

Design and Construction of Criminal Procedure Whole Process Analysis System under the Background of Big Data

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Abstract: Under the background of big data, in order to make the criminal procedure better keep up with the fast pace of the big data era, this paper analyzes the whole process of criminal procedure. By using the functions of data collation and data analysis of big data technology, using the Internet and combining with the whole process of procedure, a whole process analysis system of criminal procedure is constructed, which emphasizes the efficiency of data collation and data search and the fairness of trial cases. So as to ensure the supervision and improve the efficiency of handling cases.

1 INTRODUCTION

Criminal procedure is an activity in which the public security organs, people's procuratorates and people's courts verify and punish the criminal acts involved by the defendants according to the criminal procedure process and their requirements. Other state organs are not allowed to participate in criminal procedure cases. Simply put, it is the activities of defending the rights of the defendants who have not committed crimes and pursuing the responsibilities of the defendants who have committed crimes. The purpose of criminal procedure is to punish criminals with a fair attitude, to protect the rights and interests of those who do not commit crimes, and to educate citizens to abide by the law and actively fight against criminals. The legal system not only regulates people's behavior, but also protects people's basic rights and interests. (Xie 2002) (Chen 2013).

In this paper, the author intends to use big data technology to construct a whole process analysis system of criminal procedure in the function of efficient use of data, so as to solve the problems existing in the process of trial of criminal procedure, such as low case handling efficiency and insufficient supervision, thereby improving the efficiency of trial of cases and maintaining the fairness in the process of trial of cases.

2 OVERVIEW OF THE CRIMINAL PROCEDURE

2.1 Formation of Criminal Procedure

The Criminal Procedure Law was adopted at the second session of the Fifth National People's Congress on July 1, 1979, and was revised twice at the fourth session of the Eighth National People's Congress on March 17, 1996 and the fifth session of the Eleventh National People's Congress on March 14, 2012. On February 4, 2021, the Supreme People's Court interpreted the Interpretation of the Supreme People's Court on the Application of the Criminal Procedure Law of the People's Republic of China. Compared with the previous Interpretation in 2012, the new Interpretation adds three chapters: the trial of confession and punishment cases, expedited procedure and trial procedure in absentia. The emphasis is on strengthening human rights judicature, maintaining judicial justice, strengthening judicial protection of property involved, and strengthening the connection between supervision and litigation.

This revision of criminal procedure is clear in content and specific in direction. This revision takes safeguarding the rights of participants in litigation as the main line throughout, strengthens the handling of evidence and property involved in the trial process, maintains the status of trial, improves the linkage mechanism between supervision and trial, and improves and refines the procedures of confiscation of illegal income and trial in absentia. It fully

embodies the key concept of governing the country according to law in the new era, conforms to the latest requirements of criminal procedure in the new era, and improves some contents of criminal procedure, which is of great significance for promoting the modernization of national legal system construction.

2.2 Contents of Criminal Procedure Process

Generally, the process of criminal procedure is the process that the participants must know. Investigation is the first step in the process of criminal procedure, and the public security organs will decide whether to pursue criminal responsibility through investigation, and to pursue criminal responsibility, it is necessary to enter the process of filing a case. After the case is filed, the public security organs will detain the parties in criminal detention. In the process of criminal detention, the public security organs can either extend the detention period or put forward compulsory measures (which can be put forward when there is no criminal fact, the suspect did not commit it or the circumstances of the crime are not serious). When the public security organ thinks that there is social

danger, it can request arrest, and the time limit is generally 3 days, but it may also be 37 days (37 days is in the arrest of major suspects, the public security extended 30 days plus the procuratorate decided to arrest 7 days, called the golden period to rescue the suspects). After examination, the procuratorate may decide whether to approve the arrest or not. After the public security organ thinks that the case has met the conditions for examination and prosecution, it needs to enter the examination and prosecution, and decide whether to transfer the case information to the procuratorate; if not, it needs to be decided to withdraw the case. After a one-and-a-half-month examination, the procuratorate decides whether to prosecute, and prosecution is generally divided into summary procedure and ordinary procedure (the summary procedure was added to the amended criminal procedure, that is, the plea admission procedure and the expedited judgment procedure). In the trial stage, you enter the first trial procedure, if you refuse to accept the judgment, you can enter the second trial procedure and decide to change the sentence or retrial on the original basis. When entering the retrial link, a decision may be made to retrial and dismiss the appeal. The criminal procedure flowchart 1 is shown in Figure 1.

