a movement of legal reform in the first half of the twentieth century in the United States. It challenges the traditional legal methods from the opposite side. It advocates that legal methods must introduce the measurement of social interests into the legal reasoning. It can be said that legal formalism neglects the sociality of the subject of reasoning. Judges are people who live in the real society, and it is impossible for them to engage in legal activities without being influenced by their social experience and modes of thinking. Instead of following the rules mechanically, judges tend to make some value choices in the actual trial practice, especially in complex cases. Once faced with the value choices, the reasoning logic of legal formalism shows its fatal weakness of rigidity. A famous saying by American jurist Oliver Wendell Holmes Jr. goes "The life of law lies not in logic but in experience."[6] The emphasis of legal realism on the subjective initiative and flexibility of legal reasoning of judges promotes the study of AI from simulating the external logical form of legal reasoning to summing up the regularity and universality of judicial experience and exploring the internal thinking structure of judges. The development of large-scale knowledge base system (KBS) pays attention to the integration of thinking structure. Many small-scale subsystems with internal links are organically linked through associative procedures on the basis of simulating the functions of legal reasoning elements (legal inquiry, legal interpretation, legal application, legal evaluation and explanation) respectively, forming a whole system with function of legal reasoning.

1.4 "Open Texture" Theory Provides Theoretical Innovation for the Application of AI in the Judicial Practice

Legal formalism often neglects the existence of complex and difficult cases, which are characterized by the absence of a single logical correspondence between legal rules and cases. Sometimes several different conclusions can be derived from a legal rule, and it is not easy to tell which is right or which is wrong. Sometimes several similar legal rules can be applied in one case. Under these circumstances, applying formalistic reasoning is usually useless. While criticizing legal formalism,

[5] Baosheng (2001b).

[6] Bodenheimer (1987).

legal realism goes to another extreme. It denies the existence of general legal rules with universality, and attempts to completely replace "law in written rules" with "law in action". This kind of overcorrection is a necessary step for legal reasoning to get rid of the mechanical theory of legal formalism, but if the law really only exists in specific judgments, as legal realism claims, and if legal reasoning does not follow any standards or vary from person to person, it will be a challenge not only to legal formalism, but also to the fundamental principles of rule governance required by rule of law.[7] And it will also shake the basis for the application of AI in the judicial practice. In this situation, "Open Texture" theory is put forward by some legal theorists, which is an eclectic theory of legal formalism and legal realism. The "Open Texture" theory recognizes the limitations of logic while emphasizing its importance. It denies that the judge judges the case arbitrarily according to his own intuitive experience while acknowledging free evaluation of evidence through inner conviction. Under the guidance of this theory, AI can have deeper and wider application in the judicial field. On the one hand, it screens out simple problems from difficult ones and uses rule-based technology to solve them. On the other hand, it uses non-case knowledge, such as rules, statements from both sides of the prosecution and the defense, and common sense to obtain preliminary answers to difficult problems, and then compare different cases to check the correctness of the judgment. "Open Texture" theory not only affirms the formal rationality of law, but also maintains the vigorous vitality of the continuous development of judicial practice, making it possible for artificial intelligence to optimize the scientificity and accuracy of judges' judgments.

2 The National Strategy of AI Leads Judicial Modernization

AI is an important driving force of the new round of scientific and technological revolution and industrial transformation. Accelerating the development of the new generation AI is a strategic issue concerning whether China can seize the opportunity of a new round of scientific and technological revolution and industrial transformation.

In July 2017, ***the Development Planning for the New Generation Artificial Intelligence*** (hereinafter referred to as the *Planning*) issued by the State Council of China put forward the Three-stage development goal of AI in China. At the same time, *the Planning* set specific requirements for the application of AI in the judicial field. It included the building of intelligent courts, making it an important part of the national strategy. With the guidance of national strategy and the support of national policy, the rapid development of AI will promote the application transformation of many intelligent technologies from laboratory to real life quickly, and will further promote the deep integration of AI and justice, thus promoting the development and realization of judicial modernization.

[7] Baosheng (2001c).

3 AI Provides Strong Technical Support for Promoting Judicial Modernization

Realizing judicial modernization is complex process, which requires not only the guidance of right direction and advanced theories but also the support of modern technologies.

In recent years, the development of modern technologies such as the Internet, big data, cloud computing and AI have injected great scientific strength into judicial activities, and provided strong technical support for the realization of judicial modernization.

For instance, the improvement and iteration of the deep learning algorithm pushes the judicial application of AI to a deeper level, and multi-source, multi-type, real-time and massive data make the description of judicial activities more realistic and comprehensive.

A large number of practices have proved that the deep integration of modern technologies such as AI and justice can **"add technological wings" to justice and make justice a real science**.

4 AI Helps to Overcome Judicial Difficulties and Promotes Judicial Progress

Science and technology is the key to solve judicial difficulties.

Every technological revolution carried out by human beings has resulted in a remarkable improvement in work efficiency brought about by the innovation of tools of production. The deep integration of AI and judicial practice in China proves that new technologies such as AI play an irreplaceable role in solving judicial difficulties and promoting judicial progress. The significance is mainly reflected in following aspects.

4.1 Promoting Judicial Reform and Implementing the Judicial Accountability System

Implementing the Judicial Accountability System is crucial to judicial reform. It is related to "one who tries a case shall have the power to decide the case and be responsible for his decision", whether the people's courts can exercise their judicial power independently and impartially according to law, whether the exercise of power of supervision and management over trials is reasonable and standardized, and so on. The use of modern technologies such as AI can effectively promote the implementation of the Judicial Accountability System. Through the application of modern technologies, the whole process of the handling of cases can be visible and

traceable so that the interference of human factors can be reduced in the process of case handling and Sole judges and collegial panels can fully **exercise adjudicative power**, thus promoting the actual implementation of Judicial Accountability System.

4.2 Preventing Cases in Which People are Unjustly, Falsely or Wrongly Charged or Sentenced and Guaranteeing Judicial Impartiality

Since the 18th CPC National Congress, the people's courts have corrected the judgments on 46 major criminal cases, in which people were unjustly, falsely or wrongly charged or sentenced in accordance with law. There are many causes behind the occurrence of these cases, among which the unclear facts and insufficient evidence are the most important ones. The application of AI in the process of handling criminal cases can provide standardized and data-based guidance for case handlers to collect and fix evidence, examine, verify and check evidence, discover defects and contradictions in evidence in time, and prompt case handlers to verify and correct them in time, so as to ensure that the factual evidence of the investigation, examination and prosecution cases can stand the test of the law, thus effectively avoiding the occurrence of cases in which people are unjustly, falsely or wrongly charged or sentenced from the root. In handling civil and administrative cases, the application of modern technologies can realize the induction of the focus of disputes, assistance in determination of the scope of the trial, the hint of judgment deviation and other functions, so as to help judges to unify the adjudicative criteria and the application of law in handling similar cases and ensure judicial impartiality.

4.3 Facilitating Judicial Openness and Making Justice Visible and Measurable

Judicial openness is the best way to prevent corruption. Judicial openness is not only the requirement of the work of the people's courts, but also an important means to promote judicial impartiality and enhance the public credibility of the judiciary. The application of AI technology has greatly broadened the methods, ways and space of judicial openness. Through AI and other modern technologies, we set up an all-round, multilevel, interactive and intelligent judicial open system, which contributes to the development of an open, dynamic, transparent and convenient sunshine judicial mechanism, making justice available, visible and measurable, so as to guarantee people's right to know, to participate, to express and to supervise and enhance the public credibility of the judiciary.

4.4 All-Round Intelligent Service to Solve Problems in Litigation

It is an important duty of the people's courts to provide timely and effective litigation services. The Litigation Service Center established by the people's courts is not only an important bridge to connect with the public, but also an important channel to accept the supervision of the public. With the advent of the era of AI, the Litigation Service Center of the people's courts has introduced new technologies such as AI to effectively solve the prominent difficulties people face. 12,368 Intelligent Platform of Litigation Service, Lawyer Service Platform and other platforms break through the restrictions of time and space to provide 24 h litigation service for the people, realizing **all-round, zero-distance and barrier-free service** for the people, and **greatly improving the capability and efficiency of litigation service**. Through these platforms, we provide all litigation and non-litigation services except trial. At the same time, using the advantages of calculation and analysis of judicial big data in litigation services, we can realize the prediction of litigation results, analyze the winning rate, guide the parties to correctly evaluate the trend of the case, and form reasonable litigation expectations.

4.5 Alleviating the Phenomenon of Overloaded Cases but Relatively Fewer Staffs and Improving the Quality and Efficiency of the Trial

In recent years, the number of cases accepted by the people's courts has been increasing year by year, the contradiction between overloaded cases and relatively fewer staffs has become one of the major problems affecting and restricting the development of the people's courts. In the absence of additional staffing, the main way out is to seek strength and efficiency from science and technology. By introducing new technologies such as AI, we have developed 26 functions such as intelligent document reading, intelligent sorting out plea propositions, intelligent generation of court transcripts, intelligent matching document model, intelligent generation of adjudicative documents, etc. These functions are equivalent to equipping judges with an AI assistant, which can liberate judges from a large number of business and auxiliary work and concentrate on the core business of trial. This not only alleviates the contradiction of overloaded cases and relatively fewer staffs, but also greatly improves the quality and efficiency of the trial.

4.6 The Visualization and Supervision of the Whole Process to Prevent Judicial Corruption and Improve Judicial Civilization

Impartiality is the lifeline of justice. Justice is the last line of defense to safeguard social fairness and justice. To prevent judicial corruption, we need not only to improve the quality of judges, but also to use scientific and technological means. Through new technologies such as AI, the whole process of handling cases can be **recorded and supervised**. In this way, the whole process of exercising adjudicative power is visualized and supervised, so as to reduce the arbitrariness of the judiciary, decrease the possibility of covert operation, prevent the interference of human factors, and eliminate judicial corruption.

Applying modern technologies such as AI in the trial practice is conducive to the implementation of the Trial-centered Litigation Reform as well as the strengthening of the substantiation of court trials, so that legal principles such as the protection of human rights can be better adhered and the unity of punishing crimes and protecting human rights can be actually realized. Thus, a higher level socialist judicial civilization will finally be built.

References

[America] E. Bodenheimer, *Jurisprudence: The Philosophy and Method of the Law*, translator: Deng Zhenglai and Ji Jingwu, Huaxia (Publishing House, December 1987), p. 478

Z. Baosheng, Jurisprudential thinking on artificial intelligence legal system. Law Rev. (5) (2001a)

Z. Baosheng, Jurisprudential thinking on artificial intelligence legal system. Law Rev. (Bimonthly) (5), 15 (2001b)

Z. Baosheng, Jurisprudential thinking on artificial intelligence legal system. Law Rev. (Bimonthly) (5), 16 (2001c)

Scholz, *A Concise Introduction to Logic*, translator: Zhang Jialong (The Commercial Press, 1977), p. 54

Part II
Practice: AI Facilitating China's Judicial Reform—AI Assistive System for Criminal Cases Constructed in Shanghai

Chapter 4
AI Assistive System for Criminal Cases in Shanghai

1 The Decision of AI Software Development

In January 2017, **the Commission of Political and Legal Affairs under the Communist Party of China Central Committee** (hereinafter as "the CPLA under the CPCCC")—a functional department of the CPCCC that leads and manages the work of politics and law by guiding and supervising the related authorities such as the police office, the procuratorate, the court, the prison, etc.— **made a decision to research and develop "a software system for advancing the reform of the trial-centered criminal procedure system in China"**.

"The integration of innovative technology and the reform of the litigation system is of especially significance for the reform of the trial-centered criminal procedure system in China," said Meng Jianzhu, the 18th head of the CPLA under the CPCCC (2012–2017). "This integration refers to embedding uniform evidence standards into a digitalized program based on the further application of big data analysis in order to reduce judicial arbitrariness, improve trial efficiency, and promote the judicial justice."

Such a **strategic** decision is crucial to strengthen the rule of law in China, because it pioneers the deep application of artificial intelligence in the judicial field, which bears major significance for the development of China's judicial system, justice and civilization.

2 Reasons for AI Software Development

The reasons for the Commission of Political and Legal Affairs to research and develop such a software system in 2017 are as follows.

Y. Cui, *Artificial Intelligence and Judicial Modernization*,
https://doi.org/10.1007/978-981-32-9880-4_4

2.1 The Results of Wrongful Convictions Correction

Since the 18th National Congress of the Communist Party of China (CPC) in late 2012, courts around China have corrected the judgments on **46** major criminal cases, including the case of Huugjilt and the case of Nie Shubin against the background of the Central Committee of the CPC comprehensively advancing law-based governance and judicial system reform. Huugjilt and Nie were wrongly executed for rape and murder at age 18 in 1996 and at 21 in 1995, but were finally acquitted in 2014 and 2016 respectively. Their exoneration, together with many others, have enhanced Chinese people's confidence in judicial impartiality. Though wrongful convictions are not a common phenomenon, their destruction of the rule of law in China is fatal.

"**Justice is the lifeblood of the rule of law. Judicial justice greatly encourages social justice, while judicial injustice cripples it**," emphasized President Xi Jinping.

"One foul sentence does more hurt than many foul examples. For these do but corrupt the stream, the other corrupts the fountain," Xi also quoted Francis Bacon's famous saying in his essay *Of Judicature*, commenting that Bacon's words contain a profound truth, "If the judicial system lacks credibility, social justice will be generally questioned, and social harmony and stability will be difficult to guarantee."

Justice is the last line of defense to safeguard social equity and justice. The wrongful convictions in the past were generally caused by the complex interaction between many pairs of factors, such as history and reality, subjectivity and objectivity, institution and practice, etc. In particular, their occurrence can be attributed to the poor implementation of the principles and rules determined by law, which seriously affects judicial impartiality. However, it's far from enough to just correct the wrongful convictions in line with the law and be supported by the public. The miscarriage of justice must be rooted out in China. But how?

2.2 The Necessity to Advance the Litigation System Reform

To prevent the occurrence of wrongful convictions from happening, the Fourth Plenary Session of the 18th Central Committee of the Communist Party of China in October 2014—the annual meeting which centered on "rule of law" for the first time in the Party's history—made a major national deployment to "advance the reform of the trial-centered criminal procedure system". The aim of the reform is to ensure that when handling a case, officers are fully aware that their case handling must stand up to the test of law, and that the factual evidence from investigations and reviews is able to stand up to the test of law. The officers also need to fully implement the rules of evidence-based judgement; gather, secure, save, review, and utilize evidence in strict accordance with the law; improve the system for the appearance in court by witnesses and expert witnesses; and ensure that court trials play a decisive roe in finding out the truth, determining the facts, protecting the right to litigate, and producing a fair judgment. This reform is conductive to ensuring the substantive justice of judgements through procedural justice in court proceedings, and effectively preventing false charges and unjust or erroneous rulings.

"For the wrongful convictions, we should not only correct them in line with the law but also reflect the underlying problems in judicial system, so as to establish an improved mechanism to prevent them from happening," stressed Meng Jianzhu. "The trial-centered reform of the criminal procedure system, which involves all units of politics and law as well as all links of criminal procedure, is a comprehensive reform with butterfly effect to ensure that the innocent are not subject to criminal prosecution and the guilty are fairly punished."[1]

Therefore, on 27 June 2016 the Central Leading Team for Comprehensively Deepening Reform, a team established since November 2013 in charge of designing China's reform on an overall basis, deliberated and adopted *Opinions on Comprehensively Promoting the Reform of the Trial-Centered Criminal Procedure System*. Then on 21 July 2016, the Opinions were jointly published by the Supreme People's Court, in conjunction with the Supreme People's Procuratorate, the Ministry of Public Security, the Ministry of State Security and the Ministry of Justice. Subsequently, on 17 February 2017 the Supreme People's Court issued *The Implementation Opinions on Comprehensively Promoting the Reform of the Trial-Centered Criminal Procedure System*.

The reform of the litigation system focusing on court proceedings constitutes a major part of the overall reform deployment made by the CPC Central Committee with Xi Jinping as the General Secretary, based on the overall strategy of comprehensively advancing the rule of law and upholding and developing socialism with Chinese characteristics. It is a reform with important and far-reaching significance. If implementing the reform of the judicial accountability system is the **foundation** of China's judicial reform, the reform of the litigation system should be regarded as a **more profound reform**, because the latter is a substantial reform in judicial concept, as well as a self-improvement in the socialist judicial system with Chinese characters. Moreover, the reform of the litigation system marks **a great progress** of the rule of law in China, **ensuring the innocent are not be held criminally accountable and the guilty are subject to just punishment, therefore effectively preventing the false accusations and unjust or erroneous rulings**.

2.3 The AI-Assisted Litigation Reform

However, how to effectively implement the reform of the litigation system and prevent false charges and unjust or erroneous rulings?

In the new era of big data and artificial intelligence, with the wisdom of all mankind, the modern technology and the innovation of the people working in the judiciary can be better integrated than they used to be, thus forming an merging

[1] See Meng Jianzhu's speech at the central political and legal work conference on January 12, 2017. Meng was then a member of the Political Bureau of the CPCCC and head of the CPLA under the CPCCC.

effect of technological rationality, judicial rationality and human rationality, which provides the possibility for the implementation of this reform.

"For the wrongful convictions, we should not only correct them in line with the law but also reflect the underlying problems in judicial system, so as to establish an improved mechanism to prevent them from happening," Meng Jianzhu said.

"Technologies such as big data should be employed to explore how to formulate and embed the evidence standards uniformly applicable into digitalized case-handling procedures, thus laying a foundation for the implementation of litigation system reform," Meng added.

To this end, the CPLA under the CPCCC has determined to research and develop "a software system to advance the reform of litigation system with court proceedings at the core", a key decision with "advanced technology assisting the litigation system reform" as its general guidance and an innovative approach to implement such reform.

It is a major innovation to employ the high-techs to implement the trial-centered litigation reform and to prevent wrongful convictions.

3 Technological Support for the Decision-Making

New technologies such as artificial intelligence have provided strong technical underpinning for advancing the reform of the trial-centered litigation system, solving difficult problems in criminal litigation, and preventing false charges and unjust or erroneous rulings.

3.1 Judicial Big Data: Solid Foundation of AI

As a strategic resource, big data forms the foundation of AI application. With the rapid development of the Internet, online data has become extremely rich. By describing the reality more closely from different perspectives, the multi-source, real-time, massive and multi-type data lay a solid foundation for the application of AI through establishing the AI algorithm model.[2] For example, during the process of advancing the reform of trial-centered litigation system, the establishment of a **big database for criminal cases**—including the sub databases such as the evidence standards library, the electronic archives library, the case library (including the bulletin cases and the guiding cases issued by the Supreme People's Court), the judgment documents library, the judicial interpretations library for laws and regulations, the case-handling documents library, etc.— together with a network platform of criminal cases shared by public security organs, procuratorates and courts is capable of proving powerful information data resources to support and guarantee the application AI in criminal justice.

[2]Ph.D. Wang Jian, chairman of Technology Steering Committee of Alibaba Group, holds that the progress of AI is based on the continuous development of internet infrastructure, and that AI makes no sense in isolation from the Internet.

3.2 Strong Computing Power: Diversified Application of AI

Owing to the rapid progress of cloud computing technology and chip processing ability, parallel computation becomes a reality. In addition, the basic calculating ability of AI can also be credited to the development of Graphic Processing Units (GPU), Field Programmable Gate Array (FPGA) and Application Specific Integrated Circuit (ASIC) such as Google's TPU (Tensor Processing Unit), whose joint efforts make AI's deep neural network algorithm model similar to human thinking become a reality. Therefore, a variety of applications can be used for multiple functions based on the cloud computing technology in the process of advancing the reform of litigation system with court proceedings at the core. These functions include evidence standards guide, single evidence review, arrestment conditions review, social risk assessment, review and judgement of evidence chain and evidence of the whole case, legality supervision of the case-handling procedure, evidence presentation during the hearing, recommendation of similar cases, reference for sentencing, document generating, electronic file transferring, whole process audio and video recording, relevant knowledge indexing, etc.—all aiming to generally improve the officers' level of ability when handling a case.

3.3 Deep Learning Algorithm: Core Engine of AI

Machine learning algorithm is the core engine to realize the application of artificial intelligence in criminal litigation. Machine learning, especially the perfection and iteration of deep learning and reinforcement learning, contributes to the use of AI in various fields. Base on the deep learning algorithm of AI, the software can obtain the function of logical thinking and experience-based judgment, both of which are the key to establish and improve a set of uniform evidence standards applicable for criminal cases in the process of the litigation system reform.

Equipped with the advanced skills such as optical character recognition (OCR), natural language processing (NLP), intelligent voice recognition, judicial entity recognition, entity relationship analysis, automatic extraction of judicial key elements, etc., Shanghai has developed a criminal trial intelligent assistant system based on the deep analyzing, summarizing and machine learning of the typical criminal cases, judicial information, and case-handling experience accumulated by public security organs, procuratorates and courts. By following the established standards, rules and models of evidence, this intelligent system can realize three major functions: **firstly**, to intelligently recognize and extract information from a variety of evidence (including the printed text, a proportion of hand-written characters, signatures, fingerprints, seals, forms, pictures, etc.); **secondly**, to transfer audio and video recordings into Chinese characters, to accurately locate the relevant content in the recordings based on the transferred characters, and to spot the evidence items such as time, location, persons, tools, methods, and consequences of crime; and **thirdly**,

to prove the logical relationship between items of evidence, including verification, interconnection and contradiction. Hence the following purposes to develop such a system can be achieved: (1) To discover and solve in time the common problems existing in criminal case-handling. For example, the evidence standards are not uniformly applicable across criminal cases, and the case-handling procedure is not standardized. (2) To ensure that the cases requested for approving arrest, transferred to investigation or prosecution meet the standards stipulated by the law. (3) To improve the quality and efficiency of case-handling. (4) To effectively prevent the occurrence of unjust, falsely or wrongly charged or sentenced cases, and to reduce the arbitrariness of the judiciary.

Chapter 5
Honor and Ambition: Shanghai High People's Court Undertakes the Project of AI Assistive Software Development

The Chinese Dream: a dream of national rejuvenation that the Chinese people work tirelessly to realize. This concept was put forward by Chinese President Xi Jinping when he attended an exhibition themed "Road Towards Renewal" at the end of 2012.

The ambition of judicial modernization: an ambition of equipping the judicial process with advanced technologies to make it more scientific than ever, which is unremittingly pursued by the Chinese legal professionals (jurists, lawyers, judges, etc.) and elites of science and technology. At the beginning of the reform and opening-up in China, insightful people in the legal and scientific fields embarked on their pursuit of this ambition. With the efforts of one generation after another, the ambition will become a reality.

1 The Ambition of Judicial Modernization: A Common Pursuit of China's Legal Professionals and Scientists

1.1 To Make the Judicial Practice Scientific

"Science is not really developed until it has learned to make use of mathematics," said Karl Marx.[1]

"The introduction of mathematical models and algorithms promotes the rapid development of economics, compared with which the backwardness of the law study is because it failed to introduce into it the modern science and technology, including intelligent algorithms," **said Zhou Qiang**, the President of the Supreme People's Court of the People's Republic of China. "Therefore, the employment of some advanced technologies such as machine learning, evidence modeling and algorithm

[1] Lafargue (1973).

Y. Cui, *Artificial Intelligence and Judicial Modernization*,
https://doi.org/10.1007/978-981-32-9880-4_5

in the judicial field will make judicial activities more scientific and accurate than they used to be, and thus playing an active role in case-handling practice."[2]

The study of law belongs to the category of social science and judicature is an activity that applies the laws and regulations into case judgment. In judicial activities, the laws and regulations based on which the rulings are made embody the essence of human rationality and can be used repeatedly, just as the rules of any natural science. Besides, judgment behaviors of the judges are regulated and restrained by logic, experience and even the rules of social and historical evolution, which is also a classic feature of social science. Therefore, it is reasonable to deduce that judicature is a science. **And with the development of judicial activities, it is necessary to make judicial practice scientific**.

1.2 Scientists' Pursuit of the Ambition: Rule-of-Law System Based on Systems Engineering

In October 1979, **Professor Qian Xuesen**, a famous a Chinese scientist who made important contributions to the missile and space programs of both the United States and People's Republic of China, proposed to "**establish rule-of-law in China based on systems engineering**",[3] an exploration assisted by systems theory. He pointed that in the process of improving the socialist legal system, the mathematical logic and computing technology should be heavily relied on because of the following formula:

rule-of-law in China based on systems engineering = systems theory + marxist-leninist jurisprudence + mathematics + computer technology

Professor Qian is the first person who put forward the concept of "rule-of-law in China based on systems engineering". As we all know, the proposal to strengthen the legal system and to build "socialist legal system" was initiated by Deng Xiaoping, "the Chief Architect of China's Reform", at the CPC work conference in December 1978 and then was adopted at the Third Plenary Session of the 11th Central Committee of the Communist Party of China. Less than a year later, in October 1979, scientists led by Professor Qian began to design a route for its realization.

In 1985, by further suggesting **the application of artificial intelligence, knowledge engineering and expert system in legal affairs**, Professor Qian is generally regarded as **the initiator of "AI assistive rule-of-law"** in China.

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[2] Adopted from the speech of Zhou Qiang after he listened to the report on the research and development of "Shanghai intelligent assistive system for criminal cases" delivered by Shanghai High People's Court on June 21, 2017.

[3] In October 1979, professor Qian Xuesen put forward the concept of "rule-of-law in China based on systems engineering" at an academic conference on system engineering held by Chinese Academy of Sciences, Chinese Academy of Social Sciences, Ministry of Education, Ministry of Mechanical Industry and other government departments.

Thanks to the efforts of Professor Qian and other scientists, systems theory and other modern science and technology have been introduced into the study of law in China **for the first time**. Legal professionals in China have been enormously inspired by the innovative idea that the rule-of-law in China can be achieved based on the integration of the systems approach and modern technology. From then on, the research and practice of "technologically assistive rule-of-law" have been carried out for nearly 40 years and various advances been made continuously.

1.3 Jurists' Pursuit of the Ambition: Computer-Assisted Measurement of Penalty

In 1986, "Expert system for comprehensively balanced sentencing and computer-aided sentencing", a research project run by Professor **Zhu Huarong** and Researcher **Xiao Kaquan**, was established as one of **"The 7th Five-Year Plan (1986–1990)" research subjects of The National Social Science Fund of China**. And their research achieved results in establishing mathematical model for the sentencing of larceny.

In the same year, Professor **Su Huiyu**,[4] Professor **Zhang Guoquan**,[5] and Lecturer **Shi Jiansan**[6] of the East China University of Political Science and Law proposed and undertook a research project on computer-aided sentencing. Their research results, a book entitled ***Sentencing and Computer: the Application of Impartial and Rational Sentencing*** (1989), won the attention and recognition of the judicial circle, because it elaborates that the sentences passed by the computer-aided sentencing system integrated with the expertise of the legal professionals are nearly the same as those passed by the judges.

Then in 1993, Professor **Zhao Tingguang**[7] of Wuhan University developed the "Expert System for Criminal Law Practice". With its consulting and retrieval subsystem, assistive conviction subsystem, and assistive sentencing subsystem, it can fulfil the functions of retrieving relevant criminal law knowledge and making inferences and judgements about individual criminal cases.

From all these examples above, it is clear that China's **jurists have not stopped their efforts to realize the judicial modernization**.

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[4]Su Huiyu (1934–2019) was the Emeritus Professor of East China University of Political Science and Law, consultant of Criminal Law Institute of China Law Society, and chairman of Shanghai Criminal Law Society. He also took many other academic postions.

[5]Zhang Guoquan is a professor and former vice President of East China University of Political science and law, specializing in Criminal Law.

[6]Shi Jiansan is a researcher of the Institute of Law of Shanghai Academy of Social Sciences, specializing in criminal law, economic law and anti-unfair competition law.

[7]Zhao Tingguang (1935–2017) was a professor of the Law School of Wuhan University. He was praised as "the bridge-builder between law and computer" for initiating the research direction of "computer crime and legal countermeasures" in China.

1.4 Ambition Realization: Efforts of Generations

In the history, many major reforms and inventions were accomplished through the continuous endeavor of one generation after another. And the realization of juridical modernization is no exception.

For example, the research results on computer-aided sentencing elaborated in ***Sentencing and Computer*** were not widely promoted and applied due to the social and technological constraints about 30 years ago. However, inspired by the courage, sense of responsibility, and exploration spirit of the former generations, today's generation may realize **the ambition of judicial modernization** after 40 years of reform and opening-up in China, when we are living in an enormously improved social and economic conditions and equipped with modern technologies such as the Internet, big data, cloud computing and artificial intelligence.

I myself is a beneficiary of this book. After undertaking the task of developing a software system for "litigation reform with court proceedings as the core", **I borrowed the book from Shanghai Library** and have read it several times. Its content, together with the forward-looking visions of the authors, inspired and guided me throughout the research and development of the System.

The realization of judicial modernization in China is like a relay race, and generations of legal professionals and technological elites are like runners. With pairs of much better running shoes (modern technologies) than the past, the runners of our generation are confident to take the baton and sprint for the finish line with **bravery, sense of responsibility, courage, and perseverance**.

2 An Honorable Task with Opportunity and Difficulty

2.1 The Assignment of the Task

February 6, 2017, the second working day after the after the Spring Festival holiday, is an unforgettable date for both Shanghai High People's Court and its then President, which is me. At around 4:00 p.m., **Meng Jianzhu**, the 18th head (2012–2017) of the CPLA under the CPCCC, arrived at the Shanghai High People's Court to survey the progress of the judicial reform in Shanghai, accompanied by **Han Zheng**, then a member of the CPC Central Committee Political Bureau and Secretary of the CPC Shanghai Municipal Committee, as well as some members of the CPLA under the CPCCC, such as Wang Yongqing, Jiang Wei, Shi Jun, and some municipal officials, including Jiang Ping, Yin Hong, Bai Shaokang, Zhang Bencai, etc. After the survey, at a meeting of the political and legal leaders in Shanghai presided over by Meng, he assigned three new tasks for the judicial reform in Shanghai. One of them was for Shanghai High People's Court to undertake: the research and development of **a software system for implementing the trial-centered litigation reform**.

"The trial-centered litigation reform is at the core of the judicial reform, and Shanghai is qualified to establish a standardized evidence system of for courts, procuratorates, public security organs and other relevant judicial and security authorities," Meng explained in his speech at the meeting. "The procedure of the litigation reform could be as follows: **Firstly**, to collect and summarize evidence standards and rules by extracting the useful information from a massive judicial data with high-techs such as big data. **Secondly**, to establish the framework and details of a standardized evidence system based on the previous experience in building digital courts and intelligent courts. **Thirdly**, to implement the trial-centered litigation reform relying on this standardized evidence system as well as the substantiation of court trials. Thus, a new path to realize the litigation reform is found."

Ever since this meeting, the glorious and arduous task of developing an intelligent assistant software system for "the trial-centered litigation reform" formally falls on the shoulders of Shanghai High People's court.

Why named "206 System"?
As mysterious as it sounds, the code "206" is just short of "February 6" to mark the date that Shanghai High People's court was given the task of software development by the Commission for Political and Legal Affairs under the CPCCC. And it is not surprising to name the task as the **206 Project**, and the software system as the **206 System**, both of which were adopted by the news media and portal websites, for example, *Jiefang Daily*, *People's Court Daily*, chinacourt.org, eastday.com, etc.

2.2 Opportunity in the Task

"Judicial reform and the informatization construction are like **a pair of wings** for the judicial development in China", said Zhou Qiang, the President of the Supreme People's Court of the People's Republic of China. And Shanghai High People's court is honored to participate in both of these two missions as a pioneer.

Since the beginning of 2014, the first judicial system reform pilot has been initiated by Shanghai High People's Court to accumulate "Shanghai Experience" for courts nationwide to follow. Three years later in 2017, **once again** it was Shanghai High People's Court that was trusted by the CPLA under CPCCC with a new duty in the field of information construction—the research and development of an intelligent assistive software system ("206 System"). And the fulfillment of this task is a precious opportunity for Shanghai High People's Court to explore a new route toward judicial intellectualization.

2.3 Challenges of the Task

The next day of the survey by Secretary Meng of CPLA and other leaders, in the morning of February 7, Jiang Wei, then the deputy director of the Office of the Leading Group for Judicial Reform under CPCCC and the vice president of the Supreme People's Court, who accompanied Meng in yesterday's survey arrived at Shanghai Committee of Political and Legal Affairs to chair a special meeting. At the meeting, Jiang firstly divided the task of software development into three steps. **Step one**: to formulate uniformly applicable evidence standards and evidence rules and apply them into case investigation with the assistance of high-techs such as big data. **Step Two**, to establish evidence models for selecting complicated crimes and cases prone to problems as well as recommending precisely the judgements of similar cases with the high-techs such as big data and AI, thus assisting the public security organs, procuratorates, and courts to handle cases fairly. **Step Three**, to set up special teams to ensure that the software system can be launched online for test operation in May 2017 and for formal operation in July 2017. And Shanghai High People's Court should share its experience of software development at the National Judicial Reform Promotion Conference.

After the above instructions, Deputy Director Jiang then explained the reason why I was chosen as the head of this software development task by quoting **Secretary Meng Jiangzhu's comment** on me. "As the President of Shanghai High People's Court, Yadong Cui (the author) is very familiar with the work of the political and legal organs, due to his previous working experience as the director of the Public Security Bureau in Anhui City, the head of the CPLA in Guizhou Province, and his present position. Therefore, the Shanghai High People's Court is entrusted with this software development task with him as the head. And the CPLA under CPCCC hopes that Shanghai could complete this arduous task."[8] On hearing this comment, I was deeply touched by the trust from the Party organizations, and filled with a sense of responsibility. During the limited working time before my retirement by the end of 2017, I'm honored to accept and participate in this task, and will prove worthy of the Party's trust.

However, the initial excitement of my team and I was soon cooled down, because we found that there was no example to follow to develop such an intelligent assistive

[8]On May 31, 2017, when Secretary Meng Jianzhu talked about the issues on trial-centered litigation reform at the Summary and commendation Conference on Criminal Justice of National Courts, he asked me to introduce briefly about the progress of the intelligent software system development in Shanghai. After my presentation he said, "As the President of Shanghai High People's Court, Yadong also used to serve as the head of CPLA in Guizhou Province, the director of the Public Security Bureau in Anhui City, and even an investigator of the Public Security Bureau. His rich working experience makes him familiar with the issues related to public security organs and courts at all levels. That's why he is appointed as the head to develop an AI-assistive intelligent software system to fulfill the transition from human case review to AI-assisted intelligent case review."

software system for criminal trials at home and abroad from the available information. And we began to feel great pressure due to the difficulty, demands and responsibility of this task.

To begin with, the task is **arduous and challenging**. After in-depth search and argumentation, we discovered that the 206 Project should **start from scratch**, and breakthrough are needed both in profession and in technology. **The breakthrough in profession** means the 206 Project should formulate uniformly evidence standards and evidence rules and embed them in big data system so as to provide the staff on duty with uniformly applicable guidance to gather and secure evidence in their case-handling process. **The breakthrough in technology** means that the 206 Project should employ high-techs such as AI to review, verify and check the evidence of criminal cases, so as to prevent wrongful convictions. And obviously, both of these two breakthroughs are extremely difficult to achieve.

Moreover, the task is **demanding and significant**. As a technologically innovative project which applies high-techs such as big data and AI into criminal litigation practice, the research and development of a software system "for the trial-centered litigation reform" is a crucial to realize the trial-centered litigation reform led by the CPC Central Committee, as well as to prevent the wrongful rulings effectively. Hence the significant responsibility of this task is self-evident.

Finally, the task is **tight in schedule and heavy in pressure**. According to the schedule generally set by the CPLA under the CPCCC, the task should be ready for test operation by May 2017, and the experience of the software system development should be shared at the National Judicial Reform Promotion Conference in July 2017, if the system performs effectively during its test operation by the public security organs, procuratorates and courts. From the assignment of the task on February 6, to its test operation on May 3, and then to its demonstration and promotion in front of the national peers on July 10, we have only five months (a total of 154 days) in hand.

At that time many colleagues were worried that we can hardly finish the task, at least during the time required. However, confronted by all the **risks, challenges, difficulties, and pressure, we have no way back but to conquer all of them**.

3 Confidence and Foundation to Finish the Task

Confidence is the prerequisite for any success. After a rational analysis of the existing conditions and foundation of the task, my team and I strengthen our confidence and are more determined to accomplish the task.