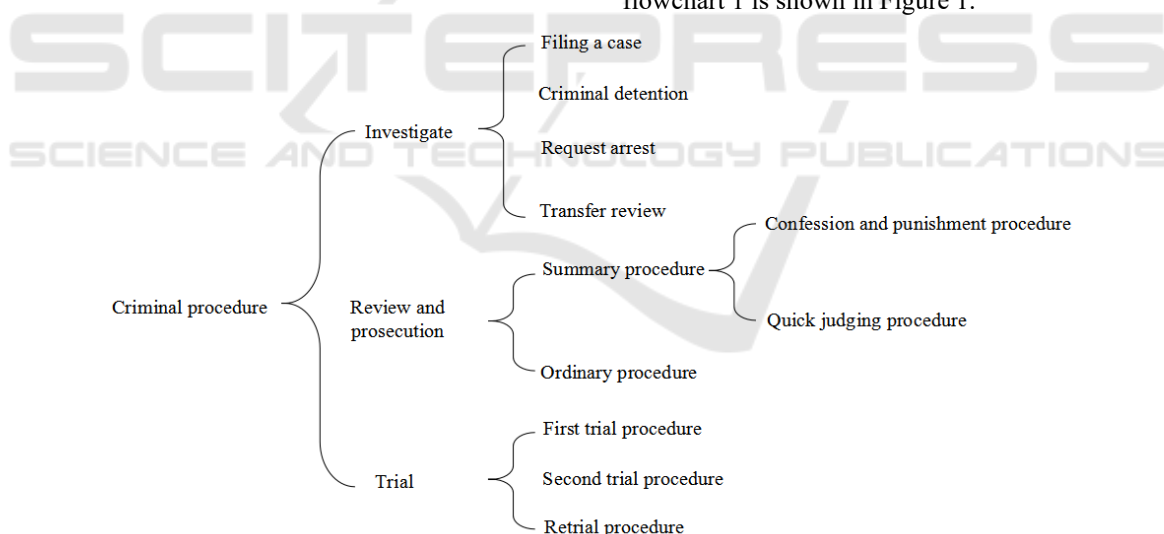


Figure 1: Criminal Procedure Process.

2.3 Problems in the Whole Process of Criminal Procedure

2.3.1 Insufficient Supervision

In criminal procedure, supervision generally emphasizes supervision during execution and execution during supervision. However, there is often

a lack of supervision in the whole process of criminal cases, which is embodied in two aspects. First, the number of supervision cases is large, while the number of people who carry out supervision is small. For example, the procuratorate of Shenzhen has to supervise 483,000 cases in a year, while the procuratorate has only about 1,300 staff members who perform this function of supervision, that is, 371

cases per capita. However, the procuratorate of criminal cases has to supervise 27,000 cases a year, and only 72 people try criminal cases. It can be seen that there are many cases to be tried by procuratorates every year, but there is a lack of people to supervise them. Second, supervision pays attention to many forms and its effect is poor. (Qi 1997) For example, the departments in charge of supervision during the trial of cases supervise the public security organs during the trial of cases. Only some error-prone areas were strictly examined, but the details were not noticed. It will cause problems in court, and make the case turn to the initial stage again. For example, Zhang Yuhuan retrial innocence case in July 2020, passion fruit girl retrial case and Zhang Zhichao retrial innocence case were in the absence of supervision, which made it impossible to implement a stricter supervision system, thus making the trial of the case unfair.

2.3.2 Handling Cases Is Inefficient

The efficiency of handling criminal cases has always been one of the focuses of people's attention. The improvement of the efficiency of handling criminal cases will promote judicial efficiency and social harmony. However, there are still some criminal cases that are not efficient in handling cases, which are mainly reflected in two aspects: First, the settlement rate. For example, in Shenzhen, a total of 27,000 criminal cases were tried in one year, while the number of concluded cases was 13,500, and the settlement rate was only 50%. Second, the length of trial of quick trial cases with light punishment. Light punishment and quick trial cases refer to cases in which criminal cases are relatively simple, the evidence is substantial and the defendant voluntarily pleads guilty. For example, the time spent in trial of fast-track cases in Shenzhen is about 50 days, which is enough to show that the efficiency of trial of cases is not high. The efficiency of handling criminal cases is not high, which directly affects the rights and interests of the parties, such as monitoring their lives and finances. If the case has been tried for several years, it will cause indelible mental harm to the relatives of the victims. As in 2018, in the passion fruit girl retrial, the case was tried for about two years.

To sum up, in view of the problems existing in the whole process of criminal procedure cases at present, the author thinks that by applying big data technology in the whole process of criminal procedure cases, can improve the supervision of trial cases, improve the handling efficiency, and then increase the fairness of

trial cases, better deepen the concept of the rule of law. (Ma 2017) (Fan 2015).