3.1 Impetus: The Pioneer Spirit of Shanghai

President Xi Jinping said Shanghai should continue to serve as a vanguard and pioneer in reform and opening-up and innovation at the panel discussion during the

Two Sessions in 2016, which is a general guideline for Shanghai's development. At the forefront of China's reform and opening-up, Shanghai's most characteristic and precious qualities and spirits are as follows: the bravery to explore, the courage to innovate, the perseverance to overcome difficulties and the confidence to challenge new targets. These qualities and spirits of reform and innovation have propelled Shanghai to become a modern international metropolis, and they will also be a driving force for us to accomplish the 206 Project.

3.2 Foundation: Pilot Judicial Reform in Shanghai

After the Third Plenary Session of the 18th CPC Central Committee made the strategic deployment of comprehensively deepening reform in November 2013, Shanghai was designated by the Central Government a polit city to initiate the judicial reform in March 2014, so as to accumulate experience for advancing the reform in an all-round way nationwide. After three years of reform, the pilot judicial reform in Shanghai courts has been implemented successfully and achieved many positive results, forming "**Shanghai Experience**" for courts nationwide to follow. The courts in Shanghai are proud of themselves because they "accomplished the judicial reform that have been thought about and talked about for many years", as President Xi Jinping put it. And since the Fourth Plenary Session of the 18th Central Committee of the Communist Party of China made decisions and arrangements to advance the litigation reform with court proceedings as its core in October 2014, Shanghai High People's Court has been one of **the country's first batch of pilot courts to employ the litigation reform** and achieved good results because it exerted pressure on itself, used its initiative and took positive actions. In summary, the former experience as a pioneer in judicial reform as well as litigation reform lays a solid foundation for Shanghai High People's Court to accomplish the "Project 206" both **ideologically and professionally**.

3.3 High-Techs: Leading Position in Informatization Construction

In recent years, by adhering to the working policy of "**strengthening the courts with high-techs**", namely "**strengthening police force, work efficiency and quality with the help of high-techs**", the courts in Shanghai establish the development plan of "**one strategy, two actions**"—big data strategy, "the internet plus" action and "AI plus" action—to advance the construction of "**digital courts**" and "**intelligent courts**" with the full use of the Internet, big data , cloud computing, artificial intelli-

gence and other high-techs. It can be said that the execution of "Project 206" under strong technological underpinning against the background that the digitalization construction of courts in Shanghai is based on the high-techs such as big data, and that the court proceedings in the city have pioneered the whole nation by achieving effective results in online case-handling and intelligent case-handling.

Reference

P. Lafargue, *Reminiscences of Marx*, trans. Ma Ji (People's Publishing House, 1973), p. 7

Chapter 6
Exploration, Practice and Breakthrough

Innovation means breakthrough. Project 206 has no previous examples to follow. The lack of experience may seem like a disadvantage, but it's not necessarily a bad thing. Sometimes it may even turn out to be a good opportunity and a big advantage. On a blank sheet of paper free from any mark, the freshest and most beautiful characters and pictures can be written and painted, as Mao Zedong, past leader of the Communist Party of China and the first Chairman of the People's Republic of China, put it. Materialist dialectics also tells us that everything is a unity of contradictions. Where there is nothing, there is an opportunity to create something; and where there is a blank, there is a chance to fill in the blank. Project 206 is just such a "blank", providing us with a platform for bold exploration and innovation, on which we can give full play to our imagination to create something brand new. Project 206 is an innovation, which means in the process of completing the project, we should blaze a new path through all difficulties. "Where is the path? It is either trodden out by people, or hacked through the thorns," said Lu Xun, a leading figure of 20th-century Chinese literature. In a word, by seizing the opportunity of the construction of Project 206, we should embark on a series of exploration and practice in order to fulfil this arduous task and to make some professional and technological breakthrough.

1 Top-Down Design of the System

Just as an ancient saying goes, he who ponders deeply wins. Similarly, a top-down design is of considerable significance for a major project, especially for Project 206, an arduous and special project with no examples to learn from. Therefore, the combination of top-level design, as well as the exploration in actions, is of particular importance for the success of the project. Since February 7, 2017, the relevant personnel of the Shanghai High People's Court have been mobilized and organized to mastermind a top-down plan for the project by researching and brainstorming.

Y. Cui, *Artificial Intelligence and Judicial Modernization*,
https://doi.org/10.1007/978-981-32-9880-4_6

1.1 Procedure of the Task

Due to the urgent time requirement of Project 206, it is unrealistic for us to spend plenty of time researching, planning and designing before taking action. A better way out is to mastermind a top-down plan step by step and to execute each step simultaneously. The Chinese prefer to "manage to cross the river by feeling the stones" (which means "to advance step by step"), as the late Chinese leader Deng Xiaoping is frequently quoted. Thus, the basic principle to finish Project 206 was set as: to put the different steps of a general project plan into an instant practice, and to improve the plan by the results and feedback of the practice.

1.2 Requirements for the Task

In order to finish the research and development task of an intelligent software system "to advance litigation reform with court proceedings as the core", there are four major requirements to meet.

Firstly, all the members of "Team 206" should have deep understanding and accurate grasp of the significance of this software development task. **Secondly**, the members should bear in mind that the final purpose of this task is to advance and realize the litigation reform in China. **Thirdly**, the members should adhere to the constitutional and legal principle that "the courts, procuratorates and the public security organs shall divide responsibilities, coordinate their efforts and check each other", the rules of justice, the nature of being problem-oriented, demand-oriented and target-oriented in software design, and the working sequence of "easy tasks first, difficult tasks second, executing the plan step by step". **Fourthly**, the members should make full use of high-techs such as big data, the Internet, cloud computing, artificial intelligence, etc. to finish the task.

1.3 Targets of the Task

During the process of the software system development, the following targets should be fulfilled. **To begin with**, with a general goal to make people experience fairness and justice in each case, the software system should integrate the high-techs such as AI tightly with the reform of judicial system by formulating uniformly applicable evidence standards, evidence rules and embed them in the digitalized programs of the software, so as to help staff on duty to gather and secure evidence, as well as to guarantee the integrity, legitimacy and validity of evidence.

Besides, the software system should also achieve the target of combining precise orientation with reasonable function designing, in order to fully exert its roles to guide standardized handling of cases, promote the substantiation of court trials, strengthen

judicial protection of human rights, implement the legal principle that judgments shall be made upon evidence, and unify the application of law.

Last, the software system should ensure that when handling a case, officers of the public security organs, procuratorates, and courts at all levels are fully aware that their case handling must stand up to the test of law, and that the factual evidence from investigations and reviews is able to stand up to the test of law, so as to reduce the arbitrariness of the judiciary, effectively prevent the occurrence of unjust, falsely or wrongly charged or sentenced cases, and improve judicial quality, efficiency and credibility.

1.4 Partner of the Task

After the basic idea of the software design is determined, the second crucial problem confronting us is that which company can undertake the task of technological part of the software development, in other words, which company should we choose as our technological partner? But initially we do not have a clue, because no company had done it before. Accordingly, we set up a special searching team, hoping to find a qualified partner as soon as possible.

On February 14, 2017 (the Valentine's Day), which happened to be the date that Shanghai High People's Court was signing a strategic cooperation agreement (mainly on the development of a voice system) with iFlytek Co. Ltd., a first-class information technology company in China, both chairman Liu Qingfeng of iFlytek and I attended the signing ceremony, and through a casual talk, we accidentally opened the prelude of our cooperation in Project 206. I can still remember the first conversation between us.

I asked him about some general information about his company, such as the number and average age of his employees, and their proportion of in different positions of the company.

He replied that there are 8,659 employees in iFlytek with an average age of 24, and more than 60% of them are engaged in technological research and development. He also introduced some innovative breakthroughs made by his company in artificial intelligence technology.

With a preliminary understanding of the strong research and development strength of iFlytek, it occurred to me that whether iFlytek could be our partner in this AI-assistive software development task. Then I told Qingfeng about the software development task, with particular emphasis on the primary function of the software—to review and guarantee the standard of evidence so as to prevent the unjust, false and wrongful charges or convictions during the process of criminal case handling with the help of high-techs such as big data, artificial intelligence, etc. "Is iFlytek capable of taking charge the technical part of software development?" I asked.

"We haven't done this type of project yet," Qingfeng replied. "But the artificial intelligence software we have developed can diagnose illness of the patients and mark college entrance examination papers, therefore I presume we can also make AI

work in criminal case-handling." He promised to do some research on this field and give a reply instantly.

On February 16, iFlytek sent a group of technicians to Shanghai High People's Court for a preliminary research.

During this period of time, our special searching team also conducted an extensive research on other potential technological partners, but our choices were found limited. Therefore, we initially decided to choose iFlytek as our partner.

In the morning of March 4 (the day before the opening of China's "Two Sessions"—the National People's Congress, the top legislature, and the Chinese People's Political Consultative Conference National Committee, China's top political advisory body, both of which will convene their annual sessions from early to mid-March), Secretary Meng Jianzhu met me in Beijing, China's capital, to know about the recent progress of the software development. I reported to him the progress of the preliminary work and our working sequence of "easy tasks first, difficult tasks second, executing the plan step by step". At that time, due to the difficulty of the task and the tight schedule, our team of Project 206 had planned to divide the whole task into two phases. The first phase is before the National Judicial Reform Promotion Conference in July, 2017, we will formulate evidence standards and rules to guide the case-handling personnel to gather and secure evidence. The second phase is after the Conference, we will start the attempt to use high-techs such as AI to realize the functions of evidence review and verification of the intelligent software system.

After my report, Secretary Jianzhu once again emphasized the significance of the intelligent software development, and comment positively on the progress of our preliminary work. However, he also firmly and clearly stated that the work of the two phases must be started simultaneously.

"The work of formulating the evidence standards can also be done by other provinces. Why it is Shanghai that is assigned this software development task? It's because the CPLA under the CPCCC believes the high-tech strengthen of this city can overcome this difficult task of evidence reviewing, verifying and checking, so as to effectively prevent the wrongful charges and convictions," he explained. "And why you are chosen as the head of this task? It's because you know the links prone to problems in case-handling process, with your working background as the former director of the provincial public security department, the former head of the provincial CPLA, and the President of Shanghai High People's Court now. There is no doubt that under your guidance, Shanghai Higher People's Court can accomplish this task successfully." From his words and tone of voice, obviously there is no wiggle room in Secretary Jianzhu's instruction.

Therefore, I arranged an urgent meeting with Qingfeng in Beijing in the evening of March 5, the opening date of the "Two Sessions". The conversation between us went as follows.

"Is iFlytek capable of undertaking the task?" I asked him directly after telling him Secretary Jianzhu's comments and instructions.

"I think so," he replied, but with a tone which was not sure enough.

"It is not the reply I'm expecting," I told him frankly. "iFlytek must make it work. If not, it will be too late for us to find another high-tech partner. This task is too

important to afford any delay or failure. Say 'yes' if you have enough confidence in the research and development capability of your company. Let me remind you, tonight you are going to make a pledge that can't be reneged on."

"Yes," Qingfeng finally answered firmly, under my forceful push.

Though choosing iFlytek as a potential partner started from a casual talk between me and Qingfeng, the final choice of this high-tech company specializing in AI is not casual at all. Before we signed a formal agreement on cooperation, the special search team had conducted a comprehensive survey and analyzed many high-tech companies with AI business all over the country, consulted the authoritative experts in the field of AI, and also sought opinions from the relative administrative authorities. After the company passed our investigation and won the support and recognition of all side, we submitted the application for cooperation with iFlytek in accordance with the procedures and obtained the approval from the relevant authorities.

The three main reasons why iFlytek was chosen are as follows.

Firstly, iFlytek masters the cutting-edge core technologies of artificial intelligence. For example, on the lists of "Industrialization Bases of Achievements of National High-tech R&D Program of China (863 Program)", "Key Software Manufacturing Enterprises in National Planning", and "Demonstration Projects of National High-tech Industrialization", iFlytek is the only one specializing in voice control technology. In particular, the Ministry of Science and Technology commissioned iFlytek to undertake the construction of the "State Key Laboratory of Cognitive Intelligence", which is China's first key laboratory of national level in the field of cognitive intelligence, the advanced stage of AI technology.

Secondly, iFlytek has accumulated rich experience from its business related to judicial practice. For instance, its intelligent voice trial system passed the expert appraisal of the Supreme People's Court (SPC) in 2016. The same year, it helped Suzhou Intermediate People's Court build the first intelligent court in China. In 2017, it signed a strategic cooperation agreement with the Information Center of the SPC. Moreover, the Political and Law Business Group under iFlytek runs multiple lines of business, serving public security organs, procuratorates, courts, Committees of Supervisory, State Security organs, etc. with various AI application systems such as Intelligent Public Security, Intelligent Police Affairs, Intelligent Procuratorial Affairs and Intelligent Court. Integrating the functional departments of product research and development, marketing, and technical service, the Political and Law Business Group successfully developed and promoted plenty of intelligent application systems with the efforts of its over 1,000 members to meet the requirements of the political and law field.

Thirdly, iFlytek has the sense of responsibility and dedication. Just two days after the casual talk between chairman of iFlytek about the software development task, the company then sent its technical professionals to Shanghai High People's Court to carry out the preliminary research and argumentation, helping the Court mastermind a working scheme. In addition, during the whole process of the software development, the staff of iFlytek rarely miss a deadline or failed a major task, which fully displays the outstanding quality and the sense of responsibility of the company itself.

The final success of the software development task also proved that it's wise to choose iFlytek as the technological partner.

1.5 Base and Team of the Task

Based on the needs of research and development, Shanghai High People's Court, together with Shanghai People's Procuratorate, Shanghai Municipal Bureau of Public Security, Shanghai Bureau of Justice and iFlytek, established **a research and development team** for "Project 206" with a big court room of Shanghai High People's Court as its **research and development base**.

The **"Project 206 Team"** was composed of staff from the courts, procuratorates, and public security organs of Shanghai, as well as the technical staff from iFlytek. In the early days, there were about 100 members in the Team, and more people joined in with time goes by. By the end of 2018, more than 700 people have participated in the research and development work, including more than 400 legal professionals in Shanghai (over 220 from courts, 80 from procuratorates, 100 from public security organs, 10 from justice organ), and over 300 technical staff from iFlytek (with 79 technicians working in the Base of Shanghai and 226 in the office of the company's headquarters in Hefei, the capital city of Anhui Province).

The Research and Development Base of Project 206 in Shanghai High People's Court

2 Orientations of the System

After the determination of the procedure, requirements, targets and technological partner of Project 206, it's time to clarify the orientations of the Project, which is also crucial to the software development task. As mentioned above, this intelligent software system is supposed to meet the requirements in case-handling so as to solve the practical problems and achieve the expected results, thus the thought of the software design should be problem-oriented, demand-oriented, goal-oriented and result-oriented.

2.1 Problem-Oriented

Undoubtedly, an in-depth research is the first step to find out the practical problems to be solved in case-handling. To identify the problems, the members of Project 206 carried out surveys more than 100 times in Shanghai High People's Court, Shanghai People's Procuratorate, Shanghai Municipal Bureau of Public Security, and the units under their leadership, such as the criminal investigation teams, the economic crime investigation teams, and the police stations. From more than 300 problems, suggestions, and case-handling standards collected by these surveys, the members of Project 206 gradually sorted out the common problems and individual problems, summarized the suggestions proposed by the case-handlings personnel, and grasped the case-handling standards and rules, as well as the major functions of the present case-handling system used by the public security and procuratorial organs, in order to pinpoint the causes of the problems and to solve them by designing the responding functions in the intelligent software system.

2.2 Demand-Oriented

The software system is designed for front-line case-handling personnel. Therefore, it is their demands that determine the general direction of the software design. From more than 150 suggestions collected from these surveys, we found that the demands of these case-handling personnel can be summarized into two points. On the one hand, the system should be practical enough to resolve the really problems in case-handling. On the other, the system should be user-friendly. Bearing these two points in mind, the software engineers are determined to fulfill the corresponding functions.

2.3 Target-Oriented and Effect-Oriented

Data is a strategic resource, without which machine learning will be impossible. One of the distinctive technological features of artificial intelligence is its automatic learning ability, based on which the expected goals and effects of the software system can be achieved. The primary reason that Google's AI-powered program AlphaGo defeated South Korea's professional Go player Lee Se-dol is that AlphaGo can teach itself about how to play the board game Go and then make its own decisions after 30 million game records were input into its system database, which enables it to obtain the expert experience of professional Go players through autonomous learning. Inspired by AlphaGo's success, the Project 206 team started to build databases for the 206 System. The existing data of criminal cases collected from the public security organs, procuratorates, and courts of the city– including unsolved cases, cases in which the arrests were disapproved, and cases in which prosecutions were not initiated—were organized and input into different databases of built for the 206 System, in order to provide standard case samples for the AI system to recognize, judge, learn and consult through machine learning. **First**, from public security organs, procuratorates and courts of Shanghai, we collected over 300,000 copies of materials about the cases in which the arrests application of the suspects were disapproved directly by the procuratorates, or in which supplementary investigations were deemed as necessary by the procuratorates before they approve the application of arrest, or in which the criminal suspects or defendants were not prosecuted when proved the pettiness of their crime or were released when proved innocent. These copies include documents of "presentation of condition of cases", electronica files, written judgments, trial records, reports of case hearing, etc. **Next**, through these documents, we sorted out the existing problems in evidence gathering, securing, verifying and reviewing in the investigation phase, prosecution phase and trial phase. The above two steps are a crucial procedure for the development of System 206 because of two reasons. **One** is that the materials collected provide a recognizable sample for the AI-assistive software system to comprehensively review and judge the integrity of the evidence chain, as well as a massive number of samples for the system to achieve machine learning. **The other** is that the problems discovered by these surveys, such as the evidence standards for criminal cases are not applicable uniformly, and the case-handling procedure lacks of standardization, will be resolved by the functions designed in the 206 System, especially the functions of "evidence review", "guidance on evidence collection", and so on.

By the end of March 2019, nine databases have been built for the 206 System, with 45 million copies of digital documents as its strategic data resources.

3 Nature, Name and Definition

3.1 The Technological Nature of the System

With the orientations of the system determined, the second major step of Project 206 is to combine the judicial activities and AI technology tightly on the prerequisite that the rules of the former and the present characters of the latter were understood thoroughly by the related team members, so as to guarantee the correct direction of the system development and prevent major mistakes.

The **initial instructions of the CPLA under the CPCCC** for the 206 System was to formulate uniform evidence standards and evidence rules and embed them in a big data system, so as to help staff on duty to collect and secure evidence". In accordance with this requirement, we firstly named the system as "Shanghai Big Bata System of Evidence Standards for Criminal Cases", a system designed to guide the frontline staff to gather, secure, review and utilize evidence by uniformly applicable standards in criminal case handling based on the Internet and big data. After that, **the CPLA under the CPCCC** further instructed us to design a function of "evidence review and judgement" for the 206 System with high-techs such as AI to allow no case with problems, even small ones entering into the judicial procedures, so as to prevent wrongfully charged or convicted cases. On receiving the second instruction, some team members worried that this intelligent function was too challenging to realize in the System, and some simply believed that it was impossible for machines to handle cases. Therefore, it is very important to emphasize and fulfil the very nature of the 206 System, which is "an AI assistive system". Here "AI" refers to the high-tech underpinning of the System, such as big data, cloud computing, and artificial intelligence. And the word "assistive" reveals that the System is not designed to **replace** the police, prosecutors, and judges, but to **assist** them to handle criminal cases normatively and efficiently.

3.2 The Assistive Nature of the System

The judicial activity has its own rules and special properties, such as judicial impartiality, judicial independence, judicial openness, and judicial experience. "Judicial experience" means that judicial personnel (primarily the judges and people's assessors) should go through the whole process of the trial of a case and directly access to and examine various kinds of evidence. In particular, they should hear the claims, reasons, the relevant laws and regulations, queries and defenses of both parties of the litigation, as well as the statements of other participants in the proceedings, in order to make a judgment on the case. And the purpose of judicial experience is to achieve judicial impartiality.[1] Therefore, cases are investigated and judged mainly

[1] Zhu (2015).

by judges, prosecutors and investigators depending on their wisdom, experience and rational judgment, whose roles cannot be replaced by the machine. However, the Internet, big data, cloud computing, artificial intelligence and other high-techs can not only provide guidance on uniform evidence standards and evidence rules for the case-handling personnel, but also help to review and verify the evidence of criminal cases, find the problems and conflicting points in the evidence, and timely inform the case-handling personnel. But it is still the staff on duty that determine whether the problems truly exist, and if so, whether to continue further investigation to verify or correct them. In this way, the factual evidence of the cases transferred for review and prosecution is able to stand up to the test of law, and the wrongful charges or convictions be effectively prevented. Thus, the role of the 206 System is to **assist** the investigators, prosecutors and judges to handle cases. And the final decision on whether to use the evidence and how to convict and sentence is decided by the court and the judge rather than the machine. In fact, the 206 System functions as an "AI judge assistant, AI prosecutor assistant and AI investigator assistant", which fit for the assistive nature of the 206 System.

3.3 Name and Definition of the System

Due to its high-tech nature and assistive nature, the 206 System was formally named as "Shanghai's intelligent assistive system for criminal cases to implement the litigation reform with court proceedings as its core". And the definition of it is as follows.

In accordance with the stipulation of Criminal Procedure Law of the People's Republic of China that "the facts of a case are clear, the evidence is reliable and sufficient", and the arrangement of the CPC Central Committee to implement the litigation reform with court proceedings as the core, supported by high-techs such as big data, cloud computing, and artificial intelligence, "Shanghai's intelligent assistive system for criminal cases" formulates evidence standards and evidence rules uniformly applicable and embed them in the criminal case handling system of public security organs, procuratorates, courts, and judicial administrative organs, so as to help staff on duty to collect and examine evidence in a standardized manner, as well as to review and verify the evidence to ensure that the facts of cases found during investigations, prosecutions and trials are legitimate and that the whole process of handling criminal cases should be visualized, recorded and supervised, so as to reduce the arbitrariness of the judiciary and effectively prevent the occurrence of unjust, falsely or wrongly charged or sentenced cases.

Reference

Z. Xiaoqing, On judicial experience. Peking Univ. Law J. **27**(4), 919–937 (2015)

Chapter 7
The Basic Structure and Functions of the 206 System

1 Operation of the 206 System

The 206 System is operated through its "One Center, One Network, and Four Platforms". "**One Center**" refers to the central server of the System, which is located in the Shanghai High People's Court. "**One Network**" refers to the unified network connecting the case-handling platforms of the public security organs, procuratorates, courts and Bureau of Justice[1] of Shanghai, which allows the users to handle cases in accordance with the rules and procedures stipulated by the Criminal Procedure Law of the People's Republic of China. And "**Four Platforms**" refer to the four case-handling platforms of the public security organs, procuratorates, courts and Bureau of Justice of Shanghai in which the 206 System are embedded.

[1]Bureau of Justice: As the judicial administrative body of the government, the Bureau of Justice is a professional functional department in charge of the publicity and management of law affairs in a city, under the leadership of the municipal CPC committee and the city government, whose rank is slightly lower than the court and procuratorates of the city—by translator.

Y. Cui, *Artificial Intelligence and Judicial Modernization*,
https://doi.org/10.1007/978-981-32-9880-4_7

Through the data exchange managed by the data management center of the 206 System, information of the criminal cases during the investigation phase executed by public security organs, the examination for prosecution phase by procuratorates, to the trial-conviction-sentence phase by courts, and the execution of penalty phase by prisons or other relevant organs, can all be shared among them.

By building a secure data exchange channel between the external network of government affairs and the service networks of the city's the public security organs, procuratorates, courts and Bureau of Justice, the 206 System realized automatic synchronous data exchange and data sharing across the departments. The four case-handling platforms bound together by the 206 System constitute a larger open platform, on which the public security organs, procuratorates, courts and Bureau of Justice of the city are able to connect, interact and integrate their case-handling procedures, as well as keep on exchange new case-handling methods between each other, on the basis that new high-techs being constantly applied to the System.

2 Databases of the 206 System

As an important foundation of the 206 System, the Shanghai Databases for Criminal Cases include:

(1) Database of **Evidence Standards** provides the case-handling personnel with a set of uniformly applicable evidence standards, which is composed of the standards summarized by the legal experts, the standards applied in previous cases, and the standards newly generated in the case-handling practice.
(2) Database of **Constitutive Elements of Crimes** provides the case-handling personnel with the frequently asked questions (FAQs) and guidance to judge the objectivity, authenticity and relevance of the factual evidence in cases involving crimes of intentional homicide, intentional injury, theft, robbery, fraud through the Internet and telecommunication, smuggling, trafficking in, transporting or manufacturing narcotic drugs, illegally taking in deposits from the general public, etc.
(3) Database of **Case Information** provides the case-handling personnel with information of various criminal cases, including the progress and results of case acceptance and handling, the basic information of the criminal suspects, the progress and results of cases when the arrest applications of the suspects were submitted by the public security organs to the procuratorates to review for approval or disapproval, and the result of criminal suspects when cases were concluded by courts.
(4) Database of **Case Features** provides the case-handling personnel with the information of criminal instruments, fingerprints, seals, DNA features, etc. in the criminal cases such as intentional homicide, intentional injury, theft, robbery, and so on in Shanghai and other parts of the country.

(5) Database of **Electronic Files** provides the case-handling personnel with all kinds of electronic files generated synchronously with the case handling. With the function of working with different types of information acquisition equipment and service systems, **firstly**, the 206 System can generate and gather files synchronously with the progress of the cases. **Besides**, the System can automatically associate the electronic litigatory files that have been generated with the relevant cases. And **thirdly**, it can automatically classify the electronic files according to the contents of the database.
(6) Database of **Written Judgements** is built with the written judgments of the criminal cases in Shanghai as its staple and the cases of the similar types nationwide as its supplements by utilizing the technologies of Natural Language Understanding (NLU) and Information Extraction (IE).
(7) Database of **Cases** provides the case-handling personnel with the previous typical criminal cases in Shanghai and the guiding cases issued by the Supreme People's Court of the People's Republic of China, after having these cases collected and processed into a uniform file format. By completely recording the case handling procedures, trial procedures, summaries and analyses of various criminal cases, etc., this database can offer useful references for the officers in the public security organs, procuratorates and courts in case handling.
(8) Database of **Laws, Regulations and Judicial Interpretations** provides the case-handling personnel with the relevant laws, regulations and judicial interpretation of the criminal case. The formatted data of this database are formed based on the explicit laws, regulations, and judicial interpretations, and then the indexes are built by means of information processing, so as to provide guidance on the search functions applicable to law information for application programs of judicial services and basic databases.
(9) Database of **Case-handling Documents** provides the case-handling personnel with a large number of documents on criminal case handling. Meanwhile, by extracting the characteristic elements of these documents, it can also form associated information with other databases, and provide reference information for the applications such as "evidence gathering and securing", "case handling procedure supervising", etc.

By the end of March 2019, the above nine Shanghai Databases for Criminal Cases had collected 45 million pieces of documents. Among them, there are 26,777 documents in the Database of Cases, 43.38 million documents in the Database of Written Judgements, 948,384 documents in the Database of Laws, Regulations and Judicial Interpretations, and 1,277 normative documents of various types from public security organs, procuratorates and courts in the Database of Case-handling Documents. As for the Database of Evidence Standards and Database of Electronic Files, both of them will be updated synchronously with the establishment of evidence standards and the development of new cases.

3 Functions of the 206 System

The 26 functions of the 206 System are as follows (Table 1):

Table 1 Table of the functions modules of the 206 System

No.	Name of the function	Brief description of the function
1	To guide evidence standards and evidence rules	Digital and checklist-styled guidelines are provided for the case handling personnel in order to reduce the limitations, differences and subjectivity that may occur when case they collect evidence purely based on their personal experience
2	To verify evidence	Every piece of evidence collected is compared and verified from the three perspectives of procedure, form and content, based on which the conclusion of verification is automatically generated, and the case-handling personnel are reminded by the System to correct or make explanations for the defective evidence
3	To review arrest conditions	Case investigators are assisted by the System to review the conditions for arresting the suspects and make judgement on whether to submit the applications for arrests to procuratorates
4	To review and judge evidence chain and evidence of the whole case	Based on the model of evidence chain built for the System, a normative case-handling procedure is formed based on the systematically summarized case-handling experience, in accordance with the legal evidence standard that the facts of a crime are clear and the evidence is reliable and sufficient. By this procedure, whether the different categories of evidence of the same issue to be investigated and verified can prove each other, whether the different issues to be investigated and verified conform to each other logically, whether the statements made by same the criminal suspects or defendants at different times conflict each other—all these questions can be reviewed and judged by the 206 System
5	To assess the degree of social harm	With big data analysis, the factors of criminal cases that affect the degree of social harm are quantified and weighted, and the social harm assessment model of different criminal factors is constructed through deep learning of the 206 System
6	To transfer electronical files	Through this function, the data interfaces of the service systems of public security organs, procuratorates and courts are connected, so that they can directly send files to each other through “one-click transmission” when dealing with their respective procedures in cases handling
7	To organize pretrial meetings	This function can help **organize** the pretrial video meeting between the prosecutor and the defense, automatically **extract** the opinions of the two parties on the evidence at the meeting to generate the meeting outline, automatically **record** the whole process of the meeting to generate a meeting record and a meeting report

(continued)

Table 1 (continued)

No.	Name of the function	Brief description of the function
8	To recommend similar cases	The realization of this function is divided into two steps. **Step 1**: To provide machine learning samples for the System 206 by marking the criminal subject, criminal behavior, subjective state of the perpetrator, case facts, evidence and other elements of the criminal cases in the Database. **Step 2**: To automatically extract case information from documents such as written decisions of approving an arrest, bills of prosecution and written judgments by Deep Neural Networks (DNN) to construct models of DNN. Through these two steps, the 206 System can automatically recommend the similar cases selected by its intelligent search engine to case-handling personnel, with "cause of action" and "composition of evidence" as the keywords from a massive number of criminal cases in the Database of Case Information
9	To offer a frame of reference for sentencing	To realize this function, relying on a large number of historical precedents, the 206 System **first** executes a deep analysis on the sentencing process with the technology of big data, and accurately marks from three dimensions the data of "statutory punishment, benchmark punishment, and declared punishment" in the criminal documents of the databases. **Next**, the 206 System extracts statutory circumstances of sentencing, discretionary circumstances of sentencing, and historical factors affecting sentencing results from the details of cases to form a large size of samples for machine learning, so as to build the Sentencing Prediction Model. With the help of this Model, the 206 System can not only put forward sentencing recommendations for prosecutors, but also provide a reference for judges to make a sentence, so as to standardize sentencing and reduce of sentencing deviation and imbalance
10	To offer index of professional knowledge	Based on the features of the case, the materials such as laws and regulations, judicial interpretation, service documents and written judgments are systematically sorted and integrated to form a professional knowledge base. By automatically pushing professional knowledge related to cases to the relevant case-handling personnel, the 206 System can provide professional information support for the full-course of case handling
11	To generate documents automatically	Through the organic integration of the data resources, the 206 System can automatically generate documents needed in the process of criminal case handling. The documents include Letter of Proposal for Prosecution by public security organs, Arrest Opinion Review by procuratorates, Review on Public Prosecution Cases by procuratorates, the Criminal Judgements by courts, etc.
12	To supervise case-handling procedures	The 206 System can record the practice of evidence gathering, securing, reviewing and judging during the whole process of handling criminal cases, so as to strengthen the supervision of case-handling procedures

(continued)

Table 1 (continued)

No.	Name of the function	Brief description of the function
13	To review the speech evidence	The 206 System can transfer audio record into characters automatically with the technology of Voice-to-Character Conversion. And then with the technology of Natural Language Processing (NLP), it can also categorize speech evidence into groups with the evidence of the similar content as one group, so as to help the case-handling personnel quickly discover the contradictory points in the speech evidence of criminal suspects, victims and witnesses by comparing the case at hand with previous similar cases, and thus play a certain assistive role in quickly finding out the criminal facts. The case-handling personnel can make notes when locating recordings and video information, so that they can consult and check them again in the future. In short, the application of Pinyin-to-Character conversion and intelligent retrieval technology of the 206 System can help the case-handling personnel to compare the verbal evidence with the audio and video materials efficiently, and to discover whether there is any violation of laws and rules in the interrogation process
14	To assist the court proceedings intelligently	**Firstly**, the 206 System can instantly find and display all the related evidence of a case in court during the trial, in order to play an actively role in ensuring that court trials play a decisive role in finding out the truth, determining the facts, protecting the right to litigate, and producing a fair judgment. **Secondly**, the System can help the judges to collect all the notes they take when they read the documents of cases, and classify the notes into different types according to the case facts, evidence, conviction, sentencing and other items, so as to provide reference for judges in the trial, which helps the judge to pay attention to the key points of the court proceedings and thus improving the trial efficiency
15	To record the deliberation of collegiate panels	With the technologies of voice recognition and Voice-to-Character Conversion, the 206 System can record in real time the opinions of **collegiate panels**[a] on cases, and generate records of deliberation automatically, ensuring the entire process of court proceedings is recorded
16	To handle cases for commutation and parole online	With the data exchange channel connected with the service system of Shanghai Bureau of Justice, the applications for commutation and parole can be **submitted** online, the documents of the cases for commutation and parole can be **transferred** online, and such applications can be **approved/disapproved** online. As a result, the entire process of commutation and parole can be processed online, which greatly improves the efficiency of case-handling

(continued)

Table 1 (continued)

No.	Name of the function	Brief description of the function
17	To share annotations of the cases	When a case is closed, the 206 System can help the case-handling personnel of the public security organs, procuratorates courts to share their annotations of the case at different phases, including case investigation, approval for arrest of the suspect, case prosecution and court proceedings, which provides an opportunity for them to learn from each other, analyze their different opinions on the same issues in case-handling, strengthen their uniform understanding of evidence standards, and thus improving their case-handling ability
18	To make full-course audio and video recordings	The 206 System can be used to record in audio and video formats **not only** the whole process of criminal case handling—such as crime scene investigation, arrest of criminal suspects, interrogation of criminal suspects, **but also** pretrial meetings, court proceedings, discussion of **judicial committees**[b] of the court
19	To question/interrogate with key points	The realization of this function can also be divided into two steps. **Step 1**: based on the key facts, key points and skills of question/interrogation summarized by the professionals in this field, the knowledge graph for interrogation with key points is formed. **Step 2**: the model of "question/interrogation with key points" is built in the 206 System with the massive interrogation records in the databases as the samples for machine learning. The model can automatically suggest and guide case-handling personnel during interrogation to discover the case facts. Under the guidance of this function, case-handling personnel can conduct a well-structured interrogation and recording base on the key points of the fact; tease out the oral statements and spot the contradicting points in them timely, so as to avoid the missing of interrogation details caused by their lack of experience, as well as to ensure the comprehensiveness, legality and accuracy of interrogation records
20	To connect the different procedures in punishment execution	The 206 System can help courts, procuratorates, public security organs, bureau of prison administration to handle online the procedural matters that occur in the process of execution of criminal punishments, such as sending, receiving and transferring prisoners
21	To supervise the execution of punishment	Supported by this function, the 206 System can not only supervise the execution of **community correction** and **property-oriented penalties** so as to strength the supervision systems, but also keep a watchful eye on the criminals who plead not guilty and thus under **Level 4 and Level 5 management**[c] in prisons so as to supervise and manage, as well as evaluate quantitatively the execution of punishments on prisoners
22	To handle the cases of quick-track sentencing	The 206 System can set relatively simple evidence standards for cases that are qualified for speedy adjudication, and automatically generate written judgments to improve case handling efficiency

(continued)

Table 1 (continued)

No.	Name of the function	Brief description of the function
23	To manage illegally acquired money or goods	The 206 System can help to regulate the management of illegally acquired money or goods by transferring their list and related materials online
24	To provide other legal services	By incorporating the legal services such as people's mediation, legal aid, forensic identification, notarization, etc. into its litigation procedures, the 206 System can make these services applied and handled online
25	To manage seamlessly the **special population**[d]	With data connection, the 206 System can share information with various organs under procuratorates, public security bureaus, bureau of prison administration, bureau of community correction administration, exit-entry administration bureau, and general station of border inspection, so as to achieve seamless connection in the management of special population
26	To search for the criminal records and misdeeds of the suspects	Based on the preset rules, the 206 System can automatically search for the criminal records and misdeeds of the suspects from the databases of written judgements by the courts, written decision on administrative detention by public security organs, written decision on compulsory isolation for drug rehabilitation by public security organs, certificate of release by prison or other punishment executing organs. These records will be offered and transferred to the case-handling personnel of various organs along the case-handling procedures, so as to solve the previous problems in offline information searching, such as complicated procedure, long cycle, incomplete information, etc.

[a]Sole judges, collegial panels, judicial committees, and compensation committees are the judicial organs prescribed by laws in the People's Republic of China—by translator
[b]See Note 1—by translator
[c]According to the serving terms in prison, the consistent performance in prison, and the nature of the crime, the prisoners will be divided into five levels in management: special loose management (Level 1), loose management (Level 2), general management (Level 3), second-class strict management (Level 4), and first-class strict management (Level 5)—by translator
[d]Nowadays, Special population, including those released from prison, community correction targets, drug addicts, problem teenagers, left-behind children and minor children of those serving prison sentences, those deceived by cult, and persistent petitioners, are the key groups that induce the high incidence of crimes and social conflicts—by translator

4 Network and Data Security of the 206 System

With the judicial informatization formally entering into the data sharing era, the information exchange platforms of various case-handling organs effectively solve the problem of massive data storage and retrieval, but meanwhile give birth to new problems in security. In the big data environment, the traditional network boundary gradually disappears, and the applications and data are exposed to increasingly unknown and complex security threats. The traditional passive security protection means cannot effectively monitor, detect, track and prevent the attacks being carried out. Therefore, the security problems of networks and data become increasingly

prominent, it is more difficult for an integrated online system to provide an effective technical defense against data theft and data leakage caused by the irregularities of the insiders and external attacks of the hackers. According to the requirements of the **Level 3 Baseline for Classified Protection of Information System**,[2] together with of the current situation of information security in China, the high level security protection of an integrated information system can be achieved by integrating the traditional information security technologies with the safe, efficient and controllable service-handling capacity, basic computing capacity and basic operating environment. Moreover, the security protection strategies of the information system should also be formulated to protect the security of data during their whole life cycle, which includes data collection, transmission, storage, processing, sharing and erasing, so as to improve the efficiency of information security protection.

4.1 Network and Communication Security

The network security system of the 206 System is composed of the network firewall, intrusion prevention system, anti-virus system, security management system, operation and maintenance management system, etc. According to the relevant regulations on network security, the security level of the 206 System must meet the requirements of Level 3, which should also be reached by the networks of public security organs, procuratorates, courts, and bureau of justice. At present, all these units possess their own confidential intranets which are isolated from the external network. And the massive sensitive information and classified data inside these confidential intranets must not flow into the networks of lower security levels. Therefore, the communication between the data center and the intranets of public security organs, procuratorates, courts and bureau of justice should be achieved by the use of Uni-directional GAP, which supports the information flow ONLY from the network of lower security level to higher ones. And the communication between the intranets of public security organs, procuratorates, courts and bureau of justice can be realized through the use of bi-directional GAP, because the intranet security level of these units are of the same.

4.2 Data Security Protection Platform

With data transparent encryption technology, data anti-tamper technology, data dynamic desensitization technology, data firewall technology and data monitoring

[2]The requirements are from an official document "Information security technology—Baseline for classified protection of information system", which is produced by National Information Security Standardization Technical Committee, China's authoritative organization of information security. And once an information system of "Level 3" is damaged, serious damage will be caused to social order, public interests, or even national security—by translator.

technology, the data security protection platform of the 206 System is established to provide unified security protection for confidential data.

4.3 Data Asset Management

The data asset management function of the 206 System includes data asset scanning, intelligent identification, and management by types and levels, through which the System can automatically discover and locate the storage location of sensitive data, and clarify the distribution of databases in network environment. **In addition**, with this function, the System can also classify and mark all sensitive data contained in the System according to the defined types and patterns of sensitive data. **Besides**, data asset management enables the 206 System to automatically tease out massive data in data center, data cloud and other big data environment, so as to identify sensitive data and record their physical location, logical location, storage format, statement, data volume, query hot spots and other information. **Finally**, this function also provides visual management tools for mass data management and supports the implementation of hierarchical protection strategy for data security, which can guarantee data security and avoid excessive protection of data.

4.4 Data and Blockchain Tamper Resistance System

The intranets of public security organs, procuratorates, courts, and bureau of justice in Shanghai are not interconnected, and the data transmission between them is achieved through Uni-directional GAP. On the basis of "One center, Four platforms", five private block chains for evidence storage and collection are added to the 206 System to prevent data tampering.

The five private block chains are the Hash Private Blockchain of documents from **public security organs**, the Hash Private Blockchain of documents from **procuratorates**, the Hash Private Blockchain of documents from **Bureau of Justice**, and the Hash Private Blockchain of documents from **Commission for Political and Legal Affairs**.

Each private blockchain contains five **nodes**, locating in the intranets of the public security organs, procuratorates, courts, bureau of justice and Commission for Political and Legal Affairs respectively. It is worth noting that the data of the private blockchain of one unit can be **read and written** by that unit, the other four units can **only read** them through data synchronization achieved through GAP technology—is applicable to all the five private blockchains. For example, the data in the block chain of courts can be read and written through the node of courts, and the nodes of the other four units only enjoy the right to read the data of courts, with data stored in the intranet of courts synchronized to other nodes with GAP technology. And this rule is applicable to all these five private blockchains.

4.5 Security of Operating System

When the 206 System is hacked, the operating system (OS) is the last line of defense for its security. The damage of the OS by malicious software may lead to the loss of important data, the loss of control of key servers, and other extremely serious consequences. Therefore, the security product to enhance the system kernel is crucial and necessary to protect the confidentiality, integrity and reliability of user information, thus ensuring the data security. The mainstream OS security enhancement software product used by the 206 System can improve the overall defense level of its operating system, resist external targeted attacks, and meet the requirements of the **Level 3** Baseline for Classified Protection of Information System.

Chapter 8
The Main Functions of the 206 System

The three key elements of artificial intelligence are core technology, database and expert experience. Similarly, those of the 206 System are core technology, judicial big data and judicial experts. Among the three key elements, the application of various core technologies of AI is indispensable, otherwise a system cannot bill itself as "intelligent". However, the general purpose of the research and development of an intelligent system is to serve for the practice of a specific field. Therefore, the experts' suggestions, the actual needs and problems in that field are **of the same significance** as AI technology for developing an intelligent system.

Take the development of the **AI-assistive system for criminal cases** as an example. During the development of the 206 System, the **high-techs such as AI** are heavily relied on to solve the problems such as the lack of uniformly applicable and standardized evidence standards, the small defects and inconsistences in the evidence, etc., so as to reduce the arbitrariness of the judiciary, ensure that the factual evidence from investigations, prosecution and trial is able to stand up to the test of law, and prevent false charges and unjust or erroneous rulings. Without the core technologies of AI, the development of this intelligent system has no chance to succeed. Meanwhile, **human wisdom** is also indispensable for developing the System. For example, the task of discovering the problems in criminal proceedings and the needs of the case-handling personnel in criminal cases should be fulfilled by the experts in the criminal justice field. And the task that should be tackled jointly by the professionals in criminal justice (who are generally assigned as team leaders of such tasks) and technicians of artificial intelligence is to tease out and formulate the evidence standards, evidence rules and evidence models by the former, and to realize the functions of evidence guiding, reviewing and judging through the 206 System's machine learning of the above standards, rules and models by the latter, with the strong underpinning of the **judicial database**.

Y. Cui, *Artificial Intelligence and Judicial Modernization*,
https://doi.org/10.1007/978-981-32-9880-4_8

1 To Formulate Guide on Evidence Standards

The guide on evidence standards is the core function of the 206 System. No litigation can proceed without evidence. In the criminal procedure, as the prerequisite and the key to decide whether the facts of a case are clear, the **lawful, effective, sufficient and reliable** evidence forms the foundation for conviction and sentencing.

In judicial practice, although Criminal Law of the People's Republic of China determines 468 crimes and Criminal Procedure Law of the People's Republic of China determined eight categories of evidence, the concrete evidence standards for each crime are vague. We need to research crimes one by one, and formulate precise evidence standards for them, and embed them into the 206 System, so as to provide **uniformly applicable, user-friendly, standardized, digitalized and checklist-styled** guidelines for case-handling personnel, as well as to provide standard samples for the System to identify and determine crimes though machine learning.

The establishment of evidence standard guidelines is a major innovation in criminal justice reform. Although its formulation process is extremely complex, we ultimately overcame all the difficulties to full the task in order to meet the research and development needs of the 206 System, as well as to form a relatively complete theoretical system of criminal procedure and the system of criminal evidence.

Shanghai allocated more than 400 experts in criminal cases to accomplish this task, with over 220 judges from courts, over 80 prosecutors from procuratorates and over 100 from public security bureaus. It took them 21 months to formulate evidence standards for 102 common crimes, among which Shanghai contributes the evidence standards for 71 high frequency local crimes, with 12,989 items of checkpoints; and the other regions of the country are in charge of the evidence standards of the rest 31 common crimes national wide, which have entered the stage of argumentation and revision by now.

1.1 Definition of Evidence

What is the definition of "evidence"? The dictionary of *Origin of Words* defines it as "things to prove a fact".[1] *Modern Chinese Dictionary*[2] defines it as "the relevant facts or material that can prove the truth of something". Oxford Companion to Law[3] defines it as "facts, and results and statements inferred from facts which help the court or other investigative body to believe certain facts and circumstances that are unknown but under investigation."

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[1] *Origin of Words*, The Commercial Press, 1991, p. 2919.

[2] Dictionary Editing Office under Institute of Language Studies of Chinese Academy of Social Sciences, *Modern Chinese Dictionary*, The Commercial Press, 1996, p. 1605.

[3] David (1988, p. 316).

Apart from the dictionaries worldwide, the different versions of Criminal Procedure Law of the People's Republic of China (hereafter as "Criminal Procedure Law") also stipulate the legal definition of "evidence". Both Article 31 of the 1979 version, and the Article 42 of 1996 Amendment of Criminal Procedure Law stipulated that "All facts that prove the true circumstances of a case shall be evidence." And Both Article 48 of the 2012 version, and Article 50 of 2018 Amendment of Criminal Procedure Law, which is effective now, stipulate that "All materials that may be used to prove the facts of a case are evidence."

And according to the stipulation of the Second Paragraph of Article 50 of Criminal Procedure Law (2018 Amendment) [Effective], Evidence includes: (1) physical evidence; (2) documentary evidence; (3) witness statement; (4) victim statement; (5) confession and defense of a criminal suspect or defendant; (6) expert opinion; (7) transcripts of crime scene investigation, examination, identification, and investigative reenactment; and (8) audio-visual recordings and electronic data.

Since the promulgation of Criminal Procedure Law of the People's Republic of China on July 1st, 1979, the Criminal Procedure Law of China has undergone three amendments, and the one on October 26th, 2018 is the latest one. From the content of revision, the legal definition of "evidence" in the Procedure Criminal Law of China has been transformed from "Facts Theory" to "Materials Theory".[4] The definition of "evidence" in the 1979 and 1996 versions of Criminal Procedure Law just explained the function of evidence—"(to) prove the true circumstance of a case", but did not clarify the legal properties of evidence. Therefore, this definition follows the "Facts Theory", according to which the evidence is presumed as an objective existence. However, whether the evidence can prove the facts of the case is actually influenced by people's subjective review and judgment, which is difficult to be complete and objective.

When it comes to the definition of "evidence" in the 2012 and 2018 revised versions of the Criminal Procedure Law, obviously the "Materials Theory" is adopted, with the Article 48 of the 2012 Amendment stipulating that "All materials that may be used to prove the facts of a case are evidence." Besides, the Third Paragraph of Article 48 adds that "(e)vidence must be verified before being used as a basis for deciding a case," from which we can see that evidence does not equal to "a basis for deciding a case". The basis for deciding a case is the judicial personnel's selection and confirmation of the evidence which affects the conviction and sentencing of the case based on the questioning of evidence by the two parties of prosecution and defense. Strictly speaking, this kind of evidence can be perceived as "evidence for deciding a case". Therefore, when evidence is to be confirmed, the object of review is "materials"; and when "a basis for deciding a case" is to be confirmed, the object of review is "evidence". As a result, the legal concept of "evidence" can be interpreted

[4]Except for "Facts Theory" and "Materials Theory", there are some other representative interpretations of "evidence in litigation" proposed by Chinese scholars, such as the "Foundation Theory", "Legal Existence Theory", "Proposal Theory", "Revised Facts Theory", etc.

as materials in legal form that are used to prove whether case facts or facts related to legal matters exist or not.[5]

In consequence, the litigation reform with court proceeding as its core which is being implemented at present is actually a reform to promote standardized evidence, with evidence as the core. The purpose of this reform is to guarantee that the evidence collecting, questioning, and accepting are in compliance with the law; that the requirements of evidence properties—**authenticity, legality and relevance**—are met; and that the evidence standard of "**the facts of a crime are clear and the evidence is reliable and sufficient**" is achieved, so as to prevent the illegal or defective evidence entering into each procedure of litigation, and to prevent the wrongful charges and conviction.

1.2 Guide on Evidence Standards

Guide on evidence standards is the core function of the 206 System, the formulation of which constitutes the staple of the reform of the trial-centered criminal procedure system.

"The integration of innovative technology and the reform of the litigation system is of especially significance for the reform of the trial-centered criminal procedure system in China. The integration here refers to embedding **uniform evidence standards** into a digitalized program based on the further application of big data analysis in order to reduce judicial arbitrariness, improve trial efficiency, and promote the judicial justice," said Secretary **Meng Jianzhu**, the former head of Commission for Political and Legal Affairs under Communist Party of China Central Committee.

He also demonstrated the procedure of the litigation reform, "Firstly, **to collect and summarize evidence standards and rules by extracting the useful information from a massive judicial data with high-techs such as big data**. Secondly, to establish the framework and details of **a standardized evidence system** based on the previous experience in building digital courts and intelligent courts. Thirdly, to implement the trial-centered litigation reform relying on this standardized evidence system as well as the substantiation of court trials. **Thus, a new path to realize the litigation reform is found**."

In the field of criminal justice research, there have been concepts such as standard of proof, rule of evidence, specification of evidence, and character of evidence, etc. As an **innovative** concept in the field of criminal justice theory in China, **"evidence standards guidance" enriches and improves the theoretical system of criminal procedure and the system of criminal evidence**, which is **groundbreaking**.

As the core function of the 206 System, "evidence standards guidance" refers to the norms of evidence collection in the handling of criminal cases, mainly on which evidence should be collected and how to collect them. These standards of evidence collection are the concretization and standardization of the abstract evidence standard

[5] Jiahong (2000, pp. 93–99).

stipulated by law that "the facts of a crime are clear and the evidence is reliable and sufficient". This evidence standards guidance consists of a complete chain of evidence, matters that must be verified, basic evidence to be collected, questions requiring attention or prompting questions, a comprehensive analysis and judgment of evidence, etc.

Currently, there are 468 crimes stipulated by China's Criminal law and its amendments. Through judicial big data analysis, there are 102 common crimes nationwide, among which 71 are common crimes in Shanghai. By the end of October 2018, the team of Project 206 had completed the formulation of guide on evidence standards for 71 common crimes in Shanghai. The establishment of evidence standards for 31 crimes involving other provinces and municipalities across the country has also entered the stage of argumentation and revision, which is scheduled to be completed by the end of March 2019.

1.3 Reasons

The reasons for establishing the evidence standards guidance are twofold:

(1) To prevent wrongful charges and convictions

Since the 18th National Congress of the CPC in the end of 2012, the people's courts have corrected the judgments on 46 major criminal cases, in which cases, people were unjustly, falsely or wrongly charged or sentenced, including the case of Nie Shubin and the case of Hugjiltu. Though the reasons for the cases of the wrongful charges and convictions are complicated, in general, there are major problems in the evidence of the majority of such cases. And the important reason for such problematic evidence, almost with on exception, is because the facts of a crime are NOT clear and the evidence is NOT reliable and sufficient. The correction of judgements on such cases according to law only not embodies the impartiality and justice of the rule of law in China, but also proves the significance to formulate the guide on evidence standards and evidence rules.

(2) To realize the standardization, concretization and operationalization of evidence

Article 50 of Criminal Procedure Law (2018 Amendment) [Effective] stipulates that All materials that may be used to prove the facts of a case are evidence. Evidence includes: (1) physical evidence; (2) documentary evidence; (3) witness statement; (4) victim statement; (5) confession and defense of a criminal suspect or defendant; (6) expert opinion; (7) transcripts of crime scene investigation, examination, identification, and investigative reenactment; and (8) audio-visual recordings and electronic data. Evidence must be verified before being used as a basis for deciding a case. Besides, **Article 55 of Criminal Procedure Law** (2018 Amendment) [Effective] stipulates that **evidence is hard and sufficient when the following conditions are met**: (1) All facts for conviction and sentencing are supported by evidence; (2) All

evidence used to decide a case has been verified under legal procedures; and (3) All facts found are beyond reasonable doubt based on all evidence of the case.

However, in judicial practice, especially in handling of individual cases, the concrete standards to classify the eight categories of evidence, together with the precise methods to collect and identify the evidence, as the frontline case-handling personnel always complained, are invisible, and difficult to understand and grasp. As a result, for a long time they have been relying mainly on their personal experience and even personal feelings to collect evidence in daily case handling, but different case-handling officers often have different knowledge and understanding of evidence. Therefore, it is necessary to formulate standardized, checklist-styled and uniformly applicable guide on evidence standards, which the officers handling cases can follow, understanding and grasp, so as to reduce judicial arbitrariness and irregular case-handling behavior, as well as to prevent unjust, false and wrongful charged or convicted cases—all of these are the targets of criminal litigation reform, and have been yearned for by the frontline case-handling personnel for a long time.

1.4 Methods and Route

(1) To build teams of judicial experts

To formulate evidence standards guidance is an innovative, complex and massive project that must rely on collective wisdom and efforts to achieve. We have allocated more than 400 experienced experts of criminal cases from courts, procuratorats and public security bureaus in Shanghai to solve this challenge. According to the characteristics of a certain type of cases, and based on the professional expertise of each expert, 71 common crimes were assigned to several expert teams, with each team responsible for researching and formulating the evidence standards for several crimes.

(2) To conduct in-depth and extensive surveys

Without full investigation, we will not be able to deliver our opinion. And it is not advisable to work in a closed-door and imaginary way. Only by truly understanding the existing problems and actual needs can we avoid deviation in our work. Therefore, we went to public security organs, procuratorates, courts, as well as the primary-level danwei (an organization where people work) of criminal investigation department, economic crime investigation department, and local police stations, etc. to conduct in-depth surveys. We also organized forums and seminars on evidence standards, in order to broaden our thoughts by gathering advice from judicial experts and scholars

(3) To grasp the rules and implement step by step

On the basis of repeated argumentation and verification by the teams of expert, and the personal working experience, we find that there are relatively fixed features and rules in evidence collection of each classic type of cases. As long as we grasp these

features and rules, many problems of formulating guide on evidence standards will be readily solved.

Take the homicide cases as an example. The Experts Team of Homicide Cases first scrutinized the case files, trial reports, written judgements of 591 homicide cases (including 319 cases convicted of intentional homicide, 195 cases of intentional intentionally hurt, 74 case of robbery, and 3 cases of kidnap) that were concluded by courts in Shanghai from 2012 to 2016. Then, based on the number of evidence required to verify the homicide case, as well as the different structure of evidence, the Team divided the homicide cases into four types—(1) homicide case being witnessed at the crime scene, (2) homicide case with criminal traces left at the crime scene, (3) homicide case with confession of the suspect verified, and (4) the homicide case with the suspect pleading not guilty—which are arranged in the order of the evidence required, from simple to complex.

For instance, **homicide case with confession of the suspect verified** refers to the criminal cases in which neither witnesses nor important criminal traces are found at the crime scene, the suspects are identified and arrested because of the relevant clues discovered by the police, and their confession is highly consistent with other evidence.

For this type of homicide case, **the way to obtain evidence** is that the police comb through the social relations of the victims, trace a variety of criminal clues, and then identify the suspect. The **key to obtain evidence** is as follows. **Firstly**, to acquire a full confession from the suspect timely; **secondly**, to make a special effort to investigate whether the relevant facts in the suspects' confession can be proved by the evidence found afterwards based on their confession; **thirdly**, to make full comparison between the facts in confession and evidence with the details found at the crime scene, so as to reach a judgment that unless the suspects personally committed the crime, they could not tell the facts highly consistent with the details of the crime scene.

This kind of case generally usually occurs under three circumstances. The first circumstance is that the criminal suspects voluntarily deliver themselves up and truthfully confess their crime. The second is that the suspects are identified because of their close interactions with the victims before their death, and truthfully confession their crime after being arrested. The third is that the suspects are identified because they appeared near the crime scene during the time of crime, and truthfully confession their crime after being arrested.

When investigating criminal facts, the basic evidence to be collected in such cases mainly includes confession of a criminal suspect; transcripts and photos of crime scene investigation and examination; registration form of traces and stuff collected from the crime scene; transcripts, checklist and relevant transcripts of identification of search and impoundment; route and location of body dumping and other crime scene transcripts of identification; forensic DNA examination and identification report; physical evidence examination report; forensic postmortem examination report; witness statement or surveillance video of facts relevant to crime; witness statement to verify the cause of crime; and other evidence which will influence the conviction and sentencing.

Compared with this type of homicide case, the basic evidence to be collected in the **homicide case being witnessed at the crime scene** is not as much, which only includes witness statement; surveillance video of the crime scene or victim statement; transcripts and photos of crime scene investigation and examination; forensic postmortem examination report; witness statement to verify the cause of crime; and other evidence which will influence the conviction and sentencing.

Based on the rules stated above in evidence collection of different types of crimes, a total of 102 common crimes in criminal cases nationwide in the past three years were chosen as the objects of research to formulate evidence standards guidance for the 206 System. With the statutory requirement of evidence that "the facts of a case are clear, the evidence is reliable and sufficient" as the premise, we started to formulate evidence standards guidance for these 102 common crimes one by one, considering the complexity and structure features of the evidence of each crime, and the practical requirements of the trial. By the end of October 2018, after the hard work of one year and eight months, we have completed the establishment of evidence standards for 71 common crimes in Shanghai, forming 12,989 verification points, and covering more than 90% of Shanghai's criminal cases. The completion of this task of evidence standards formulation should be attributed to the joint wisdom and sweat of the all the experts in criminal practice in courts, procuratorates, and public security organs of Shanghai.

1.5 Framework and Main Contents

(1) Which type of evidence to collect and how

The function design of the 206 System should realize multi-purposes. For example, the function to "review and judge evidence" is designed to prevent wrongful charges and convictions, as well as to effectively implement the trail-centered litigation reform. **Besides**, the functions of the System should be not only user-friendly for the frontline case-handling personnel to learn and grasp, but also able to uphold the basic principle prescribed by China's Criminal Procedure Law that public security organs, procuratorates and courts, in carrying out their respective duties, must also support and restrain one anther during the criminal litigation process. Therefore, functions of the 206 System should be designed to guide the case-handling personnel to collect evidence "step by step", "type by type" and "phase by phase".

"**To guide step by step**" means that when handling an individual case, the case-handling personnel can be reminded by the 206 System step by step about which facts should be verified and which categories of evidence should be collected, so as to construct a complete and closed evidence chain.

"**To guide type by type**" means that the case-handling personnel can be reminded by the 206 System about which categories of evidence should be collected, based on the structural features of the evidence and the complexity to verify criminal facts in handling cases of different types of crimes.

"**To guide phase by phase**" means that the case-handling personnel can be reminded by the 206 System about which categories of evidence should be collected, based on the different requirements of evidence collection in different phases of litigation.

(2) Chain of evidence

The evidence chain generally consists of 6 connected links, (1) source of case clues, (2) process of suspect identification and arrest, (3) verification of criminal facts, (4) analysis on evidence sufficiency and exclusivity, (5) performance of the suspect before and after the crime and other sentencing circumstances, and (6) alleged crimes.

For the complex or special types of cases, relevant links will be added to the chain of evidence. For example, in the evidence chain of the homicide case, the link of "to look for the victim and identify the deceased" will be added after that of "case clue". And for the unlawful fund-raising case, the link of "administrative illegality of fund-raising activities" will be added to its evidence chain.

The requirement for each link is as follows:

The link of "**source of case clues**" is to investigate how the case is discovered by the investigation organs. The link of process of "**suspect identification and arrest**" is to investigate how the suspect is identified and arrested. The link of "**verification of criminal facts**" is to investigate the criminal facts such as time, location, perpetrator, means, course, consequence, motive, premeditation, etc. The link of "**analysis on evidence sufficiency and exclusivity**" is to investigate whether the evidence is hard and sufficient so that the facts of a case can verify each other; and whether the evidence is logical so that all facts found are beyond reasonable doubt. The link of "**performance of the suspect before and after the crime and other sentencing circumstances**" is to investigate whether the suspect has criminal records and misdeeds, whether there exit the statutory circumstances such as voluntary surrender, meritorious performance, etc., whether there exit the discretionary circumstances such as the suspect returning the money or property or making compensation, the suspect having obtained forgiveness from the victim, etc., and whether there exit other circumstance of leniency or aggravated punishment for the suspect. The link of "**alleged crimes**" is to investigate the constitutive elements of crime, as well as how to distinguish the similar crimes or crimes easy to be confused.

Therefore, whether the evidence standards guidance for a certain type of case is normative can be judged from six perspectives: (1) whether the evidence chain is closed; (2) whether the facts to be verified are missing; (3) whether the classification of evidence is necessary and accurate; (4) whether the comprehensive analysis of evidence is reasonable; (5) whether the matters needing attention are put into place, and (6) whether the distinction between primary evidence and corroborative evidence are accurate.

(3) Evidence collection for approval of arrests

Given that the guide on evidence standards of the 206 System is design to provide the case-handling personnel with suggestions on evidence collection at different phrases, the guide on evidence collection at the phase of approval of arrests, one of the major

phases of litigation procedures, is also included in the System. Therefore, during the process of evidence standards formulation, the checklist of the primary evidence to be collected at the phase of arrest approval is specified in particular.

(4) Comprehensive analysis and judgement of the evidence

To meeting the statutory requirements of evidence that "evidence should be hard and sufficient", evidence collection is just the foundation. The proper employment of evidence relies on comprehensive analysis and judgment, through which, verification, logic and contradiction of relevant evidence under the facts can be determined, so as to eliminate reasonable doubt and draw the only conclusion. Therefore, the rules of comprehensive analysis and judgment are clarified in the guide on evidence standards of the 206 System.

To sum up, although different stages of litigation, such as investigation, prosecution and trial, have different requirements on the standard of proof, forming a complete and closed chain of evidence to find out the facts of relevant cases is the ultimate goal of each stage. Therefore, the formulation of evidence standard guidance provides a digitalized and checklist-styled guide, which is uniform, standardized, and normative, on evidence collection for case handling personnel, forcing them to collect evidence in a standardized way, so as to effectively prevent unjust, false and wrongful cases, improve the quality and efficiency of case handling, and preserve litigation resources. Moreover, the guide on evidence collection of the 206 System can ensure that cases investigated, prosecuted and judged stand the test of the law. Therefore, this function can be regarded as a major achievement of the trial-centered litigation reform, as well as that of the research and development of intelligent assistive system for criminal case handling.

2 To Formulate Guide on Evidence Rules

2.1 Definition of Evidence Rules

Evidence rules refer to the norms to be followed in evidence collecting, securing, saving and utilizing by the public securities organs, procuratorates and courts in handling criminal cases. The main purpose of evidence rules is to solve the problems of the legitimacy, authenticity and relevance of evidence, as well as the problems in evidence utilization, such as authentication of evidence, the use of hearsay evidence and exclusion of the illegally collected evidence.

2.2 Guide on Evidence Rules

The function of "guide on evidence rules" refers to the fast retrieval mechanism for evidence rules of the 206 System. To realize this function, we have compiled *Rules on Evidence Collecting, Securing, Reviewing and Judging of criminal Cases in Shanghai* (hereinafter referred to as ***Rules of Criminal Evidence in Shanghai***) by combining the rules on criminal evidence in relevant laws and regulations with the actual situation in Shanghai. It covers all types of evidence involved in the whole process of criminal proceedings, including (1) 8 categories of evidence stipulated in China's Criminal Procedure Law, (2) sentencing evidence and (3) procedural evidence materials.

For (1) **8 categories of evidence stipulated in China's Criminal Procedure Law**, each category of evidence is further divided into 3 components, procedure of evidence collection, regulation of formality requirements and content requirements, as well as inadmissible conditions. For (2) **sentencing evidence**, the evidence needs collecting, together with the norms of collecting them, is enumerated for common statutory circumstance and discretionary circumstance such as voluntary surrender, meritorious performance, recidivists, committing the same offense again, a settlement being reached between the suspect and the victim etc. For **(3) procedural evidence materials**, i.e. the various procedural matters involved in case-handling by public security organs, procuratorates and courts, such as taking a compulsory measure against the criminal suspect, property inquiry, and freezing of property, the requirements for the documents writing of these matters are clarified in the 206 System, which is convenient for the staff of public security organs, procuratorates and courts for rapid retrieval and easy reference during the evidence gathering, securing, saving and utilizing.

Take electronic data as an example. The *Rules of Criminal Evidence in Shanghai* establishes guide on collection procedure, as well as examination and judgement rules of electronic data respectively. In the process of **evidence collection of electronic data**, there are 6 requirements, including that "No less than 2 investigators shall be assigned to collect and obtain electronic evidence, and the methods of obtaining such evidence shall meet the relevant technical standards," that "The original storage media should be seized and sealed, and transcripts should be made to record the sealed condition of the original storage media," etc. The examination and judgment of electronic data are divided into three aspects, namely authenticity, integrity and legality, with a total of 17 specific rules. Moreover, 4 circumstances of defective electronic evidence and their respective requirements for correction, together with 3 circumstances to exclude the illegally collected electronic evidence are stipulated by the *Rules*. For example, the electronic evidence that has not been transferred in sealed condition, or its name, category and format are not clearly indicated, etc., shall be supplemented or reasonably explained. If not, such electronic evidence shall not be used as a basis for deciding the case. If the authenticity of the electronic data is reduced by data deleting, altering or adding, such data shall not be used as a basis for deciding the case. Therefore, by following these rules of evidence collection guided

by the 206 System, judicial officers can determine whether the evidence should be admitted, if not, it will be required to be supplemented, corrected or excluded.

2.3 Reasons

Why the function of "guide on evidence rules" should designed in the 206 System. It's because the stipulations on evidence rules are included in many laws and regulations, as well as a variety of normative documents, such as *Criminal Procedure Law of the People's Republic of China*, *Interpretation of the Supreme People's Court on Application of the Criminal Procedure Law of the People's Republic of China*, *Rules of Criminal Procedure of the People's Procuratorate (for Trial Implementation)*, *Provisions on the Procedures for Handling Criminal Cases by Public Security Organs*, *Provisions on Several Issues concerning the Exclusion of Illegal Evidence in Criminal Cases*, *Provisions on Several Issues concerning the Examination and Judgment of Evidence in Death Penalty Cases*. With their vast and diverse content overlapping partially with one another, each law, regulation and document have their different points of emphasis, and thus they are inconvenient to access to and use. Therefore, it is necessary to systematically sort out the above legal materials and provide the case-handling personnel with a checklist-styled guidance. That's why the ***Rules of Criminal Evidence in Shanghai*** was made, which not only comprehensively collects the contents of the existing evidence rules, but also classify and standardize the various requirements of evidence collection, so as to achieve accurate and fast guidance.

2.4 To Embed the Digitalized Evidence Rules into the 206 System

How to achieve this function of "guide on evidence rules" in the 206 System? Generally speaking, this function is achieved by embedding the "verification rules" which is transformed from the content of ***the Rules of Criminal Evidence in Shanghai*** and can be recognized by the computer into the 206 System. And the specific approach is to firstly divide the common evidence in case handling process into formality requirements and content requirements. Next, input the text of ***the Rules*** into the 206 System, and make the text recognizable by the computer after processed by the programs developed by the programmers through setting rules, recognizable fields, validation type, location of recognition, fields of defective information and fields of prompting information.

Take transcripts of crime scene investigation as an example, its evidence rules are regulated from two perspectives. **One** is to set rules for transcripts. The formality requirements for evidence of transcripts should include: (1) reason, (2) time, (3)

venue, (4) condition of the scene, (5) result of investigation, (6) the signature of the investigator, (7) the signature of the witness, (8) seals. The procedural requirements for evidence of transcripts should include: (1) photos of investigation, (2) map of the scene, (3) specifications of the qualifications of the witness. **The other** is to ensure the integrity of the evidence. The content of *Transcript for On-site Investigation and Inspection* should be insistent with its relevant evidence *List of Collected trace and physical evidence*, both of which are indispensable.

When guide on evidence rules is transformed into a more logical, corresponsive and unique computer language, the function "to verify a single evidence" of the 206 system is formed, becoming an important tool to assist case handling. Once a piece of evidence is recorded, the System can identify the type of it, and automatically apply the corresponding rules for verification. It should be noted that although most content of evidence rules guidance can be converted into verification rules and verification points that can be recognized by computers, the function of "a single evidence verification" cannot completely cover the evidence rules, and thus manual review is required. This is mainly based on two reasons. On the one hand, the current technical capabilities cannot fully achieve the standards of manual verification. For example, the recognition rate of computer to identify the handwriting, finger prints and seals is still not high. On the other, some elements of the evidence should be judged in combination with other factors. For example, one requirement for physical evidence is that "when identifying an object, there shall be no less than five objects or its photographs of the same kind". However, the current level of AI technology can only identify the number of photos, but cannot judge whether the photos are of "the same kind". To date, this question can only be answered through manual review.

3 To Interrogate with Key Points

The realization of this function can also be divided into two steps. Step 1: based on the key facts, key points and skills of question summarized by the professionals in this field, the knowledge graph for interrogation with key points is formed. Step 2: the model of "question with key points" is built in the 206 System with the massive interrogation records in the databases as the samples for machine learning.

With the help of this model, the 206 System can automatically suggest and guide case-handling personnel during interrogation to discover the case facts. Through this function, case-handling personnel can conduct a well-structured interrogation and recording based on the key points of the fact; tease out the oral statements and spot the contradicting points in them timely, so as to avoid the missing of interrogation details caused by their lack of experience, as well as to ensure the **comprehensiveness, legality and accuracy** of interrogation records.

4 To Build Evidence Models

4.1 Definition of Evidence Models

Evidence model is an evidence chain system of different types of cases, which is supported by evidence standard guidance and evidence rules guidance and aims to find out the facts of cases. It divides the **factors** that affect the conviction and sentencing of criminal procedure and the judgment elements of evidence normalization into different links. Then with intelligent machine learning, the 206 System can automatically help case-handling personnel to identify, examine, evaluate, review and judge the various factors of evidence, and demonstrate the whole case of evidence, together with the analysis results of the verified facts, to its users in the form of knowledge map.

4.2 Methods and Route to Formulate Evidence Models

In judicial practice, although criminal cases vary greatly and each case presents different characteristics, from the perspective of criminal procedure, the criminal facts of any case can be summarized into a fixed logical order, commonly known as "Six W": Who, When, Where, What, Why and What result.

If the "Six W" is clearly verified, a closed chain of evidence can be formed to meet the requirements for establishing the basic criminal facts of the case. Therefore, when designing the evidence model, we should grasp the most essential characteristics of criminal activities, take the investigation of "Six W" as the basis, pay attention to the investigation and verification of other circumstances that affect the conviction and sentencing, and be supplemented by necessary procedural elements. Only in this way, can the overall picture of the case be reflected, and the final conviction and sentencing obtain a comprehensive support.

In the process of constructing the evidence model, we lock the information points of the case through the horizontal and vertical dimensions.

In the **horizontal structure** of the Evidence Model, seven basic links of evidence chain are arranged: (1) source of case clues; (2) to look for the victim and identify the deceased; (3) process of suspect identification and arrest; (4) verification of criminal facts; (5) analysis on evidence sufficiency and exclusivity; (6) performance of the suspect before and after the crime and other sentencing circumstances; and (7) alleged crimes. Based on the characteristics of all kinds of cases, the number of links here can be added or deleted, and the order of each of them can be rearranged.

In the **vertical structure**, five items are designed: (1) Chain of evidence; (2) matters to be verified; (3) Verification of evidence; (4) open structure; and (5) question reminder. From case elements separating, to guide on evidence collection, and to summary of judicial experience, the five items under this structure provides a checklist-styled guidance for case handling.

Specifically, the construction of evidence model mainly follows the four paths below:

(1) To simulate the case detection logic of investigation activities

The logical starting point of criminal procedure originates from investigation activities. Therefore, the construction of evidence model also needs to describe the constituent links of the evidence chain of various cases from the perspective of investigation. The evidence model is designed by consulting the opinions of investigation organs, sorting out the judgment standards of procuratorial organs and judicial organs in finding facts, and carrying out statistical analysis of a large number of empirical cases to reasonably arrange the horizontal links of the evidence chain. In addition to the seven basic links mentioned above, the 206 System can also adjust the number and order of the links involved in the evidence chain according to the actual requirements for evidence of each crime, so as to fully meet the needs of actual case investigation and conform to the inherent rules of investigation activities in various cases.