3 BIG DATA TECHNOLOGY AND CRIMINAL PROCEDURE WHOLE PROCESS ANALYSIS SYSTEM

3.1 Big Data Technology

Big data technology refers to the application of big data, and its functions involve business analysis, data analysis, data mining, machine learning and artificial intelligence. A large number of applications of big data technology are reflected in the development period of products. In this stage, because of the large amount of data and the need to analyze the data, it will be used more in this stage. Generally speaking, big data has four characteristics, namely, abundance, diversity, value and timeliness. That is to say, collecting a large number of diverse data, and in the case of storage and management, finding many useful conclusions in time through data analysis and mining, so as to realize the value-added of data. Big data technology is often inseparable from the cooperation of cloud computing, Hadoop/HDFS /Mapreduce/Spark and other technologies. Big data is a massive database, and cloud computing is to virtualize resources and then distribute them again, which is equivalent to computers and operating systems for processing information resources. HDFS and Mapreduce store and calculate a large amount of data. When there is only one data, the data is of no value, but when many data are superimposed, the data will make a qualitative leap. For example, by analyzing a person's footprint on the Internet, you can push the relative product demand information to this person. The significance of big data is not to master the information it collects, but to deal with it professionally.

3.2 Criminal Procedure Whole Process Analysis System

With the help of big data technology, the whole process of criminal procedure has strengthened the supervision, which makes the development of the function of supervision more balanced. According to different criminal cases, the formal procedures are relatively reduced, and the efficiency of handling cases is improved. With the help of big data

technology, the operation mode of the three organs of public security and inspection law will save some unnecessary procedures when the procedures are reversed, even if it is found that there are problems in the trial process in the previous trial department. On the whole, big data technology makes up for the deficiencies of previous procedures and improves the efficiency of handling cases.

4 DESIGN AND IMPLEMENTATION OF THE CRIMINAL PROCEDURE WHOLE PROCESS ANALYSIS SYSTEM

4.1 Overall System Architecture Design

The overall framework of the system consists of three parts: reviewing data, issuing results and supervising.

After filing a case, criminal detention and requesting arrest, the public security organ sends the data to the procuratorate through the network, and the procuratorate will send the data to the court after examination. If the court finds any problem in the review of the data, the court will feed back the results to the procuratorate, and then fed back to the public security organ after being verified and confirmed by the procuratorate, and the data will be verified, modified and sent to the procuratorate again. If there is no problem after the court checks the data, it will enter the trial stage and finally issue the results. In the whole process of reviewing data and issuing results, there must be supervision by the procuratorate. In the whole process, the case materials no longer need to be transferred many times, but only need to be sent online, because the online procedure will greatly save the time of case circulation; The whole process was supervised by the procuratorate, which broke the obstacle of insufficient supervision. The overall system architecture is shown in Figure 2.

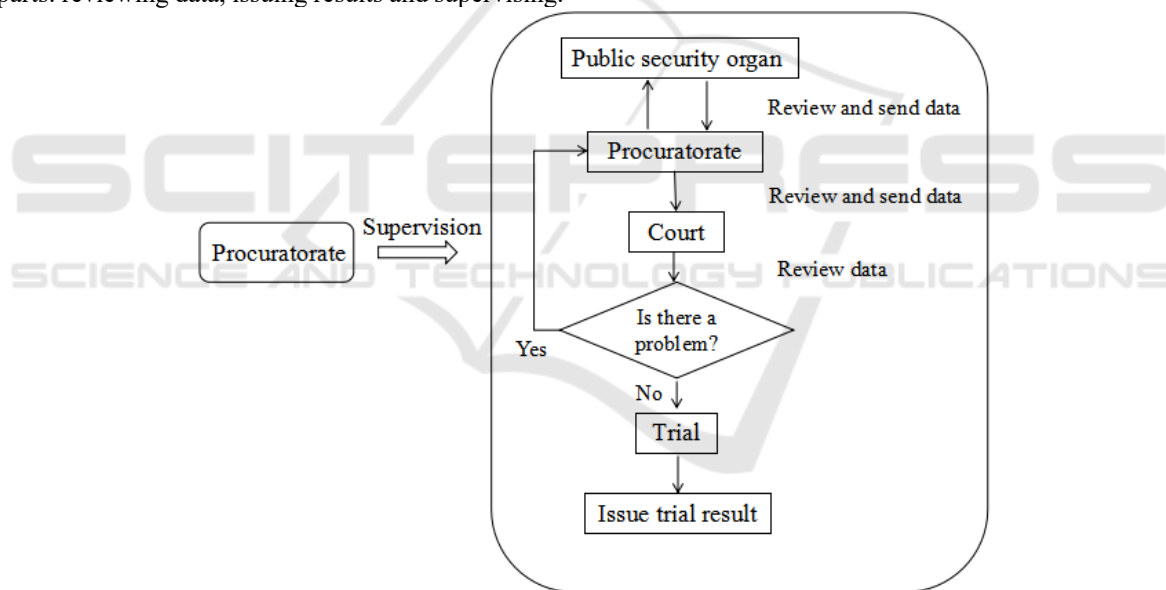


Figure 2: Overall system architecture.