(2) To clarify the facts to be verified under each link of the evidence chain

In the evidence model system, the seven links in the horizontal structure are designed to construct a complete evidence chain. According to the empirical analysis and the summary of judicial experience, each link is further divided into different facts to be verified, so as to ensure that all the facts for conviction and sentencing can find their own place in the chain. And the five items in the vertical structure are the facts in each link be verified and the corresponding basic evidence they need. This structure also lists the problems that the investigators may encounter in the search process and the matters that need special attention, so as to ensure that the verification relationship can be formed independently inside each link.

(3) To guide the investigation organs to collect evidence with full sample analysis

Through the comprehensive analysis of the investigation files, trial reports and written judgments of related cases heard by Shanghai courts in recent five years, we obtained the number and frequency of occurrence of various kinds of evidence in a certain type of case with the help of big data analysis. On this basis, the 206 System sorted out the high-frequency evidence of various facts to be verified as the basic evidence to confirm these facts, reminding investigators to pay special attention to during their evidence collection. In addition, the evidence model of the System also sets corresponding auxiliary evidence according to the specific characteristics of different criminal activities, reminding investigators to collect additionally in specific circumstances, so as to realize personalized guide on evidence searching.

(4) To remind the investigators about common problems based on judicial experience

In essence, to build the evidence model is (1) to establish the evidence standards which can determine a crime in judicial procedure and apply them in case-handling practice as operation procedure and norms; (2) to sort out possible risk points and weak links in investigation activities and highlight the common problems exposed in the evidence collection and evidence chain construction of certain type of cases, so as to provide some guidelines for investigators to solve cases; (3) to eliminate the elements that may cause unjust, false and wrongful cases in the link of evidence collection as far as possible by standardizing the procedure of evidence collection, which reflects the restriction and guidance of trial activities on investigation activities and meets the needs of the trial-centered litigation reform.

4.3 Basis to Make the Evidence Models Work

How well the evidence model can work is mainly based on how accurately the evidence has been sorted and judged. And in the process of evidence sorting and judging, it is crucial to select **the facts to be verified**, in other words, the key elements contained in each evidence.

And how to obtain these key elements of each evidence? In the 206 System, we first break down the elements needed to build the evidence chain for each crime into several information points, and give each of these points a fix tag name, such as time of crime, venue of crime, motive of crime and premeditation, the location of the booty, etc. Next, through marking tags on the evidence materials, the System can extract the information points required in the investigation of a certain type of crime. Finally, the information points thus extracted will be displayed on the System page that can be seen directly by the case-handling personnel, from which they can grasp the progress of evidence collection, and determine whether a complete chain of evidence can be formed.

Manual annotation. At the beginning of system development, we required case-handling personnel to identify and underline the **key elements** related to conviction and sentencing when they read the evidence materials, especially the transcripts, and select the corresponding labels to manually annotate them, the purpose of which is to provide materials on evidence chain review and judgement for the autonomous machine learning of the 206 System, as well as to provide basic technical means for systematic and comprehensive analysis of the case.

Automatic annotation. Since March 2018, we have been developing the automatic annotation function of the 206 System. Firstly, the labels of various kinds of evidence manually marked at the early stage of system development are used as samples for the automatic machine learning of the System. Then, through artificial intelligence and other high-techs, the semantic meanings of evidence content can be

recognized, and relevant information points automatically extracted and labeled by the System. This set of labels of the 206 System is directly related to the evidence chain, and the automatically labeled evidence materials will be summarized in the form of independent information points on the page of "review of the whole case evidence chain under the function of evidence model, so as to replace the manual annotation and enhance the practicability of the system and the satisfaction of users. By the end of October 2018, the annotated cases of larceny and robbery have been available online, with the key elements of 88% of larceny cases and 80% robbery cases being marked.

4.4 Evidence Models as a Reminder of Problems

The embedded functions in the evidence model of the 206 System include evidence collection guidelines, single evidence verification, verification analysis among related evidence, review of the evidence chain of the whole case, etc. These functions can not only provide uniformly applicable guide on evidence collection for the public security organs, procuratorates and court, but also provide real-time identification and judgment of the evidence materials input into the System by case-handling personnel. Moreover, the System can automatically check the compliance of uploaded evidence materials one by one through thousands of check points embedded in the backstage of the System. The system will automatically issue a warning to case-handling personnel about the flaws and contradictions in the evidence and guide them to make supplement, correction or explanation. Through the above technical means, case investigators are forced to pay attention to the adequacy and standardization of case evidence collection, so as to ensure the comprehensiveness and legitimacy of case evidence materials in the link of investigation and evidence collection.

For example, according to Article 118 of China's *Criminal Procedure Law (2018 Amendment)*, after a criminal suspect is transferred to a jail for custody, the investigators shall conduct interrogation of the criminal suspect inside the jail, so as to prevent and reduce the phenomenon of extortion of a confession by torture. However, through automatic examination, the 206 System discovered that after the suspect was sent to jail, the place where he was interrogated was still recorded as the police station, which was not the case-handling place prescribed by law. On discovering this defect in evidence, the System immediately reminded the case handling personnel of this problem by highlighting the problematic place in the evidence in the color of orange (see the screenshot below).

Transcripts of Interrogation in the 206 System

4.5 *Functions of the Guide on Models, Standards and Rules of Evidence*

Evidence model, evidence standards guidance, and evidence rules guidance constitute the core functions of the 206 System. Their roles and value are mainly reflected in the following three aspects:

(1) To guide evidence collection and improve the efficiency of case-handling

The function of "guide on evidence standards" can be regarded as "a private advisor" for case-handling personnel. Being reminded about the basic evidence and the auxiliary evidence to be collected for a certain type of criminal case in the form of checklist, the case-handling personnel can efficiently collect the evidentiary materials necessary for the determination of a certain type of crime, so as to make early preparation for the judicial proceedings. Meanwhile, through the preliminary and embedded judgment of the evidence chain, the 206 System can remind the investigators about the omissions and defects in the evidence collected, so that they can remedy and correct timely, and thus to ensure the adequacy and legitimacy of the collected evidence.

(2) To display the complete evidence chain and promote the quality of case-handling

The functions such as single evidence verification, review of the whole evidence chain, etc. can **minimize defects and contradictions** in the evidence materials and between them. And the design of the evidence chain model, the core component of evidence model of the 206 System, provides a full demonstration of this role. **Firstly**, the **f**acts of a certain type of case need verifying are clearly listed in the evidence chain of the System, and under each fact, several pieces of basic evidence need collecting

are recommended by the System. By following the expert guidance of the System, the investigators can collect and upload the evidence materials. **Secondly**, after the semantic recognition of the content of the evidence materials, the 206 System can automatically match each preset information point to the corresponding facts to be verified by using the label as the logical connection point, and display the evidence chain which has been constructed to the users. If the user of 206 System is a criminal investigator, he/she can take the completion of the evidence chain as a criterion to judge whether the investigation is completed or not. And if the user is a judge, he/she can make a preliminary judgment on whether the evidence in a case can form a complete and closed chain of evidence or not, so as to ensure that every case can stand the test of law and history.

(3) To unify evidence standards and regulate the behaviors in case-handling

First of all, the 206 System enables the users to have a clear understanding of the norms they should follow in the process of handling cases through the formulation of unified guidelines on evidence standards. **Secondly**, in the way of guiding step by step, type by type and phase by phase, the System enables case-handling personnel to clearly understand the matters to be verified and the evidence to be collected in each litigation stage when handling a certain type of cases, thus providing personalized and checklist-styled case-handling guidance for criminal investigators, prosecutors and judges. Therefore, they can collect, review and accept evidence in accordance with the law, so as to reduce the arbitrariness of the judiciary and firmly guard the bottom line of preventing unjust, false and wrongful cases.

5 To Review and Judge Evidence Chain and Evidence of the Whole Case

Based on the model of evidence chain built for the System, a normative case-handling procedure is formed based on the systematically summarized case-handling experience, in accordance with the legal evidence standard that the facts of a crime are clear and the evidence is reliable and sufficient. By this procedure, whether the different categories of evidence of the same issue to be investigated and verified can prove each other, whether the different issues to be investigated and verified conform to each other logically, whether the statements made by same the criminal suspects or defendants at different times conflict each other—all these questions can be reviewed and judged by the 206 System.

And the high-techs that are employed to realize this function are as follows: (1) **Named Entity Recognition** (NER) is used to locate the person, place, time, object, etc. that appears in the evidence; (2) The **entity relation analysis** technique is used to dig into the relationships between the above entities, including the relationship between people, the relationship between time, locations and traces, the origin and whereabouts of items, and the logical relationship between them; (3) The combination of **machine extraction and manual annotation** is used by the System to obtains

the items to be proved in each evidence, and then these items will be classified based on the model of evidence chain, so as to judge whether the serval pieces of evidence under each item can verify each other, whether they are logically consistent, and whether there are contradictions among them, etc.

6 To Assess Degree of Social Harm

With big data analysis, the factors of criminal cases that affect the degree of social harm are quantified and weighted, and the social harm assessment model of different criminal factors is constructed through deep learning of the 206 System. The degree of social harm is an important reference for prosecutors to decide whether to approve the arrest of the criminal suspects or defendants, and whether to place them on probation. By dividing the factors which affect the degree of social harm of criminal suspects and defendants into seven aspects and 32 indicators, the 206 System can improve the comprehensiveness, accuracy and scientific nature of the assessment.

7 To Transfer Electronical Files

With this function, the data interfaces of the service systems of public security organs, procuratorates and courts are connected, so that they can directly send files to each other through "one-click transmission" when dealing with their respective procedures in cases handling. Moreover, through the synchronous collection of case files, the 206 system realizes the electronic circulation of the files of criminal cases, so as to save time for police officers and improve their efficiency when handling criminal cases.

8 To Review the Speech Evidence

The 206 System can transfer audio record into characters automatically with the technology of Voice-to-Character Conversion. And then with the technology of Natural Language Processing (NLP), it can also categorize speech evidence into groups with the evidence of the similar content as one group, so as to help the case-handling personnel quickly discover the contradictory points in the speech evidence of criminal suspects, victims and witnesses by comparing the case at hand with previous similar cases, and thus play a certain assistive role in quickly finding out the criminal facts. The case-handling personnel can make notes when locating recordings and video information, so that they can consult and check them again in the future. In short, the application of Pinyin-to-Character conversion and intelligent retrieval technology of the 206 System can help the case-handling personnel to compare the verbal evidence

with the audio and video materials efficiently, and to discover whether there is any violation of laws and rules in the interrogation process.

9 To Offer a Frame of Reference for Sentencing

To realize this function, relying on a large number of historical precedents, the 206 system **first** executes a deep analysis on the sentencing process with the technology of big data, and accurately marks from three dimensions the data of "statutory punishment, benchmark punishment, and declared punishment" in the criminal documents of the databases. **Next**, the 206 System extracts statutory circumstances of sentencing, discretionary circumstances of sentencing, and historical factors affecting sentencing results from the details of cases to form a large size of samples for machine learning, so as to build the Sentencing Prediction Model. With the help of this Model, the 206 System can not only put forward sentencing recommendations for prosecutors, but also provide a reference for judges to make a sentence, so as to standardize sentencing and reduce of sentencing deviation and imbalance.

10 To Recommend Similar Cases

The realization of this function is divided into two steps. **Step 1**: To provide machine learning samples for the System 206 by marking the criminal subject, criminal behavior, subjective state of the perpetrator, case facts, evidence and other elements of the criminal cases in the Database. **Step 2**: To automatically extract case information from documents such as written decisions of approving an arrest, bills of prosecution and written judgments by Deep Neural Networks (DNN) to construct models of DNN. Through these two steps, the 206 System can automatically recommend the similar cases selected by its intelligent search engine to case-handling personnel, with "cause of action" and "composition of evidence" as the keywords from a massive number of criminal cases in the Database of Case Information.

11 To Assist the Court Proceedings

As an integrated AI assistive system for criminal cases, the 206 system can help the judge find out the truth, determine the facts, protect the right to litigate and judge impartially on the trial, so as to implement the **substantiation of court trials** effectively, and fully guarantee the **people's right to file a lawsuit**, as well as their **right to know, participate, express and supervise** in litigation. Only in this way, will the judicial justice, judicial civilization and judicial credibility be promoted.

11.1 The Application of AI Assistive Tech on Court Trial

The 206 System can realize full-course intelligence assistance by the facilities of the intelligent courts. As the trial proceeds, the evidence material will be automatically identified, chosen and displayed (at the screens of the court room) by the System. In an intelligent court room, the following three functions are generally used at the trial.

Intelligent speech recognizing: The 206 System can instantly and efficiently convert the speech into trial record.

Intelligent information capturing: The system utilizes technologies such as intelligent capture of case elements, recognition and understanding of voice information, etc. to automatically capture and display relevant evidence materials according to the questions and answers of the defendant, the prosecutor and the judge.

Intelligent evidence displaying: With the functions of evidence display, evidence verification, evidence chain review and judgment, and speech and word evidence, the System can display relevant materials in the courtroom, such as evidence defects and evidence contradictions found during the court proceedings.

Through the real-time combined interactions of the three functions, intelligent assistance is provided for the whole process of the trial.

11.2 The Highlights of AI-Assisted Court Trial

Evidence is the soul of a lawsuit. Therefore, the litigation reform with court proceedings as the core should be implemented in every link of trial according to requirements of the legal principle that judgments shall be made upon evidence. The function of "intelligently assisting court trial" of the 206 System is just designed to meet these requirements, which highlights the focus on the trial from the four aspects of sorting out the evidence, presenting the evidence, verifying the evidence and examining the evidence, so as to strengthen the substantiation of court trials. In this way, may the justice be realized in a visible way and a higher level of socialist judicial civilization be built. The four highlights of this function are as follows:

The first is to assist the building of evidence chain—by reviewing and judging evidence chain.

Through this function, the 206 System can automatically sort out the evidence materials, establish an association between the evidence materials of cases and the verified items, and form a preliminary evidence chain by following the statutory stand of proof that "facts of a case are clear, evidence is hard and sufficient". Based on the actual circumstances of the case and the needs of the trial, **public prosecutors** can use the preliminary evidence chain provided by the System for evidence demonstration during the court trial after reviewing and improving it, which not only reduces the time for the prosecutor to sort out the evidence, but also makes the evidence demonstration process of the whole trial clear and logical. **Judges** can also benefit from the evidence

chain provided by the System. Based on the integrality of the evidence chain, the judge can quickly review and judge whether there is any contradiction in the evidence of the whole case of in the process of trial, and conduct targeted verification of certain pieces of evidence, so as to effectively preserve judicial resources.

The second is to fully display the evidence material by letting the evidence talk.

With its function of "trial evidence display", the 206 System enables all parties to view and read all the evidence materials of the case through the electronic screens in the intelligent courtroom. Besides, all kinds of evidence are presented synchronously in electronic form in front of judges, parties of prosecution and defense, the defendants and litigation observers. Thus, the "cross-examination of litigation evidence in court" is realized, and the openness, transparency, credibility and persuasiveness of the trial are improved.

The third is to automatically point out defects in evidence by reviewing defective evidence.

With the technology of deep neural network model, the 206 System can automatically verify the evidence from the three aspects of authenticity, legitimacy and relevance through its machine learning on evidence standards and rules. If the evidence defects are found in the verification, the System will automatically remind the collegial panel to pay attention during the trial and verify the relevant information, in order to improve the comprehensiveness, accuracy and scientific nature of evidence review.

The fourth is to review the evidence materials efficiently by finding the case facts.

The function of "reviewing the speech evidence" of the 206 System is realized with the help of voice-to-Character conversion technology and intelligent retrieval technology. By this function, the case-handling personnel can quickly find the key content of audio and video materials, and locate the corresponding clips in the process of trial, as well as compare the evidence such as transcripts with the audio and video materials. In this way, the contradictions and problems in the case can be discovered and raised timely, so as to "find the case facts in court", strengthen a comprehensive inspection of evidence, and improve the quality and efficiency of the trial.

References

W. David, *Oxford Companion to Law*, trans. organized by Beijing Institute of Social and Technological Development (Guangming Daily Press, 1988), p. 316

H. Jiahong, *A New Course on Evidence Law* (Law Press China, 2000), pp. 93–99

Chapter 9
High-Techs Applied in the 206 System

The research and development and application of the 206 System is a significant event to demonstrate that AI technology is making its transition from primary application to advanced application in the judicial field. In my opinion, the significant and far-reaching influence of the System in the field of criminal justice and even the whole judicial field is no less than that of IBM's Deep Blue and Google's AlphaGo in the field of one-on-one turn-based games such as chess and Go.

In recent years, with the development of deep neural network technology, massive data resources, deep learning algorithm and large-scale parallel computing constitute the three prerequisites for the development of artificial intelligence. Its deep application in the judicial field is one of the important development directions of this high-tech, as well as a major component of the technical innovation in the judicial field.

With the application of the AI theories including circular neural network, convolutional neural network, deep neural network and attention mechanism, together with the **five core AI technologies** (Fig. 1) such as Optical Character Recognition (OCR), Natural Language Processing (NLP), Automatic Speech Recognition (ASR), Named Entity Recognition (NER) and Machine Learning (ML), the 206 System is capable of intelligent evidence identification and collection of various types of evidence—printed characters, part of the handwritten characters, signatures, handprints, seals, forms, pictures, etc. And these functions can help to guide case-handling personnel through evidence collection and fixation, formulate uniformly applicable evidence standards and normative case-handling procedures, detect timely the defects in evidence and the contradictions between different types of evidence and remind the users about them once the relevant information of case evidence has been input into the System, and ensure that cases where a request for approval of arrest has been filed or transferred for examination and prosecution meets legal standards, so as to reduce the judicial arbitrariness and prevent wrongful charges and convictions.

Due to the complex circumstances in the judicial field, the technical requirements for AI application here are extremely high. In the process of research and development, based on various basic AI technologies and in view of the particularity of criminal justice activities, the technical team of the 206 System concentrated its efforts

Y. Cui, *Artificial Intelligence and Judicial Modernization*,
https://doi.org/10.1007/978-981-32-9880-4_9

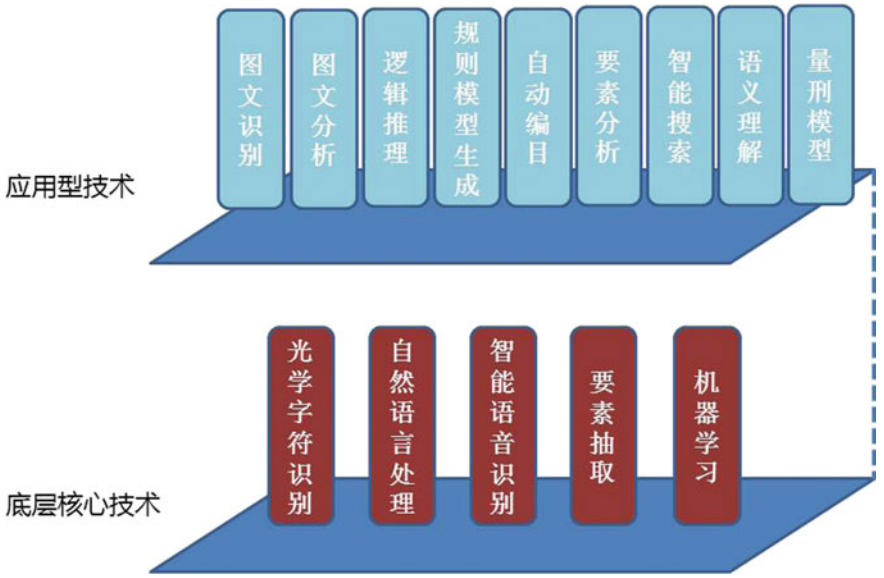


Fig. 1 5 core techs (below) and 9 practical techs (above) of the 206 System

to overcome one technical and applicable problem after another, and executed a lot of technical innovation in accordance with the requirements of the trial-centered litigation system reform. By the end of October 2018, the technical team of Project 206 has developed **nine practical AI technologies** (Fig. 1), realizing the specific functions of the 206 System such as image-text recognition, image-text analysis, logical reasoning, automatic cataloging, element analysis, rule model generating, intelligent search, semantic understanding and model of sentencing. And the technologies applied in the first four functions are currently in the world's leading position. All these technological breakthroughs not only realize the original design purpose of the 206 System, but also promote the innovative development of the AI technology itself. According to statistics, by November 30, 2018, the technical team has overcome five major technical challenges, broken 4 four technical bottlenecks, solved more than 800 specific technical problems, and created six items of intellectual property, with five patents and one copyright.

1 OCR for Recognition of Judicial Information

1.1 Technical Principle of OCR

Optical Character Recognition (OCR) refers to the process by which electronic devices (such as scanners or digital cameras) examine printed characters on paper,

determine their shapes by detecting dark and bright patterns, and then "translate" the shapes into computer-recognizable text using various character recognition methods. And in the case of the 206 System, based on the deep neural network model, it can provide users with end-to-end text recognition service, which is capable of the conversion of text in images from scanners or cameras into computer-encoded text (Fig. 2).

The procedures for the System to achieve text recognition are as follows. First, input the images with Chinese characters into the computers by image acquisition equipment such as camera or scanner. Next, divide these images into "blocks of text", and then subdivide the "blocks" into individual character or image of character. Finally, converse this single image of character into text information by "text character classifier", a tool designed based on language models.

In addition, relying on OCR technology, the System can automatically judge, split, recognize and restore various printed forms which are commonly used, and the performance of this "form recognition" of the System has been satisfactory. Last, the System can also automatically analyze the layout of a document, automatically divide it into columns, and recognize the corresponding components of the layout, such as title, row, image, table, etc., determine the recognition order, and convert the recognition result into a new text, whose layout remains the same as that of the scanned document.

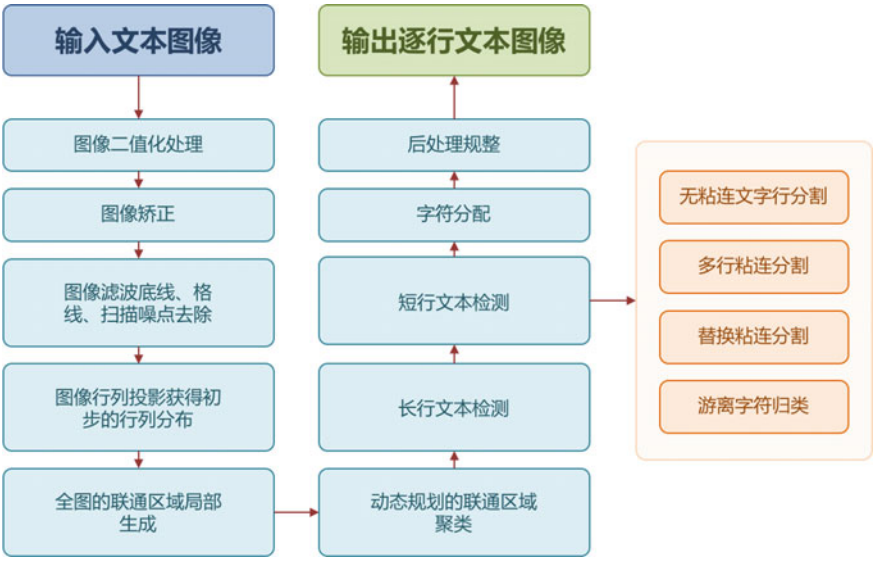


Fig. 2 Procedure of layout analysis of handwritten images

1.2 Difficulties in Technical Application of OCR

At present, there are mainly two barriers to the effective application of OCR in the field of criminal evidence. **One is that is difficult to improve the recognition rate of OCR**. After reaching a certain level, it is difficult for the recognition rate to continue to improve. An increase of 1% or even 1‰ of the recognition rate might be obtained through extremely arduous efforts. And the reasons are twofold. First, the recognition rate of materials with poor printing quality will be greatly limited. Second, Chinese characters are difficult to recognize because of their complicated strokes, different forms of writing styles and pictographic structure. This difficulty is reflected in many aspects of the recognition process, such as image preprocessing, layout analysis, feature extraction, character segmentation, classifier design and so on. Therefore, the development of Chinese character recognition has been particularly slow, with a recognition rate far from ideal. **The other is that the materials of criminal evidence are complicated, with massive interfering factors of various types**. Due to the content, category, format, layout and other features of the Chinese text, it has been a challenge for the OCR technology to recognize Chinese characters in the format of images, especially the written evidence of criminal cases. For example, an effective solution for the miscellaneous interferences of Chinese characters and numbers, a typical problem for OCR, has remined unfound. Meanwhile, the existence of interference factors such as underlines and seals in the printed or handwritten evidence materials also leads to the low recognition rate.

1.3 Solutions

To overcome the above two barriers, on the one hand, we developed a character recognition **model customized for criminal justice** in order to eliminate the interference factors in identification, reduce the error rate and improve the accuracy of evidence information extraction. On the other, we improved the accuracy of handwriting recognition technology and image recognition conversion technology of the System by the following practice:

(1) To improve the accuracy of handwriting recognition technology. The approach to **accurately** recognize and transcribe the handwritten content in electronic evidence, such as the signature of the party concerned, is the key to handwritten recognition technology. The first step of this technology is to realize accurate segmentation of document layout by analyzing and understanding the layout of evidence image. The operations involved in this step mainly include to locate the text area of the image documents, to locate the handwritten characters, to distinguish the handwritten text and print text, to segment each line of the handwritten text area, and to detect the abnormal conditions in this process.

The layout analysis and understanding of handwritten images mainly focuses on the front-end processing of electronic evidence, the principal steps of which include (Fig. 2).

Step 1: Pre-processing and rejecting of text photos. In this step, the System will pre-process the text photos by rejecting the ones with obvious problems, such as blank photos, photos with little written content that do not meet the requirements of the System, photos with graffiti, etc., so as to prevent interference to the subsequent processing.

Step 2: Non-verbal filtering. In this step, the non-handwritten characters of the text evidence in the photos, such as marking blocks, frames, numbers and printed words, should be filtered out, otherwise they will interfere with the front-end processing.

Step 3: Frame-line detecting and filtering. In this step, the lines and frame lines of the text evidence in the photos, such as frame lines, will be located and erased; For text documents without these lines, the locating should be executed base on the specific writing.

Step 4: Filtering of the text blocks blacked out. In this step, text blocks that are blacked out in the photos of text evidence will be filtered out to prevent false recognition.

Step 5: Detecting and locating the lines inserted. In this step, inserted lines of the text evidence in the photos will be detected and located to prevent interference with character recognition.

Step 6: Line positioning and segmenting. In this step, the precise boundary of each line in the document image will be located and segmented.

Step 7: Quality evaluating of the layout of evidence image. In this step, the overall cleanliness level of document images will be evaluated, and a comprehensive judgment will be made by executing a statistics analysis of the numbers of non-normative writing, blacken-out blocks, lines inserted and large connecting areas, as well as the distribution of small connecting blocks.

After completing the above steps, the handwritten characters of the text image which has been segmented into text lines will be recognized and conversed into the computer-encoded text. This recognition and conversion procedure mainly include the following steps (Fig. 3):

Step 1: Single-line text preprocessing. This process mainly includes two operations. One is to adjust the scanned image of various resolutions into a uniform standard, normally 300dpi. The other is to make tilt corrections for the text image in this line.

Step 2: Feature extraction of single-line text. In this step, based on various features of handwritten characters—such as the direction of Chinese characters possess the feature of statistic stability, and English characters also show stable characteristics after the segments being structured—and through continuous feature extraction of image frame sliding window, single line handwritten characters will be converted to various features which a computer can grasp through classification learning.

Step 3: Single line text model training. The main purpose of this step is to use CNN, RNN, DNN and other deep learning models to train the machine to learn and

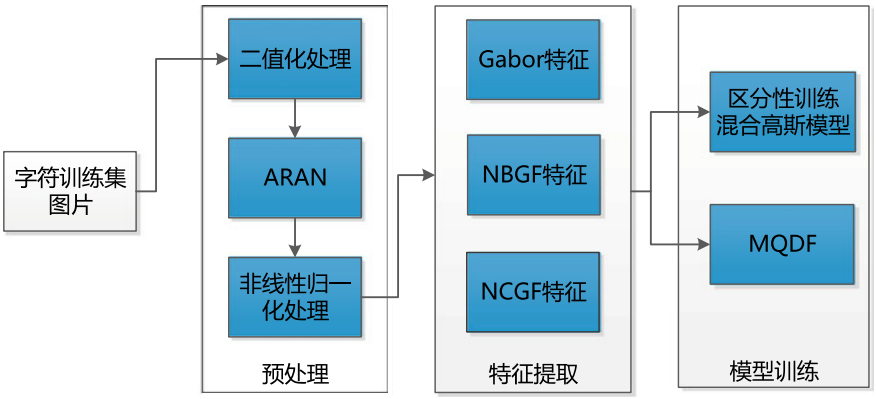


Fig. 3 Procedure of text image recognition

master the recognition of handwritten characters guided by the statistical recognition model of single line text.

Step 4: Single-line text recognition and decoding. In this step, relying on the combination of deep leaning models and Hidden Markov Model, and with the integrated employment of the efficient Connected Word Recognition based on Viterbi decoding algorism, the 206 System can recognize the content of single-line text and converse it into computer-encoded information.

(2) To improve the accuracy of image recognition and conversion. In electronic files, most of the evidence materials are in image format, which needs to be analyzed and processed by image analysis engine and converted into structured data. From the image input to the output of structured recognition results, there are several major steps in the middle, such as image preprocessing, image layout segmentation and analysis, layout understanding and document content recognition (Fig. 4).

Step 1: Document image preprocessing. In this step, it is necessary to use noise reduction method in digital image processing to remove external noise and interference probably caused by photo shooting, and to conduct RGB to Gray or binarization processing on the original color images, as well as skew correction and so on.

Step 2: Layout segmentation and analysis. In this step, the System will firstly use various edge detection methods to conduct connected component analysis of a document image. Then, after detecting the text and non-text areas of the image, by using layout segmentation methods such as connected areas segmentation and undirected graph segmentation, the System is capable of segmenting the whole image into multiple candidate area sub-blocks and identify their attributes by comprehensively adopting top-down or bottom-up segmentation strategies. The areas thus formed will be typically divided into text areas (including text character sections, separate formulas sections, embedded formulas sections), image areas, and table areas.

Step 3: Layout understanding and graphic recognition. This stage can be divided into two parts: the training part and the recognition part. In the former, through deep machine learning of massive data of document image, the System can obtain the

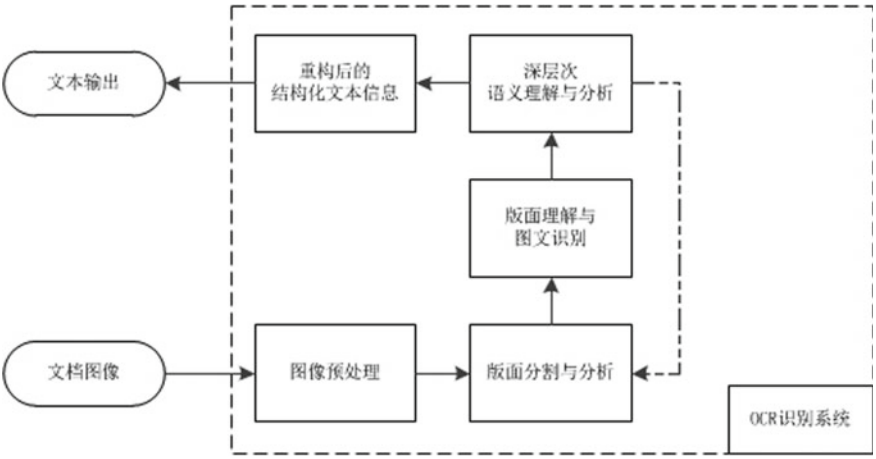


Fig. 4 Procedures of image processing

Convolutional Neural Network (CNN) model which can recognize text characters, characters and symbols in formulas and characters in pictures and tables. In the latter, by inputting the segmentation results obtained in Step 2 into the recognition and analysis module of CNN, the System can recognize and decode the graphic information, and finally convert the recognition results into structured and editable text information.

By the end of October 2018, the recognition rate of the 206 System for printed documents has reached 98%, and the that for complex documents including illustrations, signatures, handwriting, etc. has reached 92% (currently a world leader), achieving the preset goal. The realization of automatic recognition and input of Chinese character information not only solves the problem of low accuracy of character recognition in the judicial field, but also lays a foundation for the deep information mining and intelligent machine learning and analysis of the System.

2 NLP for Computers-Human Interactions

2.1 Technical Principle of NLP

The interactions between computers and human natural languages is a goal that human beings have been pursuing for a long time. It means that to reach the goal, the computer should not only understand the meaning of natural language text, but also express the given intention, thought and so on with it.

Natural Language Processing (NLP) is an important application field of artificial intelligence and a subject that must be studied in the new generation of computer science. Its main purpose is to overcome the limitations of human-computer conver-

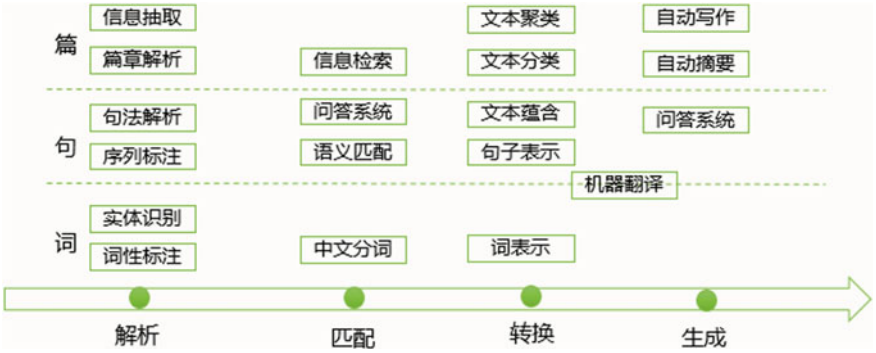


Fig. 5 Procedures of NLP System construction

sation, so that users can talk to the computer in their own natural languages. Therefore, it is necessary to develop the models of language ability and language application first, which can be realized by setting up the computational framework, and can be improved constantly by putting forward the corresponding methods. Next, various practical systems can be designed based on the language model, and the evaluation techniques of these practical systems can be discussed. In general, the establishment of NLP systems includes the following procedures (Fig. 5).

2.2 Difficulties in Technical Application of NLP

Most of the criminal evidence materials can be categorized as unstructured texts. Therefore, **how** to accurately extract effective information and **how** to eliminate the interference of complex text environment are not only two major factors directly related to whether the main functions of the 206 System can be realized but also two obstacles in the way of applying NLP technology to the judicial practice.

2.3 Solutions

Once being transformed into structured data by the NLP technology, can the unstructured text data be processed efficiently by computers, thus building a map of judicial expertise and realizing human-computer interaction and machine reading comprehension. For example, from the ways of its formation, a Chinese text is composed by a string of Chinese characters including punctuation marks, symbols, etc. And characters can form words, words can form phrases, phrases can form sentences, and sentences can form paragraphs, sections, chapters and discourses. In all the above units of Chinese language composition, as well as in the transition from the lower

units to the higher units, there both exist ambiguity and polysemy. That is to say, a string of characters of the same formation, once put in different circumstances or contexts, can be understood quick differently, as if they turn into a string of words or phrases with different meanings.

Due to the complexity of natural languages, we input a large number of annotated legal documents for the system to conduct autonomous machine learning and **grasp criminal justice knowledge**. Subsequently, the System can automatically **extract the key factors of evidence and case**s through the analysis of large corpora of typical real-world examples, i.e. a set of written judgements, legal documents and transcripts, with their distinctive characteristics annotated. And then semantic analysis is utilized to guarantee the **accuracy** of the extracted information. Relying on the criminal justice knowledge and the accurate extraction of key factors thus acquired, and through semantic recognition and cognitive engine technology based on knowledge graph of law, the System is able to **identify the meanings** of the words to be retrieved, input them into the specific knowledge graph constructed, and establish an unimpeded information input and output mechanism, so as to improve its autonomous machine learning ability and realize the functions such as machine semantic analysis.

3 ASR for Transformation from Audio to Text

3.1 Technical Principle of ASR

Automatic Speech Recognition (ASR) refers to a technology which converts human spoken language into text by computers. As an interdisciplinary subject, speech recognition is closely connected with acoustics, phonetics, linguistics, digital signal processing theory, information theory, computer science and many other disciplines. Due to the diversity and complexity of speech signals, speech recognition systems can only achieve satisfactory performance under certain conditions, which depends largely on five factors, the size of the recognition vocabulary, speech complexity, quality of speech signal, number of sound sources and hardware standards.