4.2 Detailed Functional Design

4.2.1 The Specific Application of the System

The concrete operation of the system is that the public security organs first log on to their own websites, and search for case-related information through this website and using big data collection information tools Python and Flume. The purpose of this step is to collect information other than the case data obtained during the investigation on the Internet. Secondly, the

public security organs will sort out the collected information. The specific operation is to first remove the information irrelevant to the case and supplement the missing data of the case. Then remove or modify the case information errors in the data, such as content errors, format errors and logic errors; then remove some data that have little relevance to the case; finally, relevance verification is carried out, that is, whether the content left behind belongs to the relevant information of the case is retrieved. Import relevant case data into the whole process system of

criminal procedure through Sqoop, and then use Hdfs for storage. The public security organs analyze this part of the stored data, and at this time, they can make use of Spark analysis tool in big data tools, that is, make statistics and analysis on the stored data through visual analysis and correlation method, and generate relevant statistical data and reports. Finally, dig deep into the analyzed statistical data or reports until you find information that can help the case. Information can be displayed in various forms, such as words, pictures, charts and so on. The public security organ uploads the information of these cases to the office system shared by the three organs of the Public Security Law again, which is the first step of the whole process system of criminal procedure.

The second step is for the procuratorate to review the case information on the office system. If there is any doubt, it can inform the public security organ online. The public security organ will review it again and upload it again. The procuratorate will review the information again and inform the court to review it.

The third step is the court review. This step is the same as the second step. If there is any problem, go to the higher authorities. If there is no problem, the case will be tried, and finally the review results will be uploaded.

At this stage, the application of the whole process system of criminal procedure reduces the time and energy in the process of transferring case data, and at the same time, the process also ensures the real-time, consistency and quality of data.

4.2.2 The Procuratorate Will Supervise the Whole System

At this stage, the supervision can not only call the monitoring, but also work online and inquire about the progress of the case or the relevant situation of the case online, which has reached the principle of step by step supervision and step by step caution. The overall supervision begins with the investigation by the public security organs and the appearance of the final trial results. Under the strong supervision of the procuratorate, the number of retrial can be reduced, the fairness of cases can be improved and problems such as inadequate supervision can be eliminated. (Jiang 2016).

By introducing the detailed functions of the whole process analysis system of criminal procedure, this paper not only solves the problems of insufficient supervision and low efficiency in handling cases in the whole process, but also intends to express the powerful functions of big data technology. By using big data technology, the whole process system of

criminal procedure is designed, which makes data search, data storage and data analysis more convenient, reduces some repetitive work on data, makes the utilization efficiency of case data resources higher, and ensures the fairness of case trial.

4.3 Technical Support

4.3.1 Python

Python is a language for developing various skills, and its functions are mainly applied to web crawler, website development, artificial intelligence and automatic operation and maintenance. Its advantage is that compared with static and dynamic programming languages, the interface for capturing webpage data is simpler, and the application interface provided is more complete. When processing the crawled webpage data, it will filter out the junk files and leave clean text data.

4.3.2 Flume

Flume is a tool that can not only collect data resources, but also store them. Its application is, for example, by obtaining a person's website and consumption information, after analysis, pushing related products. Its advantages are that it ensures the consistency of data transmission and acquisition, and it can efficiently collect multiple data, and supports resource types of various paths.

4.3.3 Sqoop

Sqoop is equivalent to a data transmission tool, which imports data from the database into Hdfs, and can also perform reverse operation. The use of Sqoop not only ensures the safety of data transmission between back and forth, but also supports incremental import and incremental update. By utilizing the distributed batch processing function of Mapreduce, SGOOP accelerates the data transmission speed and ensures the fault tolerance of data.

4.3.4 Spark

Spark is a framework for processing all kinds of big data. It is characterized by fast data processing, simple use and strong universality.

4.3.5 Hdfs

Hdfs refers to a distributed file system, which means that the data set has taken up more capacity than this computer, and it is necessary to store the data in other

computers dispersedly, thus creating a file for storing data of multiple computers, that is, a distributed file system. And Hdfs is a subproject of Hadoop project, which is responsible for handling very large data files. It has a wide range of applications, supports the storage of massive data, and has the functions of fault detection and automatic repair. It is often used in a large number of data clusters, and it has a high degree of fault.

5 CONCLUSIONS

Under the background of big data, the whole process analysis system of criminal procedure exists under the supervision of the procuratorate, which ensures the fairness of case trial. By online transmission of case data, the system realizes data sharing, avoids repeated work of transferring data for many times, and saves time in the process of trial of cases. The design and construction of this system has improved the efficiency of trial of criminal procedure cases and ensured the fairness of trial cases.

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