Currently, the realization of ASR is inseparable from the powerful neural network model. Like “a pair of ears”, such model enables the computer to accurately recognize the speech of speakers with different dialects and accents in a variety of noise environments and voice channels.

Since 2011, when Microsoft research first used Deep Neural Network (DNN) to achieve significant improvement in large-scale speech recognition tasks, DNN has attracted an increasingly more attention in the field of speech recognition, and has become the standard of its mainstream systems.

3.2 Difficulties in Technical Application of ASR

During the development of the 206 System, we found on the basis of full investigation that although DNN has a strong classification ability, it does not perform well in capturing contextual timing information, which may lead to low accuracy of audio and text conversion. Obviously, DNN is not an ideal choice for processing timing signals with long-term correlation.

3.3 Solutions

Therefore, the team of the 206 System initially decided to choose Recurrent Neural Network (RNN) over DNN as it programming paradigm to enables itself to learn from observational data. Unlike feedforward neural networks (e.g. DNN), RNN includes one more feedback connection in its hidden layer, in other words, the input of a hidden layer at the current time is partially the input of hidden layer at the previous time (Fig. 6). Thus, RNN is able to see the information of all previous moments through the loop feedback connection, which is equivalent to being endowed with a memory function.

However, the traditional bidirectional RNN scheme, which theoretically needs to see the end of speech (that is, all future information) in order to successfully apply future information for self-promotion, is only suitable for offline tasks. Besides, its implementation often results in a 3–5 s hard delay for online tasks requiring immediate response, such as real-time voice input, which is unacceptable. Moreover, due to its strong fitting for context correlation, RNN is inclined to get into the problem of over-fitting more often than DNN. And once the local non-robustness phenomenon appears in its training data, the traditional RNN tends to bring about additional abnormal recognition errors.

After further deliberation and comparison, a new framework entitled Feed-forward Sequential Memory Network (FSMN) was finally chosen, in which the

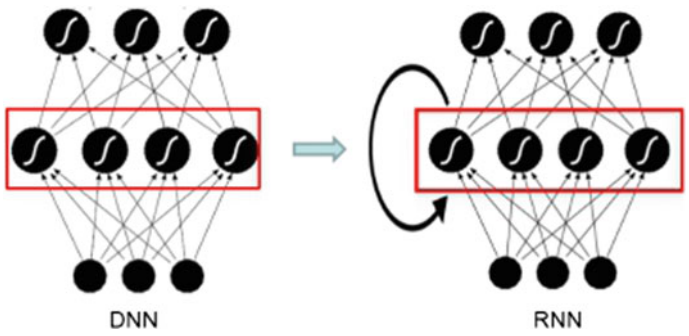


Fig. 6 Structures of DNN and RNN

above problems can be solved, with the key technical points of artificial neural network well integrated, and their respective effect improvement superimposed. It is worth mentioning that FSMN, pioneered by research and development team of the 206 System, achieve the same effect as the bidirectional LSTM (Long Short-Term Memory) network with a delay of only 180 ms by the employment of non-recurrent feedforward structure.

Through the application of FSMN scheme, the 206 System can effectively adapt to the complex channel environment, meet the requirements of system functions on the processing of sequence signals, and greatly improve the conversion accuracy. With the help of intelligent speech recognition technology, the 206 System can effectively convert audio information in audio and video materials of criminal field into text in order to provide technical support for the following work, which includes (1) to accurate positioning of relevant content in audio and video through text; (2) to quickly locate the information to be verified in the evidence, such as the time, place, person, tools, means, consequences, etc. of the crime; and (3) to deeply dig the logical relations such as verification, correlation and contradiction among proofs.

4 NER for Key Information Selection from Mass Data

4.1 Technical Principle of NER

Named Entity Recognition (NER), a fundamental technology supporting the function of element extraction of the 206 System, is essentially a technology used to complete the "pattern recognition" tasks, i.e. to recognize entity boundaries and entity types in a given sentence. This technology is not only an important basis for the completion of natural language processing tasks, but also the basis for automatic knowledge graph construction and natural language understanding.

For the 206 System, the application of NER is to achieve the function of "**entity relationship extraction**", namely, the System can automatically detect and identify some semantic relationship between entities from the text, graphic or other types of materials stored in its databases. Entity relationship extraction can be divided into **two types**, predefined relationship extraction and open relationship extraction according to whether the relationship type is defined in advance. The former refers to the pre-defined relationships extracted by the System, such as "is-a" (e.g. animal-monkey), "capital-of" (e.g. Beijing-China), etc. In contrast, the latter does not define the extracted relation category, and the System automatically finds and extracts the relation from the text.

(1) Entity relationship extraction. There is a semantic relationship between entities, and when two entities appear in the same sentence, their semantic relationship is determined by the context.

A complete entity relationship consists of two aspects: the type of relationship and the parameters of the relationship. The former describes how entities are related

to one another, such as an ***employment*** relationship between an employee and a company, while the latter refers to the entities that are involved in a relationship, such as an employment relationship between an **employee** and a **company**. There should be at least two parameters in a relationship. A relationship between two parameters is called binary relationship, and between more than two parameters, multivariate relationship. There are symmetric relations and asymmetric relations. The former does not consider the order of parameters, but the latter should because in which different orders express different relations. Sometimes an entity relationship also has a *time* attribute, the validity period for which the entity relationship exists.

(2) Entity recognition algorithm. Under this algorithm, three major methods are generally utilized to recognize named entities: rule-based methods, statistics-base methods and mixed methods.

First, rule-based methods refer to the methods of manually setting some rules to identify Named Entities according to their linguistic manifestation. Implementation of such methods relies heavily on rule-setting and requires considerable expertise. In addition, since entities in different domains have their own rules, the new rules need to be reset when dealing with the text in each new domain.

As the earliest method used in NER, when its extracted rules can accurately reflect language phenomenon, the rule-based method generally performs better in building a named entity recognition system than statistics-based method does. However, it is relatively time and manpower-consuming. On the one hand, its rule templates should be formulated **manually** by linguistic experts, with the choice of various attributes including statistics, punctuation marks, keywords, indicators and direction words, position words (e.g., endings), center words, etc. On the other, with pattern and string matching as the main means, most of the NER systems thus formulated rely on the **establishment of knowledge base and dictionary** in the first place.

Second, statistics-base methods refer to the methods of training the machine with raw or processed (manually labeled) corpus, so that it can grasp skills of NER through machine learning. Compared with the rule-based method, NER systems built in this way contain the following advantages: (1) the person who processes (annotates) corpus does not need to have an extremely rich knowledge of linguistics; (2) the construction of small-scale corpus takes an acceptable amount of time and manpower; (3) the NER system thus constructed can be used in new fields with no or little modification, as long as it is provided with the corpus of the new field for self-training.

However, the NER systems based on **data statistics** has lower performance than those based on **linguistic rules** because the probability knowledge acquired through statistical analysis by the machine is not as reliable as the expert linguistic knowledge provided by the linguists. Statistical methods used for realize NER mainly include: N-Gram Model, Hidden Markov Mode (HMM), Maximum Entropy (ME), Conditional Random Fields (CRF), Decision Tree and so on, among which, Hidden Markov Model performs is the most praised one in evaluating performance.

Third, mix methods refer to the integration of various rule-based and statistics-based to build NER system. NPL is not a completely random process. If the statistical methods are used alone, its search scope will become extremely large. Therefore,

the specific rule-knowledge of a certain field should be used to filter and process the natural languages in advance. As for the NER systems nowadays, there is hardly any one that is constructed purely based on statistical models or rule-knowledge. In many cases, the mixed methods are applied, and primarily in the following three forms. One is the overlapping or internal fusion of statistical methods. Another is the integration of rules, dictionaries and machine learning methods, whose core is the combination of methods and technologies. That is to say, some rules are introduced in the statistics-based methods, so as to combine machine learning and human wisdom. The last one is to combine various models and algorithms, take the results of the previous models as the training data of the next level, by which to obtain the models of the next level.

In the process of implementing the mixed method, we need to consider **how** to combine the two methods efficiently and **which type** of fusion techniques to adopt. As for the second question, it is the fusion techniques for classification that are often utilized, such as Voting, XVoting, GradingVa, Grading, etc., because the implementation of NER relies heavily on classification.

4.2 Difficulties in Technical Application of NER

Behind the complicated cases, massive evidence materials and documents are always piled mountain high, among which there are numerous redundant information and complex interference factors. The first step to construct the judicial knowledge graph and carry on the NLP to study how to dig out the valuable data in such a massive judicial information.

In order to effectively extract valuable data, AI needs to improve its intelligent program model through self-learning, which depends on the quality and quantity of manually annotated data. The establishment of recognition and verification rules of machine learning through manual annotation, together with optimization of intelligent learning models for its service applications constitutes the basis for the 206 System to develop various applications will are capable of intelligent learning.

However, we have been confronted with several difficulties in the practice of data labelling, especially that of text under Chinese semantics due to the complexity of this natural language. What's worse, in the field of criminal justice, the problems in text annotation are even more complicated. As we know, the high quality and quantity of data annotations guarantees the effect of machine learning, but the obtaining of which is both manpower and money-consuming. Moreover, due to the strong subjectivity of human beings, as well as the ambiguity and polysemy of Chinese language, judicial experts of and data annotators have great individual differences in the final data annotating results according to their different understandings of text information when annotating documents.

4.3 Solutions

In order to solve these problems, the research and development team of Project 206 has built a multi-level data annotation system based on contents such as criminal crimes, criminal charges, etc., to ensure the interpretability of data annotation process and to eliminate semantic differences in the description of requirements for data annotation.

The main technical plan and the semantic and element extraction framework based on deep learning are illustrated by Fig. 7.

The three major procedures of element extraction are as follows:

Firstly, key elements labelling. This procedure can be executed in four steps. **Step 1**: To generates word embedding from character embedding with character-based CNN. **Step 2**: To obtain a final word embedding by piecing together the traditional one with the one generated in Step 1. **Step 3**: To obtain the posterior probability of each word with Bidirectional Long Short-Term Memory (BiLSTM). **Step 4**: To obtain the optimal element labeling sequence with Conditional Random Fields (CRF).

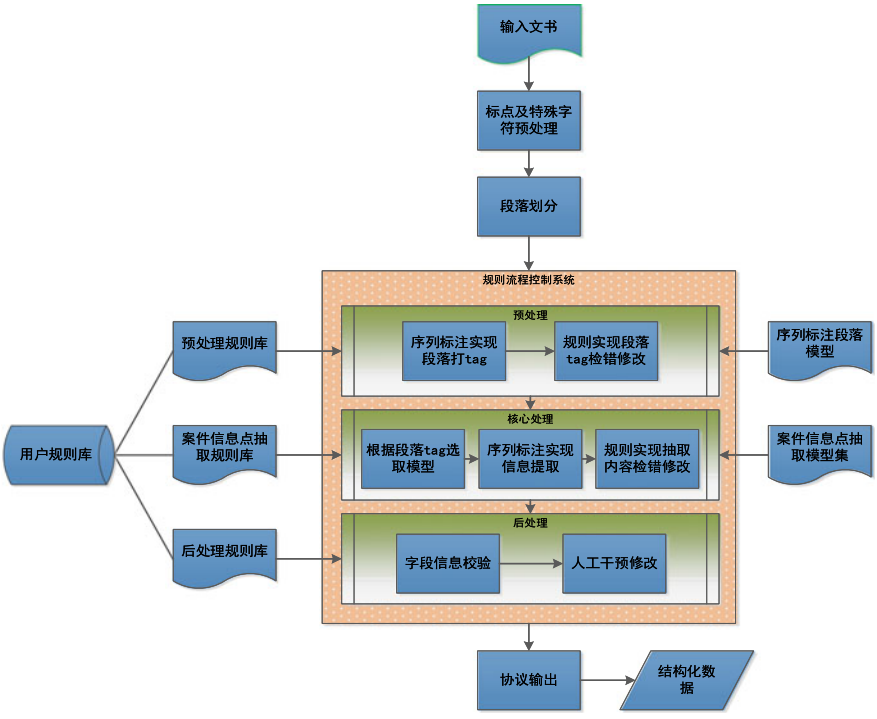


Fig. 7 Framework of key element extraction

Secondly, key elements testing by rules. After the prediction of sequence labeling, legal rules are used to detect the legitimacy and rationality of the extracted elements, and the element points which do not meet the rules will be modified or deleted. At present, rules of regular expression are employed by the 206 System to check the element points. The element points which fail to match with the rules will be deleted or modified.

Thirdly, key elements modeling. To mark the final key elements extracted by the System on the interrogation transcripts, indictment, trial record and other documents, so as to train the 206 System to construct its model of element extraction based on machine reading comprehension framework. An example of one of the reading comprehension models under this framework is illustrated in Fig. 8. Two items of input information at the bottom of this model are "Context text" and

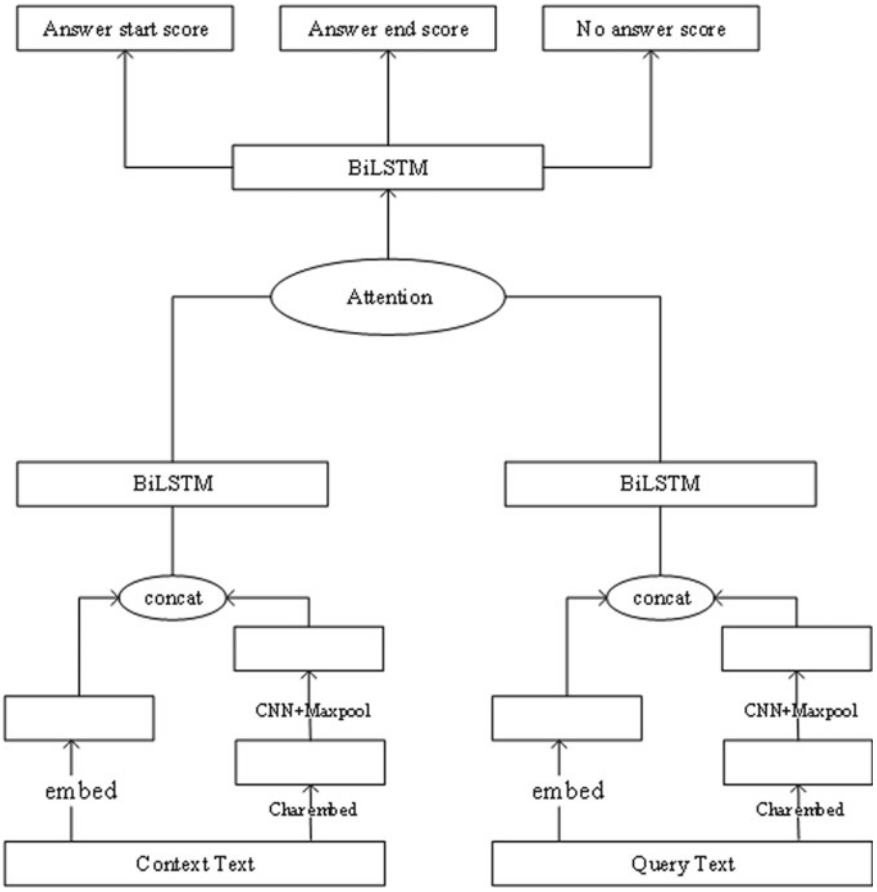


Fig. 8 Example of the model structure of element extraction based on reading comprehension technology

"Query text", which refer to "non-written judgements" and "label name of key elements" respectively. "Query text" is thus named because we rewrite the label names into the form of questions in order to improve the effect of this model. For example, the label name of "plead guilty or not" was rewritten into a question "Do you plead guilty to what you did?"

And among the three items at the top of this model, "Answer start score" is the score of the starting position of the predicted answer, "Answer end score" is the score of the ending position of the predicted answer, and "No answer score" is the score when the predicted answer is blank, the input of which is a concatenated vector of all input text.

5 ML for Construction of Judicial Knowledge Graph

5.1 Technical Principle of ML

Tom M. Mitchell provided a widely quoted, more formal definition of the algorithms studied in the machine learning field: "A computer program is said to learn from experience E with respect to some class of tasks T and performance measure P if its performance at tasks in T, as measured by P, improves with experience E." In plain English, machine learning (ML) can be interpreted as a process during which computers use programs to simulate human learning abilities and gain knowledge and experience from learning practical examples. ML is not only a major subset of AI, but also an implementation method of it. By learning knowledge and rules from sample data, ML will then use them to make practical inferences and decisions. One significant difference between ML and common programs is that the former is a data-driven approach which requires sample data.

The core of machine learning is to generate models from data by algorithms. With the learning algorisms at hand, we can "feed" them with empirical data, and then "harvest" statistical models, which reveal the rules of things and provide us with corresponding judgments for the future events. It can be said that machine learning is the study of "learning algorithms", which are essentially advanced versions of ordinary algorithms that make computer programs smarter by automatically discovering and learning data rules (Fig. 9).

The ways to build a model varies based on the different data types. In the fields of ML or AI, people will consider the learning approaches of the machine in the first place. And based on the amount and type of supervision the algorithms get during training, they can be mainly divided into supervised learning and unsupervised earning.

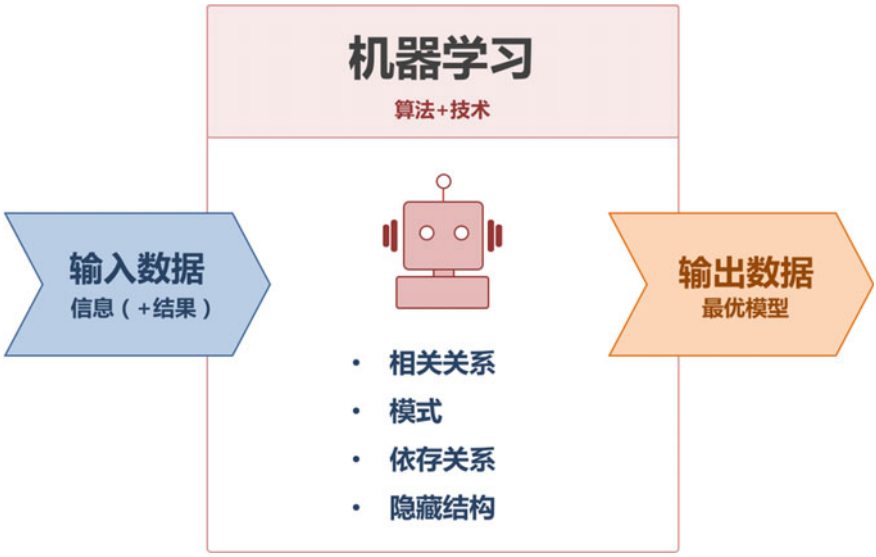


Fig. 9 Process of ML

5.2 Difficulties in Technical Application of ML

With typical cases, judicial information resources, case-handling experience accumulated by the public security organs, procuratorates and courts, as well as the evidence standards, evidence rules and evidence models formulated by the Shanghai High People's Court as its **data samples** for machine learning, and replying on the corresponding **algorithms** developed by its R&D team, the 206 System can build various **statistic models**, which can help it to timely discover the problems of criminal cases when the relevant information is input into its databases, such as the lack of uniformly applicable evidence standards, the lack of standards in case-handling procedures, defects and contradiction in evidence, etc., so as to ensure the cases applied for approval of arrest, transferred for examination and prosecution conform to the standards prescribed by the law.

However, in the specific application of ML, due to the existence of black-box model of the algorithm, the 206 System has been questioned in such aspects, such as the credibility of sentencing and the interpretability of intelligent pushing similar case reference. Judicial trials belong to the field of strong logical reasoning, and the results of judicial trials are related to value judgments such as human rights and justice. Therefore, how to ensure the credibility of the intelligent sentencing results and the interpretability of the push of similar cases is the major challenge in its research and development.

5.3 Solutions

To tackle this challenge, the R&D team of the 206 System employs algorithms of deep learning to build a knowledge map of judicial expertise. Through algorithms, massive judicial information and documents, the System can function more stably and provides judges with richer, more scientific and more convincing basis for judgement. The exploration of credible intelligent sentencing and interpretable push of similar cases is a key step in the development of empirical law.

(1) Construct intelligent sentencing models with algorisms of deep learning

Firstly, we provide a comprehensive and sufficient learning sample for the 206 system to ensure the accuracy of the sentencing models. For example, the sample database to support the building of larceny sentencing model contains the material of 300,000 larceny cases nationwide, covering all the existing case elements and sentencing circumstances of larceny.

Secondly, we adopt the algorisms of reinforcement learning and transfer learning to ensure the credibility of the sentencing model. For example, factors that affect the sentencing outcome of a case include the criminal act, the subjective aspect of the crime, the basic information of the offender, the performance of the offender before and after the crime, and other legal and discretionary sentencing circumstances. The procedures of the 206 System consist three steps. Step 1: Extract the key elements which affect the sentencing results from the mass of case materials. by the feature extraction model of the System. Step 2: Input the common and individual circumstances which affect the sentencing results based on the experience and common knowledge of judges from their trial practice. Step 3: Use the algorisms of deep learning to build the intelligent sentencing model based on Steps 1 and 2.

The intelligent sentencing model of the System consists of three components: knowledge base, database and inference engine.

(1) Knowledge base is further divided into three sections base of laws, base of experience and base of precedents to store the domain knowledge of judicial field, including the experience of judges (generally called "expert advice"), laws and regulations, specialized knowledge and common knowledge.

(2) Database stores the initial data and various information obtained during the inference process in the judicial field, such as file materials, question/interrogation transcripts, trial transcripts and other case materials. These contents are some of the facts that the expert system needs to deal with, including the quantitative data that affect the sentencing outcome of the case during the inference process.

(3) Inference engine is to extract the **decision-makin**g information by using certain **logical reasoning strategies** based on the expertise in the **knowledge base** and the information (i.e. input data) in the **database**. The inference engine of the 206 System can summarize the expertise and experience of sentencing circumstances into several inference rules, draw inferences under strategy control and obtain sentencing results, so as to ensure the credibility of the machine sentencing.

In short, the intelligent sentencing model of the 206 system integrates the experience of a large number of judges, comprehensively analyzes the basic and specific

factors related to sentencing in the facts of the case, and thus helps judges to overcome the interference of external non-legal factors and improve the justice of sentencing.

(2) Enhance the interpretability of the case-push model with knowledge graph

As a data structure to express knowledge, knowledge graph expresses the entity relations between knowledge and facts through the triple structure of "node-line-node". The reason why knowledge graph has a strong ability to express entity relations is that the approach of knowledge expressed by knowledge graph is consistent with the mode of human cognition and the way of natural language to express semantics.

The application process of knowledge graph in the judicial field is as follows. **Firstly**, knowledge graph makes judicial knowledge and judicial language be expressed relatively independently by classifying, layering and superimposing dimensions of judicial concepts. **Secondly**, knowledge graph of the System is based on the accurate extraction of case elements such as legal concept knowledge, judicial practice knowledge, expertise involved in judicial practice and general social knowledge. **Thirdly**, knowledge map is used to express the entity relationship between the evidence elements, the case elements, as well as the evidence elements and the case elements, and the logical reasoning mechanism is used to construct the case portrait. When handling a specific case, as long as the contents of case elements and evidence elements are input, the 206 System can push the cases with the highest similarity to the case-handling personnel through its knowledge graph stored in the backstage.

Chapter 10
Remarkable Effects Achieved by the 206 System

1 R&D Process

By the end of March 2019, the development and application of the 206 System has gone through three Phases.

1.1 R&D and Test Operation of the System 1.0

(1) Phase 1 (February 6, 2017–May 2, 2017)

This phase was mainly marked by the mission of the R&D of the 206 System assigned by the Commission for Political and Legal Affairs (CPLA) under Communist Party of China Central Committee (CPCCC) on February 6, 2017. And our to-do list at this Phase was as follows:

(1) To establish a leading group to ensure the R&D to run smoothly.
(2) To formulate a work plan. Shanghai High People's Court draw up a document entitled *Work Plan for research and development of a software system for "trial-centered litigation reform"*, which unified our understanding and clarified the working ideas, direction, objectives, tasks and measures of this R&D work.
(3) To choose a technical partner, and iflytek company was finally chosen.
(4) To establish a research base. Shanghai High People's Court has established the "Project 206 R&D Base". The initial research and development team has been established, with a total number of 279 people, including 64 senior officers from courts, procuratorates and public security organs in Shanghai, and 215 technical staff from iflytek, excluding coordination and security staff.
(5) To decide pilot units (such as courts, procuratorates and public security organs).
(6) To carry out surveys. The working team of Project 206 carried out 34 survey in the first month, soliciting extensive and in-depth opinions and suggestions from the case-handling officers in courts, procuratorates and public security organs,

Y. Cui, *Artificial Intelligence and Judicial Modernization*,
https://doi.org/10.1007/978-981-32-9880-4_10

and collected 78 opinions and Suggestions, and 132 requirements. We also gathered nearly 170,000 pieces of materials such as "explanation on withdrawing investigation and arrest", electronic files, written judgements, trial records, trial reports, etc. as machine learning samples.

(7) To apply for project establishment and budget. We submitted our application for the establishment of Project 206 and budget application to Shanghai Municipal Development and Reform Commission, Shanghai Municipal Economic and Informatization Commission, and other relevant local authorities upon receiving the official "task assignment" document from the CPLA under CPCCC.

(8) To conduct R&D. By following the general working idea of "promoting the research, development, test and improvement of the 206 System together", we have completed the preliminary research and development task by the end of April, 2017 and the 206 System 1.0 was qualified for test operation.

Since the establishment of the R&D Team of Project 206, all the staff have been working day and night, working overtime until 12 PM every day, making positive contributions to the success the System has achieved so far.

(2) Phase 2 (May 3, 2017–July 10, 2017)

This phase was marked by the test operation online of the 206 System 1.0 on May 3, 2017. With **nine functions and four evidence standards guidelines** for four crimes—intentional homicide, theft, taking deposits from people illegally and fraud (telecom network fraud), Version 1.0 was put into test operation in 25 pilot units until July 10, 2017. During these two months of test operation, the design standard of the System was basically reached, the effect was good, which meant the R&D work achieved initial success.

Then, at the National Judicial System Reform Promotion Conference held by the CPLA under CPCCC in Guiyang, the capital of Guizhou Province on July 10, 2017, I made a representation named

Deep application of AI in judicial field: with the 206 System developed by Shanghai High People's Court as an example, and **received affirmation and praise from the participants** of the Conference.

1.2 Promotion and Application the System 2.0

(1) Phase 1 (July 12, 2017–March 8, 2018): expansion of pilots

At this stage, we expanded the pilots of the 206 System. Soon after the Conference in Guiyang, we launched the System 2.0, which possessing 16 features and guidelines on evidence standards for seven crimes. The pilot units were expanded from 25 to 47. During this period of time, we collected 36 questions and suggestions, based on which corrections or improvement were made to the 2.0 version.

(2) Phase 2 (February 28, 2018–August 17, 2018): full application in Shanghai

This stage was marked by a conference held by the Shanghai Municipal Commission for Political and Legal Affair on February 28, 2018, at which the decision to fully promote and apply the 206 System in Shanghai was made. At this stage, Shanghai High People's Court formulated the R&D plan of the second phase for the 206 System. The crimes whose evidence standards can be guided by the System were increased to 24. Through the application of the System in the whole city, it was comprehensively tested in different areas, different application environments, as well as under the pressure of handling multi-cases. Moreover, at this phase a total of 2,500 front-line case workers were trained, 72 visits were paid to each pilot unit, 43 problems proposed by front-line case workers were solved, and thus the performance of the System was further improved.

1.3 Full Application of the System 3.0

August 17, 2018–now. This stage is marked by a special working conference which set a goal of "Three 100%". On August 17, 2018, held by the Shanghai Municipal Commission for Politics and Law Affairs (CPLA), this conference determined that with "implementation of trial-centered judicial reform" as its guideline, Project 206 should fulfill one more task apart from the other tasks set in the early stage. And the new task is to construct the political and legal case-handling platforms for Public security organs, procuratorates and courts, with real-time data interaction between the them, so that the case-handling personnel of the three departments can transfer electronic files to each other online. And the "Three 100%" stands for the three targets which the System should achieve within 2018. The first 100% means the guide on evidence standards of the System should cover the common crimes by 100%. The second means the cases of common crime happened in Shanghai should be input into the System by 100%. And the last means that the application of the System by the front-line police officers, prosecutors and judges by 100%.

At the end of October, the System 3.0 was launched and operated online, with 26 features and evidence standards guidelines for 71 crimes, fully covering all the common crimes in Shanghai.

2 Operation of the System

Since the test operation on May 3, 2017, the functions of the System have been continuously corrected and improved, and its operation has been in good condition. By the end of March 2019, in the 206 System.

Public security organs have recorded a total of 35,735 cases; Procuratorates approved 14,569 arrests and examined and prosecuted 13,955 cases; The courts accepted 9,463 cases and concluded 6,665 cases.

The system was input into a total of 265,772 pages of evidence materials; provided guide on evidence for 301,991 times (based on the click amount); provided knowledge index for 7,037 times; and reminded the users about evidence defects for 7,497 times.

3 Functions of the System

From its test operation to comprehensive application, the System has been comprehensively tested in practice for more than two years. It has not only performed well and gradually demonstrated its powerful functions, but also been accepted by front-line case handling personnel, especially the police, who shared with us that they went through a process from initial ignorance and resistance to acceptance and embrace of the 206 System. They added that the System played the roles of both an instructor and an assistant in their case-handling process. The major roles of the System include.

3.1 To Unify Network Platforms for Interconnection

With the unified network operation platforms of the public security organs, procuratorates and courts, the three organs for the first time realized their **online operation, interconnection and data sharing** when handling criminal cases. With the central server of the System located in Shanghai High People's Court, and relying on the case-handling platforms, the three organs can realize the automatic connecting and the synchronous exchanging of data. As a result, all the criminal cases handling procedures in Shanghai, from "opening a case for criminal investigation", investigation, application for approval of arrest, prosecution and trial, can be operated in case-handling platforms of the 206 System, which greatly improves the quality and efficiency of case handling. With the support of the System, the long existing data **barriers** of the political and legal systems, which had been independent, isolated and disconnected, was truly broken **for the first time**. **A breakthrough was made**.

This role is manifested in the following aspects:

(1) The unified network case handling platform provided by the 206 System realizes the synchronous generation of electronic files. While cataloguing the electronic files, it can also extract information such as names of criminal suspects and times of interrogation. The system also realizes the automatic identification and distinction of records, so that case-handling personnel can quickly locate and

find the required materials by browsing the names of records, and improve their efficiency of electronic files reading.

(2) Through its online case handling platform that can cover the whole process of criminal cases, The 206 System can extract, summarize and link information of every litigation phase so that case-handling personnel can not only obtain a full understanding of the litigation procedures from the public security organs' opening a case for investigation to the court trial of the case, but also quickly grasp the basic information and progress of the case. Thus, the problem was solved of difficulty in obtaining information of cross-departmental cases in the past. Thus, the previous difficulty has been overcome in obtaining case information across departments.

Feedback from the case-handling personnel: Before the 206 System is fully applied, all the cases that the public security organs applied for arrest approval and transferred for review required the policemen at the primary level to personally deliver the paper file materials to the legal departments of the public security bureaus located in various districts. Such manual operation and round-trip will often consume a lot of police force and time. At present, the "electronic file transfer" function of the 206 System realizes the one-click transmission of all kinds of files. In addition, materials can be corrected and supplemented in the system, saving a lot of time and energy. Therefore, it is generally popular among primary level case handling personnel.

3.2 To Unify Evidence Standards and Rules for Guidance

The functions such as evidence standards guidance, evidence rules guidance etc. designed by the 206 System not only provide a checklist-styled guidance for case-handling personnel, but also make the constitutive elements of crime, evidence identification standards and proof standards stipulated by law concrete, standardized, standardized and digitalized. Thus, as soon as the case is taken over, the case handling personnel shall collect and fix evidence in accordance with the standards and rules of evidence prescribed by law, which helps to enhance their awareness of evidence, procedures, rules, responsibilities and human rights.

Under the guidance on evidence standards and rules, case-handling personnel can clearly grasp which kind of evidence they should collect, how to collect and deal with them, etc., which not only ensures the integrity, legality and effectiveness of evidence collection, but also enhances the awareness of rules and responsibilities of the case-handling personnel, so as to reduce the arbitrariness of the judiciary and solving the long-standing problems of inconsistent application of evidence standards and irregular case handling behaviors among public security organs, procuratorates and courts.

This role is manifested in the following aspects:

The evidence standard and rule guidance are not only embedded in the 206 System, but also used in the professional and mobile phone APPs to a provide convenient,

fast and efficient guidance for case handling personnel at all time and everywhere, which makes them highly popular among investigators of criminal case at the scene. However, due to the confidentiality concern, such APPs have not been open to the public yet.

At the crime scene, the investigators of criminal case can collect evidence under the guidance of mobile phone App.

Feedback from the case-handling personnel:
For investigators of public security organs, relying on the guidance of the standards and rules of evidence, they know precisely what to do and how to do in the process of opening a case, investigation, evidence collection, making transcripts and case documents, as if accompanied by a private instructor.

For prosecutors and judges, with the concrete and categorized evidence standards and rules of criminal cases formulated by the 206 System, they can spend less time on sorting out and reviewing the evidence, and reading case documents. Therefore, the System can not only improve their working efficiency, but also enable them to focus on the judgment of the core value of trials, that is, whether the evidence is accurate and sufficient. The judicial practice has proved that the System can demonstrate its advantage in assisting the trials when cases have complicated evidence and a large quantity of documents.

3.3 To Review Evidence for Preventing Wrongful Convictions

The 206 System is designed to verify, check, prompt, supervise and review and judge the evidence chain of the whole case, so as to ensure that the facts and evidence of investigation and prosecution can stand the test of law. **First**, the System can discover timely the defects in the evidence or contradictions between various evidence, remind the case-handling personnel about the problems in evidence, and let them decide whether to correct, remedy or explain for them. This function is of crucial importance for the phase of case investigation, because if the insufficiency of the evidence cannot

be discovered and corrected in time at the initial stage of investigation, once some of the evidence is lost afterwards, it will never be recovered. **Second**, the System has transformed the evidence supervision mechanism from "to review afterwards" into "to guide in advance and "to check during the process", and at every link of the case-handling procedures, from the opening of a case to the end of the trial, it can review, check, remind and supervise the input evidence. In this way, the whole process of criminal proceedings become visible, controllable, recorded and supervised. **Third**, the 206 System helps to overcome the differences, limitations and subjectivity of individual judgments of case investigators, improves the scientific, accurate and comprehensive review and judgment of evidence, and ensure that the factual evidence of cases transferred for review and prosecution can stand the test of law, so as to effectively prevent unjust, false and wrongful cases and guarantee judicial justice.

This role is manifested in the following aspects:

(1) Single evidence review

The 206 System can verify, review and judge the single evidence, provides the case investigators with the technical means to conduct **self-examination and self-test** on the evidence collected, discover evidence defects in time and suggest the investigators to correct them immediately.

Sample of single evidence review

(2) Review and judgment of evidence chain and evidence of the whole case

The system can verify, check, prompt and supervise the evidence chain and the evidence of the whole case, timely discover the **defects and contradictions** in the evidence, and remind the investigators, who will decide whether to correct or explain for them.

Sample of review and judgement of evidence chain & evidence of whole case

Feedback from the case-handling personnel:

(1) Investigators of public security organs

In the past, we sometimes relied on experience to handle cases, especially in the procedures of investigation, evidence collection, record taking and document making. And such problems can hardly be found after evidence collection, sometimes we had not been aware of them until the court trial.

Take the evidence of "transcripts of crime scene investigation" (hereafter as "transcripts of CSI") as an example. A piece of legal and normative transcripts of CSI should contain the following check points: (1) reason, (2) time, (3) venue, (4) condition of the scene, (5) result of investigation, (6) the signature of the investigator, (7) the signature of the witness. And when the transcripts of CSI were input into the 206 System, the *List of Collected trace and physical evidence* and the photos of investigation should be attached.

When it comes to the interrogation record, the witness's signature is required at the end of it. If the person being questioned is a minor, his/her legal representatives shall be present and provide their certificates of identification. If the material content required by these key points cannot be collected and produced in time during the investigation stage, it will be difficult to correct them in the stage of examination for prosecution and the stage of trial, which will lead to inaccuracy and insufficiency of the evidence.

(2) Officers of public security organs, procuratorates and courts

The wide promotion and application of the 206 System has improved the quality and level of case handling by public security organs, effectively reduced the occurrence of "withdrawal of investigation and investigation", and ensured the smooth progress of criminal proceedings in accordance with the law. Reviewing evidence with uniform and applicable standards and rules of evidence is conducive to correcting law enforcement problems in handling criminal cases in a timely manner. In addition, the System can help to reduce the violation of legal procedures in the process of collecting, fixing and utilizing evidence at source, so that the problematic evidence

has no chance to enter the next stage of the criminal procedure, and truly realize the transformation from "arresting people to solve cases" to "determining cases with evidence".

3.4 To Assist Court Trials Intelligently for Judicial Impartiality

The 206 System can assist judges to realize the **substantiation of court trials**, with its requirements of "finding the facts in the court" and "finding the evidence in the court" effectively implemented, so as to realize the openness, fairness and transparency of the trial. With the support of the System, litigant's right of action, together with people's right to know, participate, express and supervise can fully safeguarded, justice can be achieved in a visible way, and judicial fairness, judicial civilization and judicial credibility can be enhanced.

This role is manifested in the following specific case:
On January 23, 2019, the 206 System was used at Shanghai No. 2 Intermediate People's Court to hear Yin Chen's Robbery and Murder case. **For the first time in China**, AI assistive technology was used to assist **court trial**. More than 200 people including Jiang Wei, vice President of the Supreme People's Court, Liu Xiaoyun, President of Shanghai Higher People's Court, Zhang Bencai, Chief Prosecutor of Shanghai People's Procuratorate attended the hearing. The success of the trial **marks that** Shanghai is able to use the 206 System to assist the criminal case handling from filing, investigation, arrest, prosecution and trial, realizing the full process, full coverage and full connection of the procedures in criminal case handling. Besides, it marks that the application of AI in the judicial field in China has developed from the primary stage to the advanced stage. Last, it marks the progress of judicial fairness, judicial civilization and judicial credibility in China, with a new path to facilitate China's judicial reform being discovered—by the application of an AI assistive system for criminal case, or, the 206 System in judicial practice.

Positive responses from the society. The success of the trial has generated positive social responses. After the end of the trial on January 23, vice President Jiang Wei made an important speech on it. I was interviewed by China Central television (CCTV), Shanghai TV and SITV. By 9:00 am of May 5, 2019, there have been 49 related reports on TV, more than 120 reports and their shares on news websites, over 150 posts on Sina Weibo, 36 articles on WeChat, and 5 articles on various forums, post bars, and blogs. CCTV, CGTN (China Global Television Network), *Legal Daily*, *Jiefang Daily*, *People's Court Daily*, *Wenhui Daily*, STVN and other mainstream media in China have all reported on the issue. For example, *Legal Daily* published a long news coverage on its front page titled "206 System in Shanghai: World Leader of Application of AI in Court Trial" on January 24, 2019. Two days

later, it published an opinion, entitled "Embrace judicial AI with Innovative Spirit", both of which were shared by *People's Daily Online*, xinhuanet, www.chinacourt.org, www.legaldaily.com.cn, chinadaily, as well as some other network platforms and the WeChat platform.

3.5 To Integrate Multi-functions for Saving Costs

By the end of March 2018, the 206 System had integrated 26 functions, which helps to save judicial resources and costs, greatly improve the quality and efficiency of case handling, and gradually solve the bottleneck problem of "too many cases but too few case-handling personnel". Practice shows that the more documents and complicated evidence a case has, the more obvious advantages the System can demonstrate. Take theft cases as an example, according to preliminary statistics, the time that judges spent on sorting out evidence decreases by 30–50% on average with the help of the system, which has become an indispensable "AI assistant" for the case-handling personnel.

This role is partially manifested in the following aspects:

(1) To generate documents automatically

The documents automatically generated by the 206 System include Request for Approval of Arrest, Letter of Proposal for Prosecution of public security organ; Opinions on the Examination of Arrest, Reports on the examination of Public Prosecution Cases of procuratorates; Written Judgment for Criminal Cases of courts, and so on, greatly improve the efficiency of case-handling.

(2) To guide the interrogation with key elements

With massive records of inquiry stored in its database, the System has built questioning models for different types of case, providing guide to police during questioning, so as to avoid the omission of interrogation details caused by their lack of experience, as well as to ensure the comprehensiveness and legality of the transcripts.

(3) To transfer electronic files

From the beginning of filing, the electronic file of the case can be automatically generated and transferred along with the procedures of case-handle. And the one-click transmission of these files between public security organs, procuratorates and courts has also been realized by the System. Staff can also directly correct and supplement materials on the System. This function is widely favored by the case-handling personnel because it is time and energy-saving.

(4) To demonstrate evidence in court trial

The prosecutors can use the case evidence chain formed by the 206 System to arrange and combine the relevant electronic file materials according to the requirements of cross-examination. Moreover, in the process of court demonstration, the System can annotate, zoom in and out, as well as mark the evidence materials, and realize the instant access and presentation of all evidence in court.

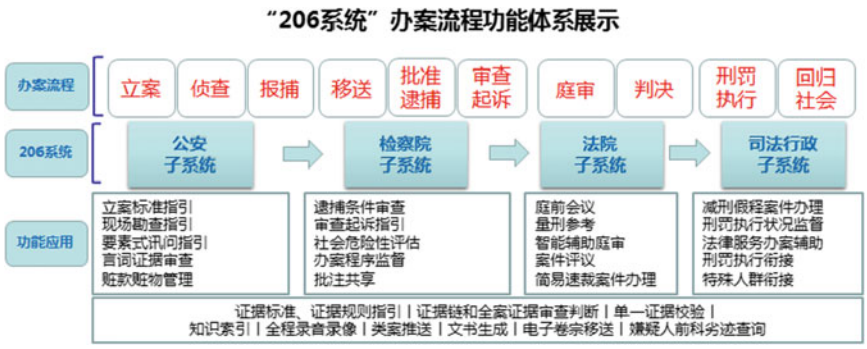
The System also supports audio and video evidence playing, fast positioning, and key word searching during the court trial.

(5) To push similar cases for judges

The outstanding advantage of the 206 System lies in its application of AI and ML, which is mainly embodied in the functions such as case pushing, sentencing suggestion, etc. At each stage of criminal procedure, the System can push the most similar cases to users based on the specific circumstances of the cases, providing them with reference for conviction or sentencing, so as to eliminate the phenomenon of "different judgments on the same case" caused by individual factors, and to achieve uniformly applicable evidence standards, balanced sentencing, and impartial justice.

3.6 To be Fully Applied for Realizing Judicial Accountability System

The wide application of the 206 System has remolded the procedures of criminal cases handling, which embodies the principle of criminal procedures that "people's courts, people's procuratorates, and public security authorities shall, according to their division of functions, coordinate and check each other to ensure correct and effective enforcement of law". Moreover, this remolding can promote judicial accountability, prevent judicial arbitrariness, realize judicial impartiality, and ensure the implementation of the trial-centered litigation reform in China.



Case-handling procedure and functions of the 206 System

Feedback from the case-handling personnel:
Public security organs, procuratorates, courts and bureau of justice, each of them is responsible for a corresponding litigation stage from case filing and investigation by the police, to case review and prosecution by the prosecutes, then to case trial and judgement by the judges, and ultimately to the enforcement of judgement by bureau of justice. Each of them should perform their respective duties to ensure the smoothness of case-handling at different stages. However, under the traditional mode of case-handling, these four organizations are used to work independently rather than cooperatively. In addition, the information materials of cases are generally in paper form, so their information and data are not interlinked and can't be shared with each other in digital form. The exchange of written materials (i.e. traditional documents) between them consumed a significant amount of manpower, material resources and energy, and the quality, efficiency and effect of the exchange of case information were not satisfactory.

The 206 System reconstructs the criminal case handling process by integrating the responsibilities, requirements and norms of each work in each litigation stage into the programs and embedded them into itself. Once the case handling personnel fail to comply with the requirements of the procedure and their behaviors exceed or lag behind, they will be warned or prevented by the System, thus forcing them to standardize their operation in accordance with the law at all stages of the proceedings. In this way, the consciousness of norm and responsibility of case workers can be enhanced, and the problems of shirking responsibility and arbitrary case handling can be overcome.

For example, in the trial stage, if the public prosecution organ applies for an extension of the trial, the change of custody for the defendant requires the cooperation of the court, the procuratorate and the detention center, which is not only time-consuming and labor-consuming, but also prone to errors. However, the traditional problem can be easily solved with one-click documents transmission function of the System.

It is far more reliable, standard and effective to let the System, rather than the people with free will, control the case-handling procedures of criminal cases according to the established rules of litigation. Every step of the criminal proceedings is operated online, so that the case-handling personnel can follow the standardized, systematic, simple and concrete instructions of the System to finish the task efficiently. And since their behaviors during case-handling will be recorded in audio and video format by the System, the criminal procedures are thus visualized and supervised.

4 Review and Acceptance Check

4.1 Expert Review

From January 29 to 30, 2018, Jing Hanzhao, Deputy Secretary-General of the CPLA under CPCCC, led a team of 15 experts to Shanghai to review the 206 System. After hearing the report and conducting field investigation, the group of experts held a special meeting on January 30 presided by Jing and gave feedback on their evaluation. The expert group fully affirmed and highly evaluated the achievements of Shanghai has made in the R&D of the 206 Project and its test operation, and put forward specific requirements for its further improvement. The evaluation report was then submitted to Guo Shengkun, head of CPLA under CPCCC, and with his consent, the System will be initially pormoted and applied in seven provinces and eight cities in the country.

4.2 Evaluation and Acceptance Check

In October 2017, the System successfully passed the evaluation and test of "software function" by Shanghai Information Security Evaluation and Certification Center (Shanghai ISECC).

In August 2018, Project 206 (Phase 1) successfully passed the **formal acceptance check** by Shanghai ISECC. Experts agreed that it met the software quality requirements stipulated by the country in terms of complete functions, stable performance, safety and reliability, and complete documentation.

5 High Appraisal and Wide Attention

5.1 High Appreciation and Appraisal

At the National Judicial System Reform Promotion Conference held by the CPLA under CPCCC in Guiyang, the capital of Guizhou Province on July 10, 2017, as soon as the 206 System appeared, it received immediate and wide attention from all walks of life and made a good impression on the judiciary and the scientific and technological circles.

Here I made a representation named *Deep application of AI in judicial field: with the 206 System developed by Shanghai High People's Court* as an example, and **received affirmation and praise from the participants** of the Conference and caught nationwide attention.

I was making a presentation entitled *Deep application of AI in judicial field* at the Conference

(1) Comments from the CPLA under the CPCCC

Comments by Meng Jianzhu, then head of CPLA under the CPCCC.
In his speech at the Conference on July 10, 2017, Secretary Meng gave full recognition and high praise to the 206 System. Shanghai's use of high-techs to promote the Trial-centered judicial reform was 'inspiring', he said, which "has demonstrated broad prospects for development." "As the first crab eater, Shanghai has found a breakthrough on the thorny road of reform, and we should applaud their innovation."[1]

In the same evening, Secretary Meng met with the main leaders of Shanghai CPLA. He once again affirmed the preliminary completion of Project 206 by pointing out that "Shanghai submitted a satisfactory answer to the national judges, court staff, and judicial personnel, and created a replicable and promoted experience for all parts of the country."[2]

On October 13, 2017, Secretary Meng wrote a preface for my book *Exploration and Practice of the Reform of the Judicial System of Shanghai Court*. "Courts in Shanghai has always adhered to the deep integration of the reform of system and mechanism with the application of high-techs, such as big data and AI to solve the difficult problems of judicial work, and strived to make the judiciary more intelligent, accurate and efficient," Meng commented. "Especially under the circumstances of tight time, heavy tasks and high requirements, Shanghai can still actively implement the litigation reform with trial as its core by transforming the basic evidence standards guidelines into data models and embedding them into the intelligent assistive case

[1] See this book, p. 286.
[2] See this book, p. 286.

handling system, i.e. the 206 System, which pioneered the deep application of AI in the judicial field and discovered a new path toward criminal justice civilization."[3]

Comments by Guo Shengqun, member of the Political Bureau of the CPC Central Committee and present head of CPLA under the CPCCC.
"We should earnestly learn from the experience and make good application of the intelligent assistive software System for criminal cases developed by Shanghai to construct a new criminal justice model adapted to the actual needs, so as to prevent the repetitive development of similar systems," Secretary Guo proposed his requirement at the Working Conference of Political and Law of CPC Central Committee on January 22, 2018.

"We should speed up the construction of cross-department case-handling platform based on big data, promote and utilize the intelligent assistive system for criminal case nationwide, and realize data interconnection, human-computer interaction and complementarity," he emphasized at the National Judicial System Reform Promotion Conference on July 24 of the same year.

(2) Comments from CPC Shanghai Municipal Committee

Comments by Han Zheng, then mayor of Shanghai and Secretary of CPC Shanghai Municipal Committee.
Han Zheng made a special trip of survey to Shanghai High People's Court on June 7, 2017. After listening to the report on R&D progress, watching the demonstration given by the member of the R&D Team, and inquiring about technical issues, he gave a high evaluation to 206 Project, believing that its promotion and use will significantly improve the judicial level.

Studying Meeting in Shanghai High People's Court.
On June 20, 2017, the Standing Committee of the Shanghai Municipal Committee of the Communist Party of China (CPC) held a study meeting on the theme of "Development and Application of AI at Home and Abroad" in Shanghai High People's Court. At the meeting, Yadong Cui, then president of Shanghai Higher People's Court, which is me, demonstrated the effects of AI application in courts of Shanghai. Liu Qingfeng, chairman of iFlyteck, gave a lecture on the latest progress and typical applications of AI.

In his speech at the meeting, Secretary Han Zheng put forward a new target, which is to build Shanghai into a leading city of AI development.

[3] See this book, p. 3.

On June 20, 2017, Yadong Cui gave a presentation entitled "Implementing Big Data Strategy to Promote the Construction of Data Court and Realize the Modernization of Judicial System and Judicial Ability" at the studying meeting of the Standing Committee of Shanghai Municipal Committee of the CPC.

Comments by Li Qiang, the present mayor of Shanghai and Secretary of CPC Shanghai Municipal Committee.
On April 9, 2018, Secretary Li Qiang, member of the Political Bureau of the CPC Central Committee and Secretary of the Shanghai Municipal Party Committee, came to Shanghai High People's Court for investigation. After listening to the special report on the application of Project 206, Li stressed that we should make full use of intelligent means, improve the intelligent assistive system for criminal cases, and further promote the quality and effects of the trial.

Shanghai Municipal Commission of Political and Legal Affairs.
Shanghai CPLA attaches great importance to the R&D of the 206 System and its promotion and application. Both Jiang Ping and Chen Yin, both of whom were members of the Standing Committee of the CPC Shanghai Municipal committee, and heads of Shanghai CPLA, with Jiang (2013–2017) and Chen (2017–2019), have arrived at the R&D and pilot sites of the System for many time, to conduct surveys, hold special meetings and listen to the reports about its progress.

(3) Comments from the Supreme People's Court

By January 2019, President Zhou Qiang of the Supreme People's Court has listened to six reports on the R&D of the 206 System, and has made several important instructions, providing strong guidance and support for us.

In the afternoon of June 19, 2018, Zhou Qiang, President of the Supreme People's Court, chaired the second plenary meeting of the Supreme Court's Leading Group on Judicial Reform in 2018. He listened to the report of Shanghai High People's Court on the R&D of The 206 System and its promotion and application throughout the country, and deliberated on the division of labor for the next phase of R&D work. After hearing the report, President Zhou affirmed and appraised our efforts in organizing and promoting the D&R, as well as promotion and application of the 206 System and achieved important results at different stages under the leadership of the CPLA of CPC Central Committee, under the leadership and support of the Shanghai Municipal Committee and Shanghai Municipal CPLA, and under the guidance of the Supreme People's Court.

The decisions made at the were as follows: (1) To further strengthen the organization and leadership of the nationwide promotion and application of the 206 System; (2) To adopt the ***Supreme People's Court's Division of Labor Plan on the Nationwide Promotion and Application of the 206 System***, which clearly states that this task of promotion and application will be undertaken by Li Shaoping, the Vice President of the Supreme People's Court, and the contact and communication with courts nationwide and the relevant units of the CPLA under CPC Central Committee will be implemented by the Office of the Central Leading Group for Judicial Reform.

On 27 February 2019, the Supreme People's Court formulated the *Opinions on Deepening the Comprehensive and Supporting Reform of the Judicial System in the People's Courts*, namely the *Fifth Five-Year Reform Program for People's Courts 2019–2023*, which clearly requires to **promote the application of intelligent assistive system for criminal cases, improve the basic evidence guidance on criminal cases at different stages of litigation, and cooperate with relevant central departments to embed the guidance into the trans-department big data case-handling platform**.

Shen Deyong, then the Standing Vice President of the Supreme People's Court, listened to two reports on the R&D of the 206 System and gave instructions. On June 27, 2017, Shen arrived at the R&D Base of Project 206 to conduct survey and offer guidance.

Li Shaoping, Jiang Wei, Zhang Shuyuan, three vice-presidents of the Supreme Court, **Xu Jiaxin**, then Director of the Political Department of the Supreme Court, together with **Hu Yunteng** and **Pei Xiangding**, commissioners of the Supreme Court, had listened to reports on many occasions, and investigated the development of the 206 System on the spot. They fully affirmed and promoted the process of the research and development of the System.

Li Shaoping: I am surprised at the progress of the 206 System. The application of modern science and technology in judicial field is the basic trend, and judicature need to be further standardized and modernized. The 206 system in Shanghai is a good exploration in this respect.[4]

[4]On June 12, 2017, Jiang Wei, then deputy director of the Central Office of Judicial Reform, went to Shanghai High Court to do research on the Project 206.

Jiang Wei: The 206 System is not only a new challenge for the court, but also the first of its kind in the world. The current achievements fully demonstrate that the central government's decision-making is correct and the way of research and development is reliable.[5]

Zhang Shuyuan: The 206 System plays a powerful role in guiding the standards of evidence, guiding the rules of evidence, graphic, voice, image recognition, electronic scanning of evidence analysis, drafting documents and so on. It plays a great role in improving the quality and efficiency of the criminal trial in the country and promoting the trial-centered litigation reform.[6]

Xu Jiaxin: The 206 System has realized the dream of judicial scientists and technicians for decades. What is more gratifying is that the System in Shanghai has been extended to civil and administrative cases, achieving full coverage of court cases.[7]

6 Wide Attention in Society

Within 24 hours after the Guiyang Conference, there were 63 relevant reports on news platform, 48 reports on Wechat platform, 219 reports on micro-blog platform, and 8 related posts on online forums. After the trial operation of Shanghai AI Assistive System for Civil, Commercial and Administrative Cases on Nov. 30, the mainstream media such as Chinanew.com reported again. There were 24 relevant reports on news platform, 6 reports on Wechat platform and 33 reports on micro-blog platform. These reports attracted wide attention from the social media and netizens. Jiefang Daily, Legal Daily, People's Court Daily, CCTV and Shanghai TV News were the first to report the development of AI Assistive System for Criminal Cases by Shanghai Court. People.com, Xinhua Network, China Court Network, Legal Network, China Daily Network and other major network platforms and Wechat platform reprinted these reports. Following are the reports of various media from July 10 to 11, 2017:

(1) News platform

A total of **63 news reports** and online reprints were published. On July 10, Jiefang Daily, People's Court Newspaper, Dongfang Net and Shangguan News published reports about the System with titles such as *Unveiling 206: AI Prospect of the Court's Future—A Record of 154 Days of Research and Development of AI Assistive System for Criminal Cases in Shanghai, 206: Can the AI System replace judges and avoid*

[5]On June 12, 2017, the deputy director of the Central Judicial Reform Office delivered a speech at a symposium on the development of "trial-centered r litigation reform software" held by the Shanghai High Court.

[6]On June 19, 2018, the Supreme People's Court held a speech at the second plenary meeting of the Supreme Court's Leading Group on Judicial Reform in 2018.

[7]On June 19, 2018, the Supreme People's Court convened the second plenary meeting of the Supreme Court's Leading Group on Judicial Reform in 2018.

the occurrence of cases in which people are unjustly, falsely or wrongly charged or sentenced? On July 11, the Legal Daily was the first to report *Application of AI in Shanghai to Prevent Injustice and False Cases—the First AI Assistive Case Handling System in China*. This report was reprinted by 58 other media, including Xinhua Net, China Court Network, Legal Network, Shanghai Comprehensive Political and Legal Administration Network, People's Network, China Daily Network, Sina News, Guangming Network, Hualong Network and Oriental Rule of Law Network.

(2) Wechat platform

There were **54 related articles** on various kinds of **Wechat platforms**, which mainly reprinted relevant news reports, with no commentary articles. Major Wechat platforms included "Supreme People's Court", "People's Court Newspaper", "Intelligent Court in Progress", "Ping'an Xuhui", "Oriental Network Political and Law Channel", "Legal Eye Observation" and so on. The article entitled *Unveiling 206: AI Prospect of the Court's Future—A Record of 154 Days of Research and Development of AI Assistive System for Criminal Cases in Shanghai* on "Supreme People's Court" Wechat platform attracted most attention. It was read by 31015 people, and got 105 likes and 5 comments.

(3) Micro-blog platform

There were **334 related micro-blog articles**, mainly relaying declarative news reports, mainly from Sina Weibo, mainly from official micro-blogs of courts at all levels and official micro-blogs of some media. The article from the official micro-blog of Supreme People's Court entitled *Unveiling 206: AI Prospect of the Court's Future—A Record of 154 Days of Research and Development of AI Assistive System for Criminal Cases in Shanghai* attracted most attention. The article was reposted for 168 times. It got 3 comments and 45 likes. Another from the official micro-blog of Jiefang Daily entitled *206: Can the AI System replace judges and avoid the occurrence of cases in which people are unjustly, falsely or wrongly charged or sentenced?* also attracted much attention. The article was reposted for 4 times. It got 6 comments and 1 likes.

(4) Comments by experts and scholars

Ye Qing, Professor, President of East China University of Politics and Law.
In a news comment written by him entitled "***Broad prospects of deep integration of AI and judicial practice***",[8] Professor Ye commented that "For the first time, the 206 system integrates the statutory uniform evidence standards into the digital criminal case handling system of the public security organs, procuratorates and courts, and makes their respective case-handling platforms connected, which greatly promotes the implementation of uniform evidence standards by the case-handling personnel of the three branches, and 'forces' the criminal cases to be handled in strict accordance with the provisions of the law in each judicial proceedings, including investigation, review and prosecution, as well as trial."

[8]Qing (2017, p. 5).

Ye also expressed his recognition and support for the 206 System in a news interview.[9] "The introduction of the System is of great significance for courts in Shanghai, as well as for the implementation of judicial reform in this city," he was quoted.

Moreover, in his academic thesis[10] entitled "*On the theoretical reflection and practical value of the case handling mode of 'combination of arrest and prosecution'*", Ye added that, "The 206 System aims to embed the uniform and applicable evidence standards into digital programs, which should become the paradigm of case-handling informatization of judicial organs in the era of big data."

Su Huiyu, Professor of East China University of Political Science and Law, Expert of Criminal Law.

On July 12, 2018, Yadong Cui paid a visit to Professor Su Huiyu, the author of *Sentencing and Computing* and a leading criminal law scholar in China. Professor Su Huiyu highly praised the Shanghai Court for combining modern science and technology with judicial practice, saying that developing an AI assistive system for handling criminal cases to promote the trial-centered litigation reform was a great innovation which would bring benefits to all.

On July 12, 2018, Yadong Cui paid a visit to Professor Su Huiyu and exchanged views with Professor Su Huiyu

[9]Mao Lijun. "President of ECUPL: opportunities and challenges in the era of AI". http://listen.eastday.com/node2/n112/n114/u1ai917444_t92.html.

[10]Qing (2018, pp. 3-11).

Cai Lidong, Professor, Dean, Faculty of Law, Jilin University.
In January, 2019, Professor Cai Lidong was interviewed by Shanghai Television Station. He said: "The visualization and intellectualization of the trial enable judges, prosecutors and defenders to view the evidence and related materials directly, which can help judges make fair judgments."

6.1 Investigation, Study and Communication in China and Abroad

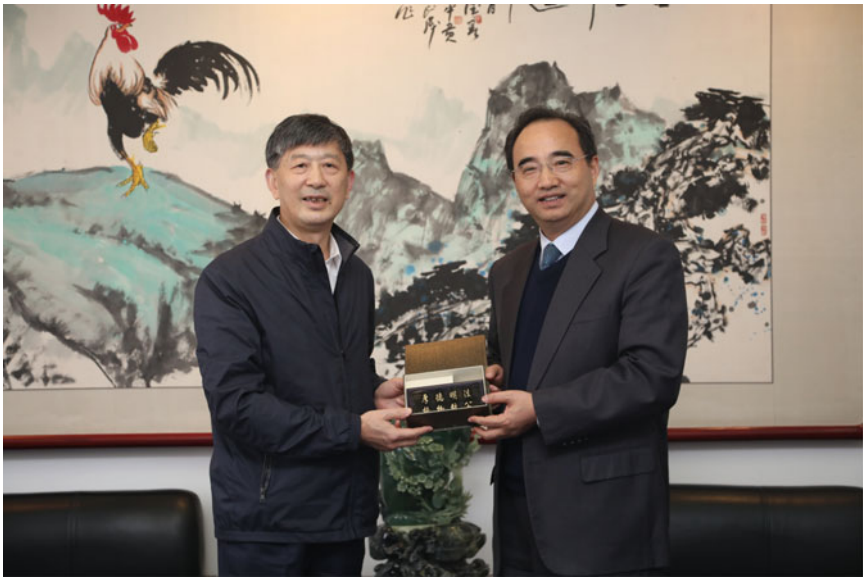
On July 11, 2017, during a group discussion at the National Forum of the Presidents of the High Court, many presidents of the High Court said that after listening to the speech of the Shanghai High Court and watching the videos, "by combining trial-centered litigation reform with informationization, the Shanghai Court **added technological wings to justice**." Shanghai's practice "played an important leading role, can **be replicated and promoted**".

After the National Conference on the Promotion of Judicial Reform, from July, 2017 to the end of March, 2019, the Shanghai High Court had received **133 groups of 3497 people** from the central state organs, local political and legal organs, the NPC, the government and the relevant departments of the CPPCC, among which 142 people from 11 groups were foreign judicial exchanges (33 groups of 1397 people since November 2018).

6.2 Frequent Academic Exchanges, Lectures and Seminars

The successful development and application of the 206 System has attracted wide attention of the society. In addition to visits, studies and exchanges at home and abroad, there has been a lot of invitations for academic exchanges, lectures and seminars. Since 2018, Yadong Cui has been invited to conduct 18 exchanges, lectures and seminars by many organizations and institutions in China, including the National People's Congress Law Commission, Tsinghua University, China University of Politics and Law, Shanghai Jiaotong University, East China University of Politics and Law, Beijing Foreign Studies University, Northeast University of Finance and Economics, Shanghai School of Politics and Law, Shanghai University, Wenzhou University and procuratorial, judicial and public security organs, etc.

On April 9, 2019, Shanghai Institute of American Studies and Shanghai Academy of Social Sciences held the Forum on "High-end Sino-US Civil Diplomacy in 2019"

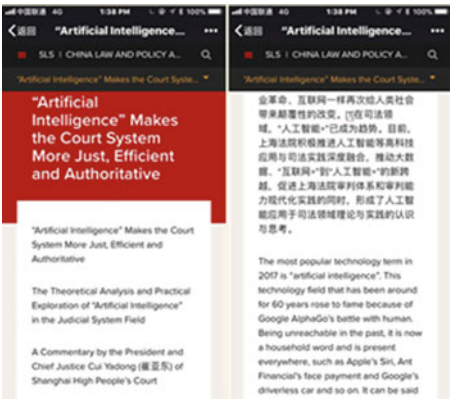


On March 22, 2019, China University of Political Science and Law invited Yadong Cui to give lectures.

On April 11, 2019, Shanghai Law Society and Shanghai People's Broadcasting Station jointly created the "Legislator's Hall", inviting Yadong Cui to be the guest speaker.

On April 12, 2019, Yadong Cui was invited to give a lecture at Wufeng College in Pudong,Shanghai.

On April 17, 2019, Comrade Yadong Cui was invited to participate in the First Management Committee of the Intelligent Law Institute of Tsinghua University.



Yadong Cui's article *Application of Artificial Intelligence of Shanghai Court in Judicial Practice* is published on the website of Stanford University.

7 Application of the System in Other Provinces and Cities

On January 10, 2018, Wang Yongqing, then Secretary-General of the CPLA under CPCCC (currently Vice-Chairman of the National Committee of the Chinese People's Political Consultative Conference), presided over a meeting on the application of the 206 System nationwide. Jing Han Chao and Bai Shaokang, the two Deputy Secretary-Generals of the CPLA under the CPCCC, Chen Yin, Secretary of the Shanghai CPC and Yadong Cui, President of Shanghai High People's Court attended the meeting. Yadong Cui reported on the trial operation of the 206 System and *the National Promotion and Application Program of the 206 System* drafted on behalf of the CPLA under the CPCCC. In his speech, Wang Yongqing spoke highly of the research and development and application of the 206 System. He pointed out that this was **a revolution in the history of Chinese legal system** and helped to **achieve remarkable progress in the construction of Chinese legal system**. **Shanghai had made outstanding contributions**. In principle, he agreed with the National Promotion and Application Program drafted by Shanghai, and made it clear that the promotion and application of the 206 System should be under the unified responsibility of the CPLA under the CPCCC, and that repeated development and construction of the similar systems in various regions should be avoided.

On January 22, 2018, **Guo Shengkun**, member of the Political Bureau of the Central Committee and Secretary of the Political and Legal Committee of the Central Committee, made a clear request in his speech at the Central Political and Legal Working Conference.

We should earnestly learn from the experience and make good use of the software of Shanghai AI Assistive System for Criminal Cases to develop a new model of criminal justice adapted to actual needs, so as to prevent the re-establishment and repetition of construction.

On July 24, 2018, **Secretary Guo Shengqi** stressed at the National Conference on Deepening the Reform of the Judicial System in an all-round way: "We should accelerate the establishment of trans-department big data case handling platform, **promote the application of AI Assistive System for Criminal Cases nationwide, and realize interoperability and human-computer interaction and complementarity**."

In April 2018, the Central Committee of Politics and Law decided to pilot the application in 8 cities of 7 provinces, including Taiyuan City of Shanxi Province, Hefei City of Anhui Province, Wuhu City, Fuzhou City of Fujian Province, Kunming City of Yunnan Province, Wenzhou City of Zhejiang Province, Changchun City of Jilin Province and Yinchuan City of Ningxia Autonomous Region. In addition, Xinjiang Production and Construction Corps and Guizhou Province also applied to join the pilot areas.

According to the request of the Central Political and Legal Commission, Shanghai Project 206 Office undertook to assist the pilot provinces and cities to do a good job in popularization and application, and to give personnel training and guidance for the pilot provinces and cities.

Under the careful preparation of Shanghai Project 206 Office, many experts were invited to give lectures during the training, including Yadong Cui from Shanghai High People's Court, Guo Weiqing, Vice-President of Shanghai High People's Court, Huang Xianqing, Vice-President of Shanghai High People's Court, Cao Hongxing, Director of Information Management Department of Shanghai High People's Court, Chen Manqing and Ding Qi of Shanghai Procuratorate, Shui Bing of Shanghai Public Security Bureau, Jin Zemeng from iFlytek Co. Ltd. Through this training, the trainees fully understood the functions and application prospects of "the 206 System" and fully grasped the use of the 206 System.

Yadong Cui gave a lecture during the training course.

The trainees believed that through the intensive training, they had learned a lot. They deeply felt that the research and development of the 206 System played a decisive role in promoting the reform of the trial-centered litigation system and had broad prospects for development. Through learning the principles, procedures and specific requirements of the establishment of evidence standards, they deeply felt that the establishment of visible and tangible evidence standards and rules of evidence was of great significance for reducing judicial arbitrariness, solving the problems of inconsistent application of criminal evidence standards and non-standardized criminal case handling behavior, avoiding the occurrence of cases in which people are unjustly, falsely or wrongly charged or sentenced. They said that they would carry out the pilot work in accordance with the deployment of the Central Political and Legal Commission and the Supreme Court.

The Project 206 Office of Shanghai High Court organized professional and technical personnel to go to Hefei and Wuhu in Anhui Province, Taiyuan in Shanxi Province and Kunming in Yunnan Province to listen to opinions and help guide the pilot work.

References

Y. Qing, *Jiefang Daily* (July 10, 2017), p. 5
Y. Qing, *Criminal Science* (2018, No. 4), pp. 3–11

Chapter 11
Extending to Civil and Administrative Fields—The Launch of Shanghai AI Assistive System for Civil and Administrative Cases

The success of the research and development of Shanghai AI Assistive System on Criminal Cases, especially the application of high-tech such as AI to solve outstanding problems in criminal proceedings, helps to implement the Trial-centered Litigation Reform, effectively avoiding the occurrence of cases in which people are unjustly, falsely or wrongly charged or sentenced, reducing judicial arbitrariness, enhancing the public credibility of the judiciary. That broadened our mind and strengthened our confidence and determination in applying AI. On July 10, 2017, after the Guiyang Conference, we decided to extend the application of AI to the handling of civil and administrative cases on based on the successful experience of the "the 206 System". Thus, in August of that year, we launched the research and development of Shanghai AI Assistive System for Civil and Administrative cases (hereinafter referred to as the "Civil and Administrative 206 System").

1 The Significance and Necessity of Its Research and Development

Civil and administrative cases account for about 70% of the total number of cases accepted by the courts. In Shanghai, for example, the number of civil and administrative cases accepted by the Shanghai Court each year accounts for about 65% of the total number of cases, while criminal cases only account for 4%. It is the obligation of courts and judges to handle every case impartially and effectively, making efforts to let people see in every judicial case that justice is served. And it is necessary and significant to apply new technologies such as AI to the handling of civil and administrative cases.

Y. Cui, *Artificial Intelligence and Judicial Modernization*,
https://doi.org/10.1007/978-981-32-9880-4_11

1.1 Unifying the Application of Law and Enhancing the Public Credibility of the Judiciary

Some prominent problems have existed in the handling of civil and administrative cases for a long time such as the non-unified application of law and the non-standardized right of discretion. Applying modern science and technology such as artificial intelligence to assist judges in handling civil and administrative cases can play a special role in accepting evidence, identifying facts, applying laws and impartial adjudication, so as to unify the application of law, standardize the exercise of judges' discretion, enhance the public credibility of the judiciary and make the people have a stronger sense of gain of fairness and justice.

AI and other modern technologies can be applied to assist judges in the handling of civil and administrative cases and play their unique role in the admission of evidence, identification of facts, application of law and impartial adjudication so as to unify the application of law and standardize the judge's right of discretion, enhancing the judicial credibility and people's sense of gaining fairness and justice.

1.2 Reducing the Arbitrariness of the Judiciary and Improving Its Quality

Through the machine learning and deep excavation of massive judicial data, civil and administrative case handling elements, we have developed the "Civil and Administrative 206 System", which is a highly intelligent system conforming to the trial law of civil and administrative cases, and meeting the needs of first-line trial. The System assists judges to effectively solve the problems existing in the trial practice of civil and administrative cases, such as inconsistent thinking, incomplete examination of evidence, non-standardized exercise of right of discretion, and excessive deviation of judgment results, thus reducing the arbitrariness of the judiciary and improving the quality of case handling.

1.3 Making Case Handling More Intelligent and Efficient

The large number of civil and commercial and administrative cases account for a greater percentage in the total number of cases. During the past three years, the Shanghai Court has accepted an annual average of about 710,000 cases, of which criminal cases accounting for about 4%, while civil and administrative cases accounting for about 65%. Therefore, the development of the "Civil and Administrative 206 System" and the use of AI and other new technologies can help to solve the contradiction of overloaded cases but relatively fewer staffs, improve case handling efficiency, and realize the standardization and make case handling more intelligent and efficient.

2 Formulating Plans and Advancing in an Orderly Manner

In August 2017, we formulated *the Work Planning of the Shanghai High People Court on the Research and Development of the Shanghai AI Assistive System for Civil and Administrative Cases (Phase I)*, which was officially launched on August 18, 2017 after being approved by the Commission for Political and Legal Affairs of the CPC Shanghai Municipal Committee. On November 29, 2017, the System was put into trial operation. In September 2018, a meeting aimed at encouraging and popularizing the use of the Shanghai AI Assistive System for Civil and Commercial and Administrative Cases throughout the whole city's courts was held. By the end of October 2018, 77435 cases had been entered into the System.

2.1 Basic Principles

(1) Adhering to the Rule of Law

The planning should carefully formulated on the basis of the substantive and procedural law in the civil and administrative fields and the judicial interpretation of the Supreme People's Court o China on civil and administrative trials so as to ensure that the research and development of the System is always based on the rule of law.

(2) Adhering to the Law of Justice

To ensure that the law of justice can be visible and measurable, we should conscientiously study the law of justice in handling civil and administrative cases and insist on integrating them with modern technologies.

(3) Adhering to Problem Orientation

The trial of civil and administrative cases is related to the protection of the vital interests of the people. It is necessary to extensively listen to the opinions and suggestions of first-line judges and lawyers, thoroughly investigate the deep-seated problems affecting judicial impartiality and inhibiting judicial capability, so as to ensure that the research and development of the System is highly targeted and can solve practical problems.

(4) Adhering to the Leading Role of Science and Technology

We should combine modern technologies with creativity of judicial personnel, setting up a strategic thinking of big data and giving full play to the leading role of modern technologies such as the Internet, big data, cloud computing and AI so as to achieve both scientific rationality and judicial rationality.

(5) Focusing on Convenience and Practicality

The research and development of the System should highlight the dominant role of judges and attach importance to user's experience of judges. The system should

be practically designed so that it will be simple and convenient for judges to use, becoming the intelligent assistant of judges in handling case.

(6) Proceeding in a Step by Step Way

Following the law of justice, the development of the System should follow a step by step way and tackle key problems one by one in a planned and progressive manner.

2.2 Establishing the Guide to Evidence Rules

Evidence is crucial to the litigation. Establishing the guide to evidence rules in civil and administrative cases is one of the core contents of the research and development of the "Civil and Administrative 206 System". In accordance with the provisions of the Civil Procedure Law, the Administrative Procedure Law and relevant judicial interpretations, we have formulated uniform and applicable rules of evidence and made detailed provisions for the evidence that should be provided by the parties for litigation claims, the types of evidence and formal elements that people's courts should investigate and collect, the distribution of burden of proof and the rules for proof attestation.

2.3 Establishing the Guide to the Elements of Case Handling

Establishing the guide to the elements of handling civil and administrative cases is another core content of the "Civil and Administrative 206 System". According to different case-handling stages such as filing a case, trial and adjudication, we have provided **unified, simple, data-based and list-based** guide to handling civil and administrative cases for case-handling personnel.

(1) **The guide to the elements of handling civil cases**. According to the trial steps handling civil cases, such as examination of litigation elements, fixing claims and defenses, defining the basis of claim right, determining the focus of the dispute, identifying the facts, confirming the elements of facts, application of specific law, generating the judgments, we have studied and established the guide to elements of handling civil cases, which provides guidance for the judges to unify the thinking of case handling, determine the direction of trial, standardize the trial process and reduce the deviation of judgment results.

(2) T**he guide to the elements of handling administrative cases**. Based on the experience of handling administrative cases, according to the elements of administrative conducts such as **law enforcement purpose, authority basis, identification of facts, administrative procedures and application of law,** we have studied and established the guide to the elements of handling administrative cases, which provides guidance for the judges to unify the thinking of handling

cases, determine the direction of trials, standardize the trial process and reduce the deviation of judgment results.

According to the planning of research and development, in the first phase of the project, we focus on the common, important and new types of civil and administrative cases, and we select six categories and eight causes of action to establish the guide to the elements of case handling.

3 The Framework and Function of the System

The Shanghai AI Assistive System for Civil and Administrative Cases is composed of three parts, namely, the application software, the big database and AI support platform. These three parts are coordinated and interdependent. Through the integration of the Internet, big data, AI and other modern technologies, we have transformed the guide to evidence rules in civil and administrative cases and the guide to the elements of handling civil and administrative cases to data models and incorporate them into the AI Assistive System for Civil and Administrative Cases, which is capable of reviewing, checking and supervising the legitimacy and relevance of evidence automatically, and guiding, examining and supervising the completeness of the elements of case handling. In this way, we can effectively unify the thinking of the handling civil and administrative cases, standardize the exercise of the power of discretion, and unify the application of law, so as to enhance the judicial quality, judicial efficiency and the public credibility of the judiciary. The details are as follows:

3.1 Establishing a Database of Civil and Administrative Cases

The database of civil and administrative cases of Shanghai consists mainly of some sub-databases including evidence rules, elements for case handling (currently including six categories and eight causes of action, etc.), electronic files, cases (including the bulletin cases of the Supreme People's Court, guiding cases; reference cases of the Shanghai Court, hundred exquisite cases, etc.), judgment documents, judicial interpretation of laws and regulations, case-handling documents, providing information resource for the handling of cases.

3.2 Building AI Support Platform

Based on neural network, machine learning and other technologies, the AI Support Platform applies various AI technologies, including **Optical Character Recogni-**

tion (OCR), Natural Language Processing (NLP), Intelligent Speech Recognition, Judicial Entity Identification, Entity Relationship Analysis and Automatic Extraction of Judicial Elements. Combined with the trial experience of the first-line judges, through manual labeling, the core elements of the case labeling system is established to capture the core information of cases, such as litigation requests, factual reasons, defense claims, focus of disputes and other core information of cases from the electronic files,, providing support for the application of the system. By the end of March 2019, the labeling system of 8 causes of action has been established, and the indexing of 8 causes of action (government information disclosure, motor vehicle traffic accident liability disputes, bank card disputes, etc.) has been completed, over 2000 electronic files and 160000 label points, realizing the highly intelligent extraction of elements of cases.

3.3 Functions of the "Civil and Administrative 206 System"

The System has **27 functions** (details of the functions are shown in the attached table).

There are 3 functions in **the filing stage**: examination of case acceptance criteria, intelligent reminding of litigation fee payment and intelligent generation of procedural documents.

There are 2 functions in the guide to **the handling of cases**: the guide to the elements of the handling of cases, and the guide to the examination and judgment of evidence.

There are 3 functions in the stage of **pre-litigation mediation**: identifying claims, identifying affirmative defense, identifying facts and reasons.

There are 6 functions in **the pre-trial stage**: intelligent reading of case files, pre induction of undisputed facts, pre induction of focus of disputes, examination of the completeness of evidence, examination of the compliance of evidence, and making an outline of court trial.

There are 5 functions in **the trial stage**: **induction of undisputed facts, induction of focus of disputes, intelligent tips for trial procedures, paperless cross-examination in trial, and intelligent generation of trial records**.

There are 2 functions in **the deliberation stage**: paperless demonstration of collegial discussion and intelligent generation of deliberation records.

There are 6 functions in **the adjudication stage**: law articles push, similar cases push, pre judgment of the adjunction, intelligent matching of document models, intelligent generation of the judgments, reminding of the degree of judgment deviation (Table 1).

Table 1 Table of the Functions of the "Shanghai AI Assistive System for Civil and Administrative Cases"

Number	Name of the function	Description of the function
1	The guide to the elements of case handling	Through the method of constructing the guide to the elements, we will standardize the thinking and procedures of the handling of cases, and provide essential, scientific and practical guide to the case-handling elements for the judges to find out the facts, correctly apply the law and make the decision in accordance with law
2	The guide to the examination and judgment of evidence	Detailed provisions are made on the evidence that should be provided by the parties and their litigant representatives if they want to bring a lawsuit, the types and formal elements of the evidence that the people's courts should collect, as well as the distribution of burden of proof and the rules of proof attestation so as to provide a list-style guide for the judge to handle the case
3	Intelligent Reading of Case files	The summary information which have been organized, marked and extracted in the trial of cases can be displayed in a modular manner and the necessary hints are given at the key nodes of the case handling to assist judges in their work
4	Push of Law Articles	According to the legal relationship determined after the pleading between the parties, the corresponding substantive legal norms are automatically pushed for judges. According to the process of the case trial, the procedural legal norms that may be involved are automatically pushed in the trial procedure
5	Push of Similar Cases	Similar cases are automatically pushed for the case-handling personnel to conduct intelligent analysis and comparison of the judgments, improving the uniformity of the application of law
6	Examination of Acceptance Criteria of Cases	To conduct an intelligent examination of whether the case conforms to the relevant provisions of the Civil Procedure Law and the Administrative Procedure Law on case-filing conditions

(continued)

Table 1 (continued)

Number	Name of the function	Description of the function
7	Intelligent Reminding of Litigation Fee Payment	Through data comparison, judges are prompted to know whether the payment of litigation fees can be reduced, exempted and delayed before the trial and judgment of the case, so that he can handle the reimbursement and collection of the litigation fees according to the situation
8	Identifying Claims	The claims of the parties and the evidence materials submitted by the parties are intelligently identified and the information is automatically extracted, classified and prompted to help judges fix the claims of the parties in a timely manner
9	Identifying Facts and Reasons	The claims of the parties and the evidence materials submitted by the parties are intelligently identified and the information is automatically extracted, classified and prompted to help judges fix the facts and reasons of the case in a timely manner
10	Identifying Affirmative Defense	The claims of the parties and the evidence materials submitted by the parties are intelligently identified and the information is automatically extracted, classified and prompted to help judges identify the affirmative defense in a timely manner
11	Pre Induction of Undisputed Facts	Through the study and induction of big data, relationship between claims and defenses is built, and the parts of the claims and facts and reasons that face no defenses are inducted as undisputed facts
12	Pre Induction of Focus of Disputes	Through AI technology, the study and induction of big data, relationship between claims and defenses is built, and the parts of the claims and facts and reasons that face defenses are inducted as focus of disputes

(continued)

Table 1 (continued)

Number	Name of the function	Description of the function
13	Examination of the Completeness of Evidence	Through the knowledge base of the elements, the corresponding elements of evidence are sorted out to find the evidence needed to support the current claims and defenses. Intelligent matching is done through the list of evidence provided by the parties to find out the missing evidence
14	Examination of the Compliance of Evidence	According to the standard of evidence examination, the compliance of documentary evidence and material evidence are examined and the compliance of some contents including seal, signature, date and authenticity are checked
15	Making an outline of court trial	Based on pleadings and evidentiary materials, the system can extract the core information from the trial outline and fill it back into the trial outline based on the personalized trial transcript models targeted at different causes of action, so as to make an outline of court trial before hearing
16	Induction of Undisputed Facts	Through the study and induction of big data, the relationship between claims and defenses is built, and the parts of the claims and facts and reasons that face no defenses are inducted as undisputed facts
17	Induction of the Focus of Disputes	Through the study and induction of big data, the relationship between claims and defenses is built, and the parts of the claims and facts and reasons that face defenses are inducted as the focus of disputes
18	Intelligent Tips for Trial Procedures	By analyzing the trial rules involved in the trial process, the trial rules database can be established, which is connected with trial system, providing tips for different procedures in the trial

(continued)

Table 1 (continued)

Number	Name of the function	Description of the function
19	Paperless Cross-examination in Trial	In the course of the trial, based on the statements of all parties, real-time electronic evidence can be searched and synchronously displayed on the terminal screen. It is mainly used in cross-examination and debate to reduce the inconvenience caused by flipping through the paper files
20	Intelligent Generation of Trial Records	By uploading the outline of the trial record to the intelligent voice trial system, it completely records the speech contents of everyone in the trial process, while the clerk manually reviews contents at the same time. Thus, the trial records can be intelligently generated
21	Paperless Demonstration of Collegial Discussion	Based on the statements of all parties, real-time electronic evidence can be searched and synchronously displayed on the terminal screen. It is mainly used in the collegial process to introduce the case as well as the process of reviewing the electronic file to reduce the inconvenience caused by flipping through the paper files
22	Intelligent Generation of Deliberation Records	The contents of the speeches of everyone in the deliberation process can be completely recorded through the intelligent voice collegation system, while the clerk manually reviews contents at the same time. Thus, the deliberation records can be intelligently generated
23	Intelligent Generation of Procedural Documents	Through the intelligent text information extraction technology, the relevant information can be automatically identified and extracted from the electronic files to directly generate the relevant documents needed in the process of case handling
24	Pre Judgment of the Adjunction	According to the relevant information of cases and the judgment guide based on points of law, pre judgment can be generated

(continued)

Table 1 (continued)

Number	Name of the function	Description of the function
25	Intelligent Matching of Document Models	According to the characteristics of cases, applicable documents, such as written judgments, conciliation statements and verdicts, are automatically matched
26	Intelligent Generation of Judgment Documents	Though AI technologies such as intelligent text information extraction, with the built-in judgment document model of the system as the framework and the combination of different characteristics of different causes of action, the judgment documents can be intelligently generated through the intelligent extraction and backfilling of information points that are based on the contents of trial transcripts and collegial transcripts
27	The Reminding of the Degree of Judgment Deviation	According to points of law involved in the case, the system can automatically extract the important information of the case, and with the results of the judgment of similar cases obtained from the analysis of the big data, the verification and reminding of deviation of the draft judgment document can be provided so as to ensure the consistency of judgments among similar cases, thus promoting the unified application of the law

4 The Progress of the Research and Development of the System

4.1 In-depth Research and Thorough Preparation

With the "the 206 System for Criminal Cases" as the precedent and reference, the research and development of the "Civil and Administrative 206 System" smoothly started.

The High Court set up a special team and established a conference liaison system. Preliminary researches were carried out, to be specific, over 100 meetings were held, 9 symposiums attended by judges and lawyers were held, more than 50 types of problems and needs were sorted out. Six categories and eight causes of action were selected as the first group of R&D targets, some of which were prospective and could reflect the characteristics of Shanghai economic and social development, while others were universal or highly standardized in operation.

After determining the scope of the first group of R&D targets, we started to tackle key problems in accordance with legal norms and rules of judicial practice, and established the guide to evidence rules and the elements for handling cases.

4.2 Establishing the Guide to Evidence Rules

Evidence is crucial to the litigation. The system first developed 8 causes of action in 6 categories, covering all of civil, commercial, maritime, finance, intellectual property and administrative fields. Therefore, we established the guide to evidence rules for various civil, commercial and administrative cases.

The guide to evidence rules means making specific provisions on the evidence that should be provided by the parties and their litigant representatives if they want to bring a lawsuit, the types and formal elements of the evidence that the people's courts should collect, as well as the allocation of the burden of proof and the rules of proof attestation, so as to provide a list-based guide for the judge to handle the case. At present, the guide to the evidence rules for civil and administrative litigations has been established, which can be uniformly applied to civil and commercial cases. And the guide to evidence for the eight causes of action has been formulated to provide guides for the examination of evidence in civil and commercial cases.

4.3 Establishing the Guide to Elements for Handling Cases

The guide to the elements for handling cases refers to standardizing the thinking and steps of handling cases by establishing the guide to the elements for handling cases, so as to provide scientific and practical guidance for judges to find out the factual elements, clarify the application of the law and make the decision in accordance with law.

(1) **Determining the scope**: "Shanghai AI Assistive System for Civil and Administrative Cases (the first phase)" selected **8** causes of action in **6** categories from **467** civil and commercial causes of action and **61** administrative causes of action as the R&D targets (**6 major categories** refer to civil and commercial, maritime, financial, intellectual property, administrative fields; **8 causes of action** include road traffic damage compensation disputes, equity transfer disputes, maritime and sea waters cargo transport contract disputes, bank card disputes, financial lease contract disputes, disputes over the right of dissemination via information network, disputes over the ownership of commissioned software, government information disclosure disputes). Some of these causes of action were prospective and could reflect the characteristics of Shanghai economic and social development, such as equity transfer disputes, financial lease contract disputes, disputes over the right of information network dissemination and so on, while others were universal or highly standardized in operation and suit-

able for informationized development, such as disputes over personal damage compensation in traffic accidents, credit card disputes, government information disclosure disputes and so on (In 2016, 495864 civil and commercial cases were accepted by courts in the whole city, of which 51312 cases were traffic disputes, accounting for 10.35%, while 98261 cases were credit card disputes, accounting for 19.82%.)

(2) **Defining the function of elements**: according to the eight causes of action in six categories, we systematically sorted out the legal provisions, judicial interpretation, legal basis, practical operation and other aspects of each cause of action and giving the guide to the elements for handling cases, providing the system with learning elements for handling cases, to enable the system to provide immediate guidance. At the same time, relevant case information under the corresponding claim is pushed through the intelligent notes for handling cases. With the important role of bridging and assisting the realization of other functions, the guide to elements for handling cases is the key and foundation of the Shanghai AI Assistive System for Civil and Administrative Cases.

4.4 Establishing Evidence Models

Evidence model is a knowledge atlas for machine review, judgment and learning, which is based on the elements of handling cases, rules of evidence and the thinking of civil, commercial and administrative cases. It provides a standard sample for machine recognition and judgment.

4.5 Establishing Database of Civil and Administrative Cases

Twelve large databases have been built (including the database of elements of handling cases, evidence rule database, entity laws and regulations database, procedure law database, filing and examination rule database, claim database, defense database, the association of claim and evidence database, trial rule database, document model database, case database, electronic file database). These provide basic data for the research and development of the System.

5 Functions of the "Civil and Administrative 206 System"

The Shanghai "Civil and Administrative 206 System" currently have 27 functions. These functions are designed according to the six stages of the case-handling process, namely, case filing, pre-litigation mediation, pre-trial, trial, deliberation, and adjunction.

By the end of March 2019, 24 functions have been developed (the guide to the elements of case handling, the guide to the examination and judgment of evidence, intelligent reading of case files, identifying claims, identifying facts and reasons, identifying claims of defense, examination of the criteria of case acceptance, intelligent reminding of paying litigation fees, pre induction of undisputed facts, pre induction of focus of disputes, examination of the completeness of evidence, construction of essential trial outline, intelligent tips for trial procedures, paperless cross-examination, intelligent generation of trial records, intelligent matching of document models, push of law articles, push of similar cases, intelligent generation of judgments).

How are these functions realized in the process of handling cases? Taking the case of "road traffic compensation dispute" as an example, we briefly introduce **the key functions** of the System.

Identifying Facts and Reasons

According to the guide to the elements of case handling, the System automatically extracts the facts and reasons in the complaint or other litigation materials through AI.

Examining the Criteria for Case Acceptance

According to the claim, intelligently extracting and comparing the information of the case to check whether it meets the filing criteria.

Examining the completeness of the evidence

We can extract the facts of the case to be proved from the claim, intelligently compare it with the guide to evidence rules database, identify the list of evidence needed for each unproved fact, proofread the evidence provided for the case and prompt the lack of evidence.

By identifying and grasping the electronic files, and combining with the litigation claim, the facts to be proved can be determined. Then, the facts to be proved are searched for in the association of claim and evidence database. A list of evidence needed for the facts of the case can be intelligently prompted. Based on the comparison between the list of evidence and the documented evidence, the missing evidence is intelligently prompted.

Pre judgment of the compliance of the evidence

Different criteria for the judgment have been established for different types of evidence based on the evidence rule database.

For example, 12 criteria for the examination of the compliance of evidence have been established for the Written Conclusion on Road Traffic Accident.

For example, 14 criteria for the examination of the compliance of evidence have been established for the Written Opinion on Forensic Identification or Evaluation.

For example, 5 criteria for the examination of the compliance of evidence have been established for cost documents.

Induction of focus of the disputes

The focus of the disputes of the case can be inducted by intelligently comparing the information of complaint and statement of defense, and referring to the trial transcript.

Intelligent generation of judgment documents

Relevant elements can be intelligently extracted from the complaint and trial transcripts and be filled in the judgment models intelligently so that functions of generating the pre judgment and pushing law articles can be realized, making it possible to intelligently generate judgment documents.

The reminding of judgment deviation

According to the case-handling elements database, the legal disputes in the case can be checked to indicate whether there is any deviation of judgments.

6 Trial Operation of the "Civil and Administrative 206 System"

6.1 The Successful Development and Trial Operation of the System

(1) **The research and development of the System had been progressing smoothly. On November 29, 2017, the "Civil and Administrative 206 System"** of Shanghai was put into trial operation. By the end of March 2019, the establishment of the guide to the elements of case-handling for **20 causes of action** had been completed. The research and development of 19 functions such as the examination and judgment of evidence and the pre induction of focus of

disputes had been finished. The labeling systems for 8 causes of action had been established, more than 5,800 electronic files for each cause of action had been marked, and the number of marked points had reached 160,000, enabling the machine to identify and extract so as to realize the automatic extraction of the elements of cases (Table 2).

(2) **The input of case information into the System**: Since the trial operation in late November 2017, by the end of March 2019, 19884 cases of **road traffic disputes**, 69193 cases of **credit card disputes** and 438 cases of **disputes over the disclosure of government information** had been input into the system.

In March 2019, equity transfer disputes, disputes over the right of dissemination via information network, disputes over the ownership of commissioned software, disputes over contract of cargo transportation by sea, financial lease contract disputes would be put into pilot operation in succession, which is expected to be popularized and applied in the whole city by the end of April.

Table 2 The table of the guide to the cause of action of case handling

Number	Name of the cause of action
1	Road traffic damage compensation disputes
2	Equity transfer disputes
3	Disputes over contract of cargo transportation by sea
4	Bank card disputes
5	Financial lease contract disputes
6	Disputes over the right of dissemination via information network
7	Disputes over the ownership of commissioned software
8	Government information disclosure disputes
9	Property service contract disputes
10	Alimony disputes
11	Railway transport contract disputes
12	Disputes over air transport sales agent contract
13	Franchise contract disputes
14	Ship collision disputes
15	Private loan dispute
16	Financial loan contract disputes
17	Disputes over the liability for misrepresentation in the securities market
18	Patent Infringement and Patent Disputes
19	Administrative registration (real estate registration) disputes
20	Disputes over administrative compensation (decision on compensation for housing expropriation)

(3) **Realization of synchronous generation of electronic files with the handling of cases**. The synchronous generation of electronic files with the case is the foundation to ensure the high quality, efficiency and smooth operation of the Civil and Administrative 206 System. Starting from the filing stage, through developing and supporting the deep integration and comprehensive application of electronic files in judicial practice, file materials are collected synchronously both in a centralized and decentralized way to ensure that the inputted data is comprehensive, accurate, timely and latest, so that the automatic generation and digital circulation of electronic files is realized. It provides judges with the functions of online case handling, synchronous reading and extracting of case information, synchronous generation of documents, assistant production of judgment documents, trial evidence demonstration, electronic file transfer, one-click archiving and so on, so as to improve the quality and efficiency of trial work.

6.2 Favorable Comments on the System

The application of the "Civil and Administrative 206 System" effectively solved the prominent problems existing in the trial practice of civil and administrative cases, such as disunity of thinking in the handling of cases, incomplete examination of evidence, non-standard exercise of power of discretion, excessive deviation of judgment results, etc., standardizing the exercise of the judges' right of discretion, improving the unity in the application of law, reducing judicial arbitrariness, and enhancing the quality of case handling and the public credibility of the judiciary. The System was highly appraised by leaders at all levels and attracted much attention from the society.

(1) The Comment by the Supreme People's Court

Zhou Qiang, President of the Supreme People's Court of China, has spoken highly of the System on many occasions. On January 12, 2018, he issued an instruction: "It is necessary to conscientiously sum up Shanghai's experience in developing the AI Assistive System for Civil and Administrative Cases."

On January 10, 2018, **Hu Yunteng,** from the special committee of the Supreme People's Court, was entrusted by President Zhou Qiang to listen to a special report by me and our team members. During the report, Hu Yunteng inquired about the thought, functional design and other details of the research and development of the System. After listening to the report, he made *some highly complimentary remarks about* the Civil 206 System developed by the Shanghai High Court.

On June 19, 2018, at the second plenary meeting of the Supreme People's Court's Leading Group on Judicial Reform, **Li Shaoping**, Vice President of the Supreme People's Court of China, listened to the report by Shanghai High People's Court on the research and development of the "206 System" and its popularization and

application in China. He fully affirmed the praised the initial achievements of the "206 System," asking to further accelerate the progress of the research and development of the System so as to solve the problem of overloaded cases but relatively fewer staffs, and further standardize the handling of cases.

(2) Unanimous Praise from Judges

The judges handling cases spoke highly of the System, especially of the functions of "pre induction of undisputed facts", "pre induction of the focus of disputes", "intelligent generation of essential trial outline", "compensation cost calculator" and so on. The System has played an important role in assisting the judge to determine the facts, apply the law, accept evidence and judge impartially.

(3) The Media Paid Much Attention to the System

Some media such as Legal Daily, People's Court Daily, WenHui Newspaper, STVN have made reports on Shanghai Court's research and development of the AI Assistive System for Civil and Commercial and Administrative Cases in articles auch as *From 10 to 80%: Upgrading of AI Assisted Case-Handling—the First Batch of Six Categories and Eight Causes of Action in the Development of the AI Assistive System for Civil and Commercial and Administrative Cases*, *the Shanghai 206 AI Assistive System for the Handling of Civil and Commercial and Administrative Cases Launches Trial Operation*. People's Net, Xinhua Net, China Court Network, Legal Network, China Daily Network, Sina, Hexun Net, IFENG Net and other major network platforms as well as the WeChat platform have reprinted these reports.

Prospects: Opportunities and Challenges of AI: Constructing the AI-assisted Rule of Law for the Future

AI empowers a new era.

On September 17, 2018, the 2018 World AI Conference was held in Shanghai.

President Xi Jinping sent a congratulatory letter to the conference.

The advent of the era of AI has provided us with great historical opportunities.

Han Zheng, now Chinese Vice Premier and former Secretary of the CPC Shanghai Municipal Committee, proposed that: "Shanghai should strive to **play a leading role in the AI development in China**".[1]

Li Qiang, current Secretary of the CPC Shanghai Municipal Committee, stressed that: "We should deepen the application of AI, accelerate the development of AI industry and strive to build a national AI development highland, making Shanghai a leading source of AI innovation, a demonstration area of AI application, a hub of AI industry and a center of AI talents in China".[2]

[1] On June 20, 2017, Han Zheng delivered the speech at the Learning Conference of the Standing Committee of the CPC Shanghai Municipal Committee.

[2] On July 10, 2018, Secretary Li Qiang delivered the speech at the Learning Conference of the Central Group of the Shanghai Municipal Party Committee.

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Part III
Prospects: Opportunities and Challenges of AI: Constructing the AI-Assisted Rule of Law for the Future

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Chapter 12
Grasping the Opportunities of the Era, Keeping a Close Eye on the Frontiers of Science and Technology and Promoting Judicial Modernization

1 Ideas Guide Strategies; Opportunities Determine the Future

Ideas are the sources of actions and strategies.

Since the birth of the famous "Turing Test", AI has gone through nearly 70 years of development and it has infiltrated, merged and developed into all fields of society. Especially in the past ten years, we can feel that the new round of AI is the most remarkable achievement of technological progress, representing a new direction of human technological development. AI is profoundly changing the world.

In July 2017, the State Council of China issued the *Development Planning for the New Generation Artificial Intelligence*, making AI a national strategy.

Gaining the initiative to develop AI is a strategic thinking determined by the country.

In some significant fields of science and technology, China used to be a "follower", but in the new round of science and technology competition, China is striving to become to a "parallel runner" or even a "front runner".

Ideas play a decisive role in solving difficulties.

With the rapid development of science and technology today, whoever has an advantage over science and technology will be able to gain the initiative in the competition to win the future.

We must use new ideas to lead the way forward.

Opportunities are fleeting, seizing opportunities is seizing the future.

As a modern strategic technology as well as a subversive technology, AI has become a new core competitiveness of future development and is seen as a strategic resource. **Whoever has an advantage over AI will be able to gain the initiative in the future competition**.

Y. Cui, *Artificial Intelligence and Judicial Modernization*,
https://doi.org/10.1007/978-981-32-9880-4_12

President Xi Jinping pointed out that: Developing the new generation AI is a strategic issue concerning the core competitiveness of our country and a strategic high ground that must be firmly grasped.[1]"

We are in the era AI. We should have a strong sense of opportunity, strategy and science and technology. Adhering to the principle of taking the initiative, being open and compatible, improving continuously and maintaining stable results, we should firmly seize this rare historical opportunity and strive to promote the development of AI plus justice, AI plus law enforcement and AI plus governance so as to make good use of AI and realize the dream of judicial modernization.

2 Keeping a Close Eye on the Frontier of Science and Technology, Applying the Latest Achievements and Promoting Judicial Progress

Karl Marx once said: "Only when a science succeeds in applying mathematics can it reach a truly perfect level."

Deng Xiaoping once said: Science and technology constitutes a primary productive force.

President Xi Jinping stressed that: Science and technology is a strategic resource for national development, which can make a country stronger, enterprises successful, and people's life better. If China wants to be stronger and the Chinese people live better, we need strong science and technology.[2]

Zhou Qiang, President of the Supreme People's Court of China, pointed out that: "The rapid development of economics is because of the introduction of mathematical models and algorithms. Comparatively speaking, jurisprudence lags behind because it lacks the integration of modern science and technology, including intelligent algorithms. Applying machine in-depth learning, evidence models and algorithms to the judicial field can make judicial activities more scientific and accurate so as to improve the quality and efficiency of handling cases".[3]

Only by integrating science and technology can justice be better developed and advanced so as to become a real science, and social fairness and justice can be better defended.

In recent years, modern technologies such as the Internet, big data, cloud computing and AI are developing rapidly, adding technological impetus to judicial activities

[1] On October 31, 2018, General Secretary Xi Jinping delivered the speech at the ninth collective study of the Political Bureau of the Central Committee.

[2] On May 30, 2016, General Secretary Xi Jinping delivered the speech at the National Conference on Science and Technology Innovation, the Academicians' Congress of the Chinese Academy of Sciences and the Chinese Academy of Engineering and the Ninth National Congress of the Chinese Association of Science and Technology.

[3] On June 21, 2017, President Zhou Qiang delivered the speech when after he listened to the report of Shanghai High Court on the development of "Shanghai AI Assistive System for Criminal Cases".

and providing strong technical support for the realization of judicial modernization. For example, the improvement and iteration of the deep learning algorithm pushes the application of AI in the judiciary to a deeper level. Multi-source, multi-type, real-time and massive judicial data make the description of judicial activities more vivid and comprehensive.

The life of science and technology lies in its application. Years of practice has made me realize that: **scientific and technological innovation never ends, so we must keep an eye on the latest cutting-edge technology so as to keep pace with the times**. We should always persist in the deep integration of the latest scientific and technological achievements with judicial practice, **"adding technological wings" to justice** to make judicial activities more scientific and accurate. We should also make efforts to minimize problems causes by the cognitive limitation and arbitrariness of judicial personnel, and prevent the interference of human factors, so as to achieve the integration of **technological rationality, judicial rationality and human rationality**. In the way, we can promote judicial progress and enhance quality, efficiency and public credibility of the judiciary, **making jurisprudence a real science**.

3 Adhering to the Problem-Oriented and Demand-Oriented Approach and Making Good Use of Scientific and Technological Tools

With the wide application of modern science and technology in judicial field, successful practice of courts in trial management, litigation service, trial execution and intelligent courts makes us realize more profoundly that modern science and technology, such as Internet, big data and artificial intelligence, are powerful tools and motives for **solving judicial difficulties and promoting judicial progress**. The new mode of judicial operation developed through the deep integration of technology and the judiciary contributes to the improvement of concepts, the innovation of institutional mechanism and the standardization of judicial behavior. It also plays an essential role in realizing judicial impartiality and exercising judicial power for the people, thus making the fair, efficient and authoritative socialist judicial system with Chinese characteristics more mature and well-established.

Problems are not only the starting point of reform, but also the direction of our work. Promoting the deep integration of modern technologies and judicial activities is not a watchword, nor a form, but a concrete action. We must **adhere to the problem-oriented, demand-oriented approach and solve prominent problems in judicial practice**. **Otherwise it would be a vanity project without any fruitful results**. At present, judicial reform has entered the deep-water area, and we are faced with many problems and difficulties, which are no less serious than 40 years ago. Technology is a tool to solve these problems and a driving force for judicial reform. In implementing judicial reform, we need to make good use of modern science and technology such as AI to solve difficulties in system and mechanism, so as to enhance

the quality, efficiency and the public credibility of the judiciary and ensure judicial impartiality. At the same time, this also provides a broad platform for AI to innovate itself, integrate into the judiciary, and serve the judiciary so as to reflect its own value.

Chapter 13
Following the Law of Justice, Promoting Human-Machine Collaboration to Better Serve the Judiciary

Despite the wider and better application of AI in the judiciary and its broad prospects, we need to realize that the development of AI is still in its initial Stage (**Artificial Narrow Intelligence**) with some technological uncertainties and limitations. Therefore, we should follow the law of justice and its characteristics, grasp the features of AI in human-machine collaboration and cross-border integration, and combine them closely to better serve the judiciary.

1 Following the Law of Justice, Grasping the Features of AI to Assist Case Handling

1.1 The Law of Justice and Its Characteristics Determine that AI Can Only Be Used as a Supplementary Case Handling Tool

Everything has its own inherent law of development. Anything that violates the inherent law of the development of things will inevitably fail.

Judicature has its own unique laws, such as impartiality, independence, neutrality and experience. These characteristics, especially the requirement of personal experience, determine that the case-handling personnel are the main body of case handling and AI can only be an assistant to them. These laws must be followed both in the promotion of judicial reform and application of AI in the judiciary.

Y. Cui, *Artificial Intelligence and Judicial Modernization*,
https://doi.org/10.1007/978-981-32-9880-4_13

1.2 The Periodic Features of AI Development Determine that AI Can Only Be Used as a Supplementary Case Handling Tool

At present, with certain limitations and uncertainties, the development of AI is still in its infancy, which is also known as Artificial Narrow Intelligence. The fact that AlphaGo defeated Lee Se-dol shocked the world and subverted people's views on AI. It is believed that machines **are able to listen, speak, think and judge**. But machines are far from being able to **think and judge like humans**. Especially in judicial activities, based on their understanding, judges, prosecutors and investigators apply the law to handle cases with their own knowledge structure, practical experience, case-handling experience and life experience. However, it is **impossible for AI to think and judge like judges, prosecutors and investigators**. Shanghai AI Assistive System for Criminal Cases is an innovative product of the deep integration of **scientific rationality, legal rationality and human rationality**. It marks that **the application of AI in the judiciary has moved from primary application to advanced application**. But the main functions of AI in this System is to **provide guidance** for case-handling personnel to collect and fix evidence; **timely find out** the defective evidence and contradiction in evidence chain and **prompt** to the case-handling personnel to let them decide whether to correct, accept or make explanations on the evidence. Its function is to **assist judges, prosecutors and investigators in handling cases**. The use of the System doesn't mean that machines can handle cases, make conviction or sentencing. Nor can machines replace judges, prosecutors and investigators to handle cases. Finding out and identifying the facts and evidences of the case, convicting and sentencing, etc. must be completed through the court trial. Only the judge has the power to make a judgment. (This is also the reason why we insisted on positioning the 206 System as "Shanghai **AI Assistive System** for Criminal Cases" in the early stage of research and development.)

2 Promoting Human-Machine Collaboration to Enhance the Application of AI in the Judiciary

Human-machine collaboration is one of the main features of AI. Promoting human-machine collaboration to assist the judiciary is the right way for the deep integration of AI and justice. We should strictly observe the laws of justice and its characteristics and grasp periodic features of AI. By making full use of this modern technology through deep integration, we can improve ideas and concepts, innovate the system and mechanism, standardize judicial behaviors and perfect the litigation system so as to better serve the judiciary.

I believe we should actively embrace new technology and actively promote the integration and application of new technology in the judiciary. The advantages of AI should not be exaggerated, nor the use of AI be prohibited. It is viable that we **seek advantages and avoid disadvantages, maximizing the benefit of AI**.

3 Promoting Cross-border Integration, Expanding In-depth Application to Improve Intelligent Judiciary

President Xi Jinping pointed out that: We should follow the law of justice, combine the deepening of judicial reform with the application of modern science and technology, and constantly improve and develop the socialist judicial system with Chinese characteristics.

Improving the level of socialization, legalization, intellectualization and specialization of social governance is the goal put forward at the 19th CPC National Congress.

Promoting the deep application of AI in the field of social governance is **an effective way** to realize the modernization of national governance system and governance capacity. The deep application of AI in judicial field is **a feasible way** to realize judicial modernization. Cross-border integration is another main feature of AI. We should keep pace with AI development and actively expand the application of AI in judicial practice so as to make the social governance system and governance capacity more modernized and intelligent.

3.1 Expanding the Application of AI in the Fields of Criminal Cases to Realize Cross-border Integration

With the comprehensive application of "the 206 System", there are more and more demands for its judicial application. According to the demands of various departments, the number of the functions of "the 206 System" will be increased from 9 and 16 to 26 (88 sub-functions), covering the whole process of the handling of criminal cases, from case filing, investigations, approval of arrest, prosecution, trial, judgment to penalty execution, commutation and parole, release of prisoners upon serving their sentences and return to society. The features of human-machine collaboration and **cross-border integration** will be better reflected. Thus, the System will be upgraded from **a single criminal case handling system** to a **system that integrates penalty execution, commutation and parole, release of prisoners after serving their sentences and return to society** and so on.

3.2 Expansion to the Field of Civil and Administrative Cases to Realize the Intelligent Handling of Civil and Administrative Cases

The Shanghai "Civil and Administrative 206 System" has been successfully developed and put into trial operation. The system runs steadily with encouraging results. It plays an important role in assisting judges to identify facts, apply laws, admit evidence and judge impartially and is conducive to standardizing the exercise of judges' right of discretion, unifying the application of law, improving the quality, efficiency and public credibility of the judiciary, and realizing the transition from **a single criminal case handling system to a comprehensive civil and administrative case handling system** (see Chap. 8 of this book).

3.3 Expanding the in-Depth Application of AI in the Judiciary to Realize the Intelligent Judiciary

Just like two wheels to a vehicle and two wings to a bird, informatization and judicial reform are two indispensable factors to the judicial modernization. Today, with the rapid development of science and technology, we need to further deepen the integration of AI in trial execution, judicial openness, litigation service, court management, judicial supervision and judicial decision-making by promoting the informatization of courts, transform and upgrade the functions of the System, so as to build intelligent courts in a comprehensive and more advanced way.

(1) Promoting intelligent adjudication and enforcement

Relying on new technologies such as AI, we will further improve the Assistive Trial System. On the premise of giving full play to the main responsibility of judges, the System provides judges with functions such as similar case push, law articles push, sentencing reference push, automatic generation of legal documents, auxiliary adjudication document making, intelligent analysis of errors in adjudication documents and so on to assist judges in handling cases, realizing the intelligent adjudication and enforcement to enhance the quality and efficiency of case handling.

(2) Promoting intelligent judicial openness

By using AI and other new technologies, we will establish an all-round, multi-level, interactive and intelligent system of judicial openness, promoting the intelligent association and active push of important information in the whole process of handling cases such as trial procedure, enforcement procedure, judicial documents, court trial and so on, thus fully guaranteeing the people's right to know, to participate, to express and to supervise.

(3) Promoting intelligent judicial service

Efforts will be made to further promote the close integration of modern technology with the judiciary for the people and litigation services. We will make full use of new technologies such as "big data", "Internet plus" and "AI plus", to develop an open, and intelligent online judicial service system, which can provide people with all-around, all-weather, zero distance and barrier free litigation service.

(4) Promoting intelligent judicial management

By using AI to strengthen the visualization of whole process of court management, we will realize the digital intelligent prompt of trial management, visualized intelligent tracking management of adjudication and enforcement, targeted intelligent dynamic management of trial quality and efficiency, digitalized intelligent evaluation of judges' performance and so on, greatly improving the efficiency of management.

(5) Promoting intelligent judicial supervision

By using big data analysis, video image recognition, semantic analysis and other technologies, the whole process of handling cases from adjudication to enforcement will be visualized, recorded and supervised, effectively preventing the influence of relationship, human relations and money on the trial of cases, providing a strong guarantee for fair and honest justice to ensure that the power is exercised in the sunshine.

(6) Promoting intelligent judicial decision-making

Relying on big data, AI and other technologies, we will promote the intelligent evaluation of the effectiveness of judicial reform, the public credibility of the judiciary, judges' performance based on big data, and provide big data intelligent correlation analysis of the development trend, case distribution and causes of various cases, so as to provide intelligent support for the modernization of courts.

3.4 Expanding the Application of AI in Social Governance to Promote Intelligent Governance

Realizing the intelligent social governance is **critical** to realizing the modernization of social governance system and governance capacity. On the one hand, the vigorous development of high-techs represented by AI has brought new changes and challenges to social models and structures; on the other hand, it also provides new momentum and opportunities for innovative social governance. We ill further expand the application of AI in the fields of national governance and social governance. To be specific, we will fully utilize the technical advantages of AI to accurately perceive, predict and warn about the major situation of social security, timely grasp group cognition and psychological changes, and make decisions to response actively. In this way, we can use modern technologies such as AI to enhance the social governance

capacity, making the process of social governance more scientific, intelligent and optimized.

(1) Innovating the idea of intelligent social governance

Under the background of modernization, governance has changed from one-way management to pluralistic co-governance. We should take the initiative to adapt to the new requirements of intelligent governance and adopt the idea of co-construction, co-governance and common interests, mobilizing the enthusiasm and creativity of people. At the same time, **as the main content of the pluralistic social governance the application of high technology is the powerful driving force of intelligent governance**. For example, we can apply the AI in-depth learning and self-renewal technology to the security supervision of new industries and business, and build a research and evaluation model based on big data, so as to enhance the dynamicity and accuracy of prevention and control. If we make full use of the great convenience brought by the development of big data and AI to improve the performance of social governance, we can achieve more with fewer efforts.

(2) Promoting the intelligent social governance system

An important prerequisite for promoting the intelligent social governance is to promote the intelligent governance system. In order to make better use of advanced technology to promote the intelligent social governance, we must **constantly optimize and improve the social governance system and realize the coordinated development of system and technology**, so as to build a governance system with complexity and flexibility. First of all, we should strengthen the top-level design to establish an integrated security system. For example, "with the three-dimensional and information-based social security prevention and control system as the support, we should weave a tight public security net, establishing and improving public security prevention and control networks within the society, key industries and units, urban and rural communities". Secondly, we should develop an intelligent supervision mechanism. By relying on modern intelligent technologies and managing power and people with a set of efficient and perfect system, we need to implement the main responsibility of social governance and the supervision mechanism of power restricting power. For example, with the application of big data technology, we can establish a full-process, all-link, and all-factor information-based regulatory mechanism.

(3) Promoting the intelligent social governance capacity

In the era of AI, we should actively apply AI to improve social governance. We should make full use of the technological advantages of AI to accurately perceive, predict and prompt the important situation of social security, timely grasp group cognition and psychological changes, and make decisions to response actively, so as to **improve social governance through the use of AI**, enhance the efficiency of public services at different levels, and maintain social harmony and stability. Thus, the social governance will be raised to a new level.[1] In particular, in order to meet

[1] Tianshu (2018).

the urgent needs of comprehensive social management, new crime investigation and anti-terrorism, we should develop intelligent security and police products integrating multiple detection and sensing technologies, video image information analysis and recognition technology and biometric recognition technology, and establish an intelligent monitoring platform. We should strengthen the intelligent transformation and upgrading of security equipment in key public areas and support communities or cities with appropriate conditions to develop public security regional demonstration based on AI. And we can do more. Through the in-depth application of AI in the field of social governance and public security, the modernization of social governance system and governance capacity will be realized.

Reference

Q. Tianshu, *How will social governance develop in the era of AI*? Learning Times (March 10, 2018).

Chapter 14
Building AI-Assisted Rule of Law for the Future, Seeking Advantages and Avoiding Disadvantages to Make AI Better Benefit Mankind

AI has the characteristics of high integration of technical and social attributes. On the one hand, it promotes tremendous economic and social changes, and profoundly affects our social life. AI has become a national strategy and a new core competence. On the other hand, it may bring risks and challenges. The problem that AI may go out of control and cause harm can not be ignored.

1 AI: A "Double-Edged Sword"

As a modern subversive technology, AI has brought revolutionary changes to human society, and the benefits have been fully manifested. But the development of AI, like other technological advances, is also a "double-edged sword". The uncertainties of AI development may bring risks and challenges, such as changing employment structure, impacting law and social ethics, violating personal privacy, challenging international relations norms, etc., which will have a far-reaching impact on government management, economic security, social stability and even global governance. People are greatly **worrie**d about this. How to **seek benefits and avoid disadvantages, share development and ensure that the development and application of AI do not run counter to human values and ideas has attracted great attention**.

As early as 2014, the "Devil Theory of AI" has aroused heated debate in academia and industry. Stephen Hawking, a famous British physicist, frequently warned against the development of AI: "AI may destroy human beings" and "the comprehensive development of AI will declare the death of human beings". Bill Gates once said, "Human beings need to fear the rise of AI." These all reflect people's worries about the future development of AI.

In 2016, the White House released *Preparing for* ***the Future of Artificial Intelligence***, which proposed that the United States should deal with the problems posed by the progress of AI on social and public policy.

Y. Cui, *Artificial Intelligence and Judicial Modernization*,
https://doi.org/10.1007/978-981-32-9880-4_14

In 2017, China's ***New Generation AI Development Planning*** put forward that by 2025, laws and regulations, codes of ethics and the policy system concerning AI will be preliminarily established, so as to realize the security assessment and control of AI, and minimize possible risks.

In September 2018, President Xi Jinping pointed out in his congratulations to the World AI Conference that the new generation of AI is booming all over the world, injecting new momentum into economic and social development, and profoundly changing people's production and lifestyle. To grasp this development opportunity and deal with the new issues raised by AI in the fields of law, security, employment, ethics and government governance, it is necessary for all countries to deepen cooperation and discuss together.

How to deal with the risk and challenge brought by the development of AI, this is a new important issue we face.

2 Rule of Law: A Guarantee of the Healthy and Sustainable Development of AI

Rule of law is the best way of social governance, and it is also the best way to promote, standardize and guarantee the healthy and sustainable development of AI.

At present, many experts and scholars in the field of law and law have sensitively realized this problem, carried out active research, and formed many research results.

In my opinion, with the rapid development and application of AI, it is necessary and important to think and study the risks and challenges that AI may bring, which **should be included in the AI national strategy**. However, the current research on security issues such as AI risks and challenges is relatively weak. There are some problems, such as insufficient systematicness, pertinence and authority, lack of unified planning and guidance in research orientation and focus of research, lagging behind in relevant policy response and the construction of the rule of law. There is a huge gap between the development and application of AI and research on security issues of AI.

How to solve these problems?

Under these circumstances, the theme of **the development and application of AI and the protection of the rule of law** is attracting increasing attention.

Building an AI-assisted rule of law for the future and standardizing, promoting and guaranteeing the development of AI with the rule of law are gradually becoming the consensus of people.

Since AI may bring risks and challenges, we should **be prepared for potential risks in the future, carry out prospective research and seek solution to these problems through legal means**. Being global, future-oriented, peace-oriented and people-oriented, and adhering to the concept of good security, innovative development, reliable, controllable, standardized and orderly development, efforts should be

made to **build an AI-assisted rule of law for the future**. We should regulate the development and application of AI and the response to risks and challenges through legal means, so as to promote, standardize and guarantee the healthy and sustainable development of AI for the benefit of mankind.

3 Establishing the Evaluation and Research System and Mechanism for the Development of AI to Ensure Safe, Reliable and Controllable Development of AI

An effective system and mechanism of AI development evaluation should be established as soon as possible. In view of the risks and challenges that may arise from the development of AI in the aspects of civil privacy, information rights, right to know, intellectual property rights protection and protection of minors, we should **carefully evaluate the legal, security, ethical and social governance problems** that may arise from the development of AI, and make **prospective studies** on AI-related legal issues in advance to ensure **safe, reliable and controllable development of AI**.

4 Establishing the Legal System of AI so that Its Development is Legally Regulated

Efforts should be made to strengthen prospective thinking and research on legal issues related to the development of AI, develop laws and regulations for the development and application of AI, **speed up legislation in the field of AI, and improve the timeliness and effectiveness of the legal system**, so as to ensure that the development of AI is legally regulated (Table 1).

5 Strengthening the Adjudication and Research of AI-Related Cases and Giving Full Play to the Role of Typical Cases

We should attach great importance to the trial of new types of cases involving AI, strengthen the guidance research on the trial of such cases, establish a database of typical cases, and publish typical cases, thus giving full play to the role of typical cases **in preventing similar cases in advance and controlling and guiding** AI application, and providing practical support for the legislation of AI.

Table 1 Legislation on AI in some countries of the world in recent two years

	Time	Documents	Brief Contents
EU	2016	Civil Law Rules on Robotics	Establishment of a unified regulatory body for robots and AI; establishment of a registration system for more advanced robots; introducing electronic personality to promote registration, insurance and management of autonomous intelligent robots (especially invisible AI); proposing ethical principles and the Robot Charter to ensure responsible innovation; defining the "independent intelligence creation" standard for copyright works produced by computers and robots and protect the Intellectual Property of AI achievements
The USA	2017	Future Artificial Intelligence Act of 2017	The Act recommends that the US Department of Commerce establish the Federal Advisory Committee on AI and Its Applications. The work of the Advisory Committee is mainly focused on the following two aspects: 1. Promoting the development and utilization of AI; 2. Perfecting risk prevention of AI
	2017	Innovation Corps Act of 2017	The Act focuses on the value of AI technology in improving the quality of life of Americans and its possible substitution for some jobs
	2017	Computer Science for All Act of 2017	The Act requires U.S. Department of Commerce and Department of Education to strengthen computer science education for secondary school students
	2017	Computer Science in STEM Act of 2017	The Act requires U.S. Department of Commerce and Department of Education to strengthen vocational training
South Korea	2017	Basic Act on Robots	The ethical norms of robots are clearly stipulated, and various problems arising from the popularization of robots are solved by setting up policy promotion agencies, so as to prepare for the arrival of a new society in which robots and humans coexist harmoniously. *The Act* includes ethical norms of robots; establishment of full-time management organization; security and liability for damages; protection of users' rights and interests

6 Establishing Specialized Research Institutes to Prevent Risks and Challenges

We should give full play to the advantages of the socialist system with Chinese characteristics, establish high-level and authoritative research institutes and specialized institutes to deal with risks and challenges at the national level, plan, guide the transformation and application of research results, study measures

to prevent and deal with risks, and form a systematic, authoritative and effective research, prevention and control system.

7 Strengthening the Cooperation of "Government, Industry, Education and Research" and Training Compound Talents

Integrating talents and academic resources such as research institutes, universities, enterprises and legal units, high-end think tanks, etc., to promote the disciplinary development of AI and law, build a first-class National Laboratory of AI and law, and comprehensively promote the theoretical research, achievement transformation and project landing of AI in the field of justice. Relying on the unique advantages of training talents, universities should dynamically adjust the subject and curriculum settings, train a new generation of AI and law talents.

Chapter 15
The High-Level Seminar on AI and Rule of Law Yields Fruitful Theoretical Results, Leading the Direction of Development

From September 17 to 19, 2018, The World AI Conference, focusing on the theme of "The New Era of Artificial Intelligence Empowerment", was successfully held in Shanghai. During the conference, led by Shanghai Law Society and co-sponsored by Shanghai Economic and Information Commission, Shanghai People's Publishing House, Shanghai Science and Technology Association, Shanghai Institute of Science and Technology, and IFLYTEK CO.,LTD, Shanghai Judicial Think Tank Society, *Oriental Law,* Judicial Reform and Social Governance Research Center of Tsinghua Yangtze River Delta Research Institute of Zhejiang Province, and Beijing Uxsino Software Co., Ltd., **the high-level Seminar on** "**Artificial Intelligence and Rule of Law**" was held at Shanghai Science Hall. It was the first time for a high-level Seminar on "Artificial Intelligence and Rule of Law" to be held during the World AI Conference. For this reason, the seminar was identified as **one of the four special events** of the conference, which attracted wide attention from the society.

On 19 September 2018, the high-level Seminar on "Artificial Intelligence and Rule of Law" was held.

Y. Cui, *Artificial Intelligence and Judicial Modernization*,
https://doi.org/10.1007/978-981-32-9880-4_15

Zhang Wenxian, Vice President of China Law Society, Vice Mayor of Shanghai Municipal People's Government, Gong Daoan, Director of Municipal Public Security Bureau, Liu Xiaoyun, President of Shanghai High People's Court and Zhang Bencai, Procurator-General of Shanghai People's Procuratorate attended the seminar and delivered speeches. The opening ceremony of the seminar was presided over by Yadong Cui, Party Secretary of Shanghai Law Society. Eight well-known experts and scholars at home and abroad were invited to give keynote speeches at the seminar, and the ***Shanghai Initiative on Artificial Intelligence and Future Rule of Law*** (for the first time at home and abroad) was issued. The seminar yielded fruitful results.

1 AI and the Rule of Law

1.1 High-Level Seminar Leading Theoretical Frontiers

The high-level Seminar on "Artificial Intelligence and Rule of Law" brought together leading experts in theory and practice. Eight experts and scholars made keynote speeches, including **Yadong Cui**, Secretary of the Party Group, President and Second-level Justice of Shanghai Law Society, **Zhao Zhiyun**, Secretary of the Party Committee of China Institute of Science and Technology Information, Ministry of Science and Technology, **Hong Xiaowen**, Senior Vice President of Microsoft, **Wang Dong**, General Manager of Tencent Yun, **Liu Xianquan**, Vice President of China Criminal Law Society, **Zhao Zhiwei**, Senior Vice President of IFLYTEK CO., LTD., and **Peng Chengxin**, Standing Director of Civil Law Research Society of China Law Society, **Zhao Chunxue**, co-founder of Beijing Uxsino Software Co., Ltd. The discussion put forward a number of insightful core ideas.

1.1.1 The Key to the Development and Application of AI Is to Ensure the Rule of Law

We should solve the legal problems related to AI from the top design level, promote the development of AI rule of law application and the improvement of legal guarantee system, and build the basic consensus of rule of law in the future.

Yadong Cui, former Secretary and President of the Party Group of the Shanghai Higher People's Court, secretary and President of the Party Group of the Shanghai Law Society and (Grand) Justice of the Second Rank, made a keynote speech on "AI and Judicial Modernization"

1.1.2 Advocating Correct Recognition of the Positive Role of AI and Its Risks

While bringing great opportunities for economic and social development, AI also brings many risks and challenges. It is necessary to carry out research in advance and guide the situation according to circumstances, promote the integration of modern science and technology and the creativity of judicial personnel, and deepen the integration of scientific and technological rationality and judicial rationality, so as to promote development and application of AI and benefit human society.

1.1.3 The Bright Prospects of the Application of AI in the Judicial Field

We should accurately grasp the combination of the law of justice and the characteristics of AI, actively expand its judicial application, and make AI better serve the judiciary, thus promoting the realization of judicial modernization.

1.1.4 Striking a Balance Between Promoting the Development of AI and Its Standardization

In view of the actual needs of current economic and social development, we should prioritize AI development and make preparations for corresponding systems, laws, norms and standards. The development of AI is likely to widen the existing data and technology gap between countries and eventually transform them into development gap, thus posing new challenges to global governance. China must make plans in advance, contribute more to global governance, and grasp the initiative of AI development.

1.1.5 Designing AI in a Way that Extends Human Intelligence

We should adhere to the principles of "fair, reliable and safe, inclusive, transparent and responsible" in the development of AI. We should develop AI for all under the principles, policies and laws of responsible AI so as to drive economic and social progress in an all-round way.

1.1.6 Exploring to Endow AI with Limited Legal Personality

In order to better promote the development of AI, we should clarify the imputation principle of "piercing the veil of AI", purchase compulsory insurance of liability for AI, establish AI reserve fund, and formulate a specific "AI development law" in advance within a country. It is necessary to speed up the study of the criminal risks of Artificial General Intelligence (AGI) and the corresponding provisions in criminal law, reconstruct the penalty system, include AGI robots into the scope of penalty, and set up effective penalty methods adapted to their characteristics.

1.2 Issuing the Shanghai Initiative on Artificial Intelligence and Future Rule of Law

A high degree of consensus was reached at the seminar, ***the Shanghai Initiative on Artificial Intelligence and Future Rule of Law*** was issued (Hereinafter referred to as *the Shanghai Initiative*). As far as we know, **this is the world's first initiative on AI and rule of law**, contributing "**Shanghai wisdom**" and "**Chinese wisdom**" to the future development of AI.

The Shanghai Initiative puts forward 14 specific articles from four aspects: the conceptual framework of AI and the future rule of law, the legal path of promoting and standardizing the development of AI, strengthening the educational research and practice in the field of AI law, and promoting the international exchange and cooperation in AI and the future rule of law. It strives to build a high-end brand of AI and the rule of law research and form an international discourse system on AI and the rule of law. Being global, future-oriented, peace-oriented and people-oriented, *the Shanghai Initiative* adheres to the concept of good security, innovative development, sharing of achievements, reliable and controllable, standardized and orderly development, and proposes to build an AI-assisted rule of law for the future, making the development and application of AI legally regulated. It also proposes to strengthen prospective research, prediction and restrictive guidance on AI innovation development and risk challenges, and to carry out basic theoretical research on AI and rule of law, so as to provide support for the safe, reliable and controllable development of AI. At the same time, it advocates promoting the formulation of legal norms in the stage of technology design, promote the fairness, transparency and security of AI algorithm through rule setting, avoid algorithm discrimination, and eliminate the application of technology that is contrary to ethical value and public order and good customs. It proposes to carry out research on the prevention and punishment of crimes involving AI, so as to avoid the application of AI in criminal activities. It advocates broadening the teaching content of AI and other specialties on the basis of law discipline, paying attention to the cross-integration of AI and law education, and cultivating a group of talents with legal literacy and knowledge of AI technology. It calls for the promotion of international exchanges and cooperation in the development and application of AI, the establishment of an international cooperation framework of AI and the rule of law, the pooling of wisdom of all parties, the joint exploration, and promotion of development, the protection of security and the sharing of achievements. The issuing of *the Shanghai Initiative*, which creatively used intelligent speech synthesis technology, was released by AI robots at the seminar. It has attracted wide attention and received unanimous praise.

The Shanghai Initiative on Artificial Intelligence and Future Rule of Law was issued at the high-level Seminar on "Artificial Intelligence and Rule of Law"

1.3 Attention and Positive Response from the Society

The success of **the high-level Seminar on “Artificial Intelligence and Rule of Law”** at 2018 The World AI Conference demonstrates the unique value of rule of law in the development and application of AI to the society, and attracts experts from many industries to participate in the construction of AI-assisted rule of law in. It has made a positive contribution to accelerating the development strategy of AI in China.

Its success has aroused people’s great attention to AI and rule of law.

Participants enrolled with unprecedented enthusiasm, from the preset 40 people to 150 people, and finally more than 300 people actually attended the seminar. Among them, through the Wechat public account of Shanghai Law Society, 10 participants were invited to participate in the seminar. In a short time, more than 200 people submitted their registration information, which showed people’s enthusiasm for the seminar. After the beginning of the seminar, there were still many people who came

to the venue of 2018 World AI Conference. Due to the limitation of venue, they were unable to enter.

People's Network, Fenghuang Network, Watch News, Tencent News Client, Tencent Dashen Network and other media carried out live broadcasting of the high-level Seminar on "AI and Rule of Law" on the Internet, with a total of 2.31 million broadcasts. Live cloud photo albums have been opened, and photos have been browsed by tens of thousands of people. Media journalists paid close attention to the seminar. News about the conference was mainly disseminated through five platforms: video broadcasting, news websites, Wechat, Weibo and online forums. For example, People's Daily, Legal Daily, People's Court Daily and CNR reported on the seminar. Local media such as, Jiefang Daily, Xinmin. com, Dongfang. com and Shanghai Hotline also paid great attention to the seminar.

With the advent of the era of AI, while actively developing and applying AI, we must pay close attention to the risks and challenges it may bring, build an AI-assisted rule of law system for the future, strengthen prevention in advance and guidance to minimize the possible risks. While actively embracing the new round of scientific and technological revolution, we should speed up the rule construction of AI legal system, establish and improve the legal system for the development and application of AI, so as to ensure the safe, reliable and controllable development of AI, seek advantages and avoid disadvantages, and make AI better benefit mankind.

Are you ready for the era of AI?

Appendix
Shanghai Initiative on Artificial Intelligence and Future Rule of Law

We are standing at a new starting point in human history. The rapid development and wide application of new technologies such as artificial intelligence have brought revolutionary changes to our production and lifestyle. Human society is facing new opportunities and challenges in the sustainable development of AI. As a disruptive technology with a wide range of impacts, the risks and challenges brought by the uncertainty of AI's development will have far-reaching impact on law, security, employment, ethics, government governance, economic development, social stability and even global governance. How to seek benefits and avoid disadvantages and share achievements has become a common concern for all of us.

The Seminar on "Artificial Intelligence and Rule of Law" at 2018 WAIC (World Artificial Intelligence Conference) has conducted in-depth discussions on the themes of how to deal with the possible risks and challenges brought by Artificial Intelligence, how to develop the future rule of law system of Artificial Intelligence, how to promote, standardize and guarantee the healthy and sustainable development of Artificial Intelligence, so as to serve the implementation of national strategy of Artificial Intelligence and promote the well-being of human society, and reached a consensus and jointly sponsored the "Shanghai Initiative on Artificial Intelligence and Future Rule of Law".

Y. Cui, *Artificial Intelligence and Judicial Modernization*,
https://doi.org/10.1007/978-981-32-9880-4

A.1 Artificial Intelligence and the Conceptual Framework for the Development of the Future Rule of Law

1. Adhering to global, future and peace orientation, adhering to people-oriented, good security, innovative development, sharing results, reliable and controllable, standardized and orderly, build the future AI-assisted rule of law.
2. Strengthening prospective research, prediction and restrictive guidance on AI innovation-driven development and possible risks and challenges, and carrying out basic theoretical research on AI and rule of law, so as to provide support for the safe, reliable and controllable development of AI.

A.2 Promoting the Standardization of the Rule of Law to Guarantee the Development of Artificial Intelligence

3. Exploring the establishment the research system of AI normative development and risk prevention and control at the national level, planning layout, guiding the direction and focus of research as a whole, in order to improve the pertinence, systematicness and authority of research.
4. Establishing legislative norms, legal systems, policy systems and ethical norms suitable for the development of AI innovation, forming legal mechanisms for AI safety assessment and risk prevention and control, and enhancing the ability to manage and control technical rules and application rules.
5. To formulate laws and regulations in the stage of technology design, and promote the fairness, transparency and security of AI algorithm through rule setting, avoid algorithm discrimination, and eliminate the application of technology that is contrary to ethical value and public order and good custom.
6. To develop data rights and interests system, form security mechanism, benefit mechanism and accountability mechanism of data sharing, and ensure the legitimate and safe circulation and use of data.
7. To strengthen the research on intellectual property rights of AI, and improve the interactive supporting mechanism of technological innovation, intellectual property protection and standardization in the field of AI.
8. To carry out legal research on AI application scenarios and establish risk prevention and response mechanism in complex AI scenarios.
9. To carry out relevant research on prevention and punishment of AI-related crimes, so as to avoid the application of AI in criminal activities.

A.3 Strengthening the Education Research and Practice in the Field of Artificial Intelligence Law

10. To advocate broadening the teaching content of AI and other majors on the basis of the law discipline, attach importance to the cross-integration of AI and law education, and cultivate a group of interdisciplinary talents with legal literacy and knowledge of AI technology.
11. To promote the cooperation of "government, industry, education and research", integrate research resources of universities, scientific research institutions, party and government organs, enterprises and institutions, share wisdom and experience, and jointly promote AI and future rule of law.
12. To strengthen the in-depth integration of AI and rule of law, promote the in-depth application of AI in law enforcement and judicial field, speed up the development of intelligent rule of law, and promote the intellectualization of rule of law practice.

A.4 Promoting International Exchange and Cooperation of Artificial Intelligence in the Future Rule of Law

13. To promote international exchanges and cooperation in the development and application of artificial intelligence, pool wisdom of all parties, to have discussions, promote development, protect security and share achievements.
14. To build an international cooperation framework of AI and rule of law, conclude international conventions, establish international organizations, oppose and prevent AI hegemony, promote the peaceful and effective use of AI, and create a better future for human society.

Postscript

President Xi Jinping pointed out, Historically and in reality, many people have been striving tenaciously to upgrade themselves and strive for excellence, thus creating excellent achievements.

The successful development of Shanghai AI Assistive System for Criminal Cases is a successful example of deep application of AI in the field of criminal justice. The System is a result of the joint efforts by almost 1000 legal and technical professionals. It is also a continuation to realize the dream of judicial science and technology for another generation. It is precisely these loveliest people who, with tremendous courage, have made great efforts to overcome difficulties and accomplish this great project within more than 600 days and nights. This has opened up a new way for promoting the reform of judicial system and the deep application of modern science and technology in the judicial field. Before the publication of this book, some of the reflections of people who participated in and witnessed the development of the 206 System were collected as postscripts to commemorate this glorious and great historical moment.

Yadong Cui
31 March 2019

Y. Cui, *Artificial Intelligence and Judicial Modernization*,
https://doi.org/10.1007/978-981-32-9880-4

The era of AI has come, and our country has upgraded AI as a national strategy. The development and application of the 206 System has opened a new era in the field of AI applied in justice. It has made the justice a real science, and has been a useful exploration to promote the modernization of the judicial system and the judicial capacity, which will be forever recorded in the history. I am honored and proud to participate in this great project.

—Guo Weiqing, Member of the CPC Group of Shanghai High People's Court, President of Second Intermediate People's Court, Director of Project 206 Office of Shanghai High People's Court

Applying AI to the whole process of judicial activities is just like applying the most advanced technology to the most complex social engineering, which takes not only courage and confidence, but also vision and insight. Any hesitation or excessive use is not desirable. I sincerely hope that the future of justice is truly brilliant.

—Huang Xiangqing, Member of the CPC Group of Shanghai High People's Court, President of First Intermediate People's Court, Deputy Director of Project 206 Office of Shanghai High People's Court

The AI Assistive System for Criminal Cases promotes the combination of AI technology and judicial expertise, and provides real-time intelligent assistance to case-handling personnel in the way of human-computer coupling. As an innovative application of AI in judicial field, it is a perfect interpretation of promoting social fairness and justice with management wisdom. Its application mode and depth can be regarded as the application model of AI.

—Liu Qingfeng, Chairman of iFlytek Co., Ltd.

Since the 18th century, human beings have experienced the steam age, the electrical age and the information age successively. Every revolution in science and technology will promote tremendous changes in human society. In the 21st century, we are fortunate to witness the power of science and technology again. AI will be synchronized with social economic, educational, ideological, cultural and other social changes. “The 206 System” is the best example and great innovation of the integration of AI and judicial reform, especially the trial-centered litigation system reform. It will surely promote the continuous progress of China’s judicial system and realize judicial modernization at an early date.

—Zhang Xin, President of the Fifth Civil Division of Shanghai High People’s Court, Team Leader of the Integrated Affairs Group of Project 206 Office of Shanghai High People’s Court

The Completion of the 206 System is a result of strong leadership, clear vision, tremendous courage and concerted efforts. As long as we constantly strive for excellence, keep pace with the times, and concentrate on practical application, the 206 System will open a new chapter of modern judicial civilization.

—Cao Hongxing, Director of Information Management Department of Shanghai High People's Court, Team Leader of the Technical Group of Project 206 Office of Shanghai High People's Court

AI not only promotes social development, but also provides a significant historical opportunity for judicial modernization. By seizing the opportunity and actively embracing AI, Shanghai courts succeeded in developing the 206 System, which opens the door of the deep application of AI in the judicial field, blazing a new way for the development of criminal justice civilization.

—Xu Shiliang, Vice President of the People's Court of Xuhui District, Shanghai, Team Leader of the Operation Group of Project 206 Office of Shanghai High People's Court

The application of AI in the field of criminal justice is the inevitable result of the progress of judicial system and the development of science and technology. Though easy to realize, but it is very difficult to put it into practice. It takes great wisdom and courage on the side of decision makers, as well as the wisdom and perseverance on the side of developers. The development of the 206 System is a crucial step in judicial modernization. With this successful first step, we will continue to proceed with this cause unswervingly. I am proud of being a participant in this cause.

—Dong Liwu, Deputy Director of the Office of the CPC Shanghai Municipal Committee of Political Science and Law

In the past 23 years of information, the development of the 206 System is the most revolutionary, innovative and challenging project I have ever met. By introducing in-depth machine learning, evidence model and algorithm into the judicial field, the 206 System initiated the application of AI in judicial practice, making judicial activities more scientific and accurate, and effectively preventing the occurrence of unjust and false cases. So far, the 206 System has been put into use for one year and a half. I hope it will be better and contribute to the realization of the dream of judicial modernization.

—Wu Haiyin, Deputy Director of Information Management Department of Shanghai High People's Court, Deputy Team Leader the Technical Group of Project 206 Office of Shanghai High People's Court

Science and technology is an important tool to promote social development, and also a powerful driving force to promote judicial modernization. Having the privilege of participating in the development of the 206 System, I witnessed all kinds of hardships in pioneering the deep application of modern science and technology in the judicial field, and the amazing power of modern science and technology such as AI. I am more convinced of idea "who owns science and technology, who will steer the future". I sincerely hope the 206 System will have more perfect function and more extensive application, thus becoming a better and more powerful intelligent assistant to judges, prosecutors and police officers.

—Chen Shusen, Deputy Director of Research Office of Shanghai High People's Court, Senior Judge (Fourth Rank)

As the core driving force of the new round of industrial change, AI not only serves as a new engine for economic development, but also provides a significant opportunity for the development of the rule of law. The 206 System is a great attempt for the judiciary to keep pace with the times and actively embrace new technology. It will inject unprecedented vitality into the judicial work, and will further promote the realization of judicial modernization, judicial justice and judicial civilization.

—Xiao Ke, Deputy Director of the Office of Shanghai High People's Court, Member of the Integrated Affairs Group of Project 206 Office of Shanghai High People's Court

The AI Assistive System for Criminal Cases is a pioneering effort of applying AI to modern justice. Now the System is in the newborn stage. I believe it will achieve more progress with the use of senior police officers, prosecutors and judges. And one day it will become a reliable and indispensable assistant to us.

—Tian Tian, Deputy Chief of information Management Department of the Shanghai High People's Court

Promoting the development of the 206 System is the first task I undertook after I had transferred from the army to the court. After nearly a year's work, I deeply felt the pragmatic attitude and courageous spirit of the police, prosecution and judges in Shanghai. I hope that after several years of efforts, the 206 System will be polished more perfectly, so that the data of criminal cases could work more intelligently and more accurately in the System.

—Liu Changgen, Staff of Information Management Department of the Shanghai High People's Court

The law of historical development tells us that any field or individual must actively embrace the times in which they live, and then it will bring you unpredictable surprises. Today is the era of AI. Though being unsure and anxious at the beginning, now I am fully confident of the prospects of the application of AI to judicial practice. I feel very lucky to be a witness and participant in this new era.

—Pan Yonglu, Judge of the Second Criminal Division of the Shanghai High People's Court, Member of the Operation Group of Project 206 Office of Shanghai High People's Court

The Dream of Judicial Science and Technology is the great cause pursued by the older generations. It is one of the most unforgettable experiences in our life that we have the privilege to be pioneers in applying AI to judicial practice in the great changes of social science and natural science. The modernization of Jurisdiction is a career for our generation to pursue, whatever it may cost.

—Cai Yibo, Assistant Judge of Research Office of Shanghai High People's Court, Member of the Integrated Affairs Group of Project 206 Office of Shanghai High People's Court

Science and technology are the primary productive forces. AI can be applied to the judicial process and infiltrate into many elements of judicial practice, thus turned into productivity. In the final analysis, the construction of intelligent courts should be continuously improved and perfected through the continuous application of every judicial worker.

—Jiang Hua, Assistant Judge of the Criminal Division of the People's Court of Xuhui District, Shanghai, Member of the Operation Group of Project 206 Office of Shanghai High People's Court

AI is both a partner and a challenge for human beings. How to control AI and make it better serve mankind will be a grand proposition for a long time in the future. It's a great honor to participate in the pioneering exploration of applying AI to judicial practice. I hope that our initial progress could lead to a great progress in the development of Intelligent Justice.

—Zhang Fan, Assistant Judge of the Criminal Division of the People's Court of Pudong New District, Shanghai, Member of the Operation Group of Project 206 Office of Shanghai High People's Court

I was very fortunate to participate in the great task of the development of the 206 System. It was an exciting attempt to apply AI to judicial practice. The completion of the System has given me a great sense of achievement. I sincerely hope that IFLYTEK CO., LTD. will play an active role in promoting the development of AI industry and the development of laws and regulations in China.

—Liu Jiang, Vice President of iFlytek Co., Ltd.

Through the development of the 206 System, I learned the heavy work of the police, prosecutors and judges handling criminal cases. But I was very happy that I could use professional knowledge and scientific and technological means to contribute to improving the quality and efficiency of their work. I was also honored to participate in this project which pursued the future direction of China's judicial reform through science and technology.

—Jin Zemeng, General Manager of Judicial Business Line of iFlytek Co., Ltd.

In the new era of AI, how to proceed from practice and improve quality and efficiency with AI is an important issue that people from all walks of life need to think about. Fortunately, I was able to participate in the development of the 206 System, which gave me an opportunity to truly feel the power and prospects of judicial science and technology and to contribute to its development. The collision of law and science and technology in the new era has opened the door to innovation and development, and we look forward to the participation of more legal professionals.

—Wu Tao, Staff of iFlytek Co., Ltd.

Researchers from Shanghai Judicial Think Tank