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Construction and application of logic model for telecom network fraud case investigation based on big data

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Abstract: Telecom fraud, as a new means of fraud emerging in the new era, has a very deep impact on People's Daily life and social development. Therefore, it is necessary to use big data to carry out telecom fraud crime investigation activities to adapt to the changing social environment faster. According to the analysis of accumulated experience in the investigation of telecom network fraud cases in recent years, it can be seen that the case investigation mechanism is limited, the on-site collection of evidence is more difficult, and the cross-border arrest cooperation is more difficult. All these problems directly affect the investigation efficiency and quality of telecom network fraud cases in China. Therefore, some scholars proposed to use big data technology to improve the forensics process, build a cross-border reconnaissance cooperation platform, improve the efficiency of on-site forensics and investigation, and strengthen the effective crackdown on criminal and illegal behaviors. On the basis of understanding the development status of big data technology platform, this paper clarified the corresponding logic model according to the investigation process of telecom network fraud cases, and put forward the application countermeasures with big data technology as the core.

Keywords: Big data; Telecom network fraud; Case investigation; Logic model; Detection strategy

1. Introduction

China put forward the national big data strategy at the Fifth Plenary Session of the 18th Central Committee of the Communist Party of China. Local governments have also established national or provincial comprehensive experimental zones for big data processing according to their own basic situations, so as to promote the relevant achievements of the development of national big data strategy and provide effective experience for the long-term development of big data in other regions. At the end of 2017, in the comprehensive promotion of the political bureau of the central committee of the national large data strategy, on the basis of proposed to speed up the construction of the digital infrastructure, effective integration of various data resources, promote the communication between home and abroad, a comprehensive data information security applications, prompted courts, and other departments also begin to pay close attention to the big data, application in judicial work. For example, the public security department proposed to vigorously implement the public security big data strategy, strive to build a smart public security system, create a digital police management mode, and truly realize the leapfrog development of the public security organ's social governance ability. Under the background in the era of big data, the public security organ shall gradually improve their own big data strategy, create efficient networking platform, and strengthen information connection, from the Angle of policy can provide effective basis for criminal detection, think there are days, days to calculate the information such as system provide opportunities for the development of intelligent large-scale data solutions. How to use big data reasonably to predict crime and put forward effective protective measures has become the main issue for the public security organs in China to keep up with the big data trend. From the perspective of the investigation field, the emergence of big data provides an effective basis for the investigation of telecom fraud crimes. It can dig deep and accurately judge massive data through a series of technical means around the criminal investigation target, and use a series of investigation methods before and after the investigation to prevent and fight crimes. Nowadays, public security departments at all levels in our country have begun to consciously carry out the investigation of telecom fraud cases with big data as the core. Although there are still many problems, under the

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trend of explosive growth of information, the traditional mode of telecom network fraud investigation can be transformed and more valuable information data can be extracted from it.[1.2.3]

In essence, the form of telecom fraud will change in the changing social environment and communication technology. Today, there are many scholars from different angles to define telecom fraud analysis, finally think telecom fraud refers to the criminal suspect to relevant financial of illegal possession, use phone message or network communication way, send false information to the victim, the victim implement information induction, make its active financial fraud is given. Common telecom fraud includes the following three contents: first, the use of communication technology fraud; Secondly, the overall fraud process is usually non-contact, the suspects and victims do not meet and do not communicate, each operation is remote processing; Finally, in the process of crime, the victim will take the initiative to punish their own property because of cognitive error. In the definition of criminal law, telecom fraud is not a charge prescribed in the criminal law. But in practice, there are experts who specialize in studying this part of economic crime. According to the accumulated experience of telecom frauds in our country in recent years, there are common characteristics in both the crime types and technical means. There are a large number of people involved in the case and the amount of money involved in the case is large. The victim groups are younger; The characteristics of regional moderation and professionalization are more significant. According to the results of nationwide investigation and statistics by the public security department, seven regions are listed as the important regions of regional professional telecom fraud crimes in the country, as shown in Table 1 below.[5.6.7]

The serial number	Region	Fraud type
1	Dianbai District, Maoming City, Guangdong Province	Impersonating acquaintances and leadership fraud
2	Danzhou City, Hainan Province	Ticket refund, change fraud
3	Yugan County, Jiangxi Province	Heavy money for child fraud
4	Binyang County, Guangxi Zhuang Autonomous Region	Fake QQ friend fraud
5	Shuangfeng County, Hunan Province	Photoshop picture blackmail
6	Fengning County, Hebei Province	Fraudulently impersonating the underworld
7	Xinluo District, Longyan City, Fujian Province	Pretend to be customer service online shopping fraud

Based on the understanding of big data technology architecture and the accumulated experience in the investigation of telecom network frauds cases in recent years, this paper mainly discusses the logic model of the investigation of telecom network frauds cases based on big data technology, and then proposes corresponding development measures from the perspective of practical application.

2. Method

2.1 Big data technology

Big data technology refers to the application technology of big data, including the index system, platform and other application technologies of big data. According to the analysis of the big data technology architecture diagram shown in Figure 1 below, big data refers to the data sets that cannot be captured and managed by conventional software tools within the standard time, and new processing modes are needed in order to have stronger ability of process optimization, insight discovery, management and decision-making.

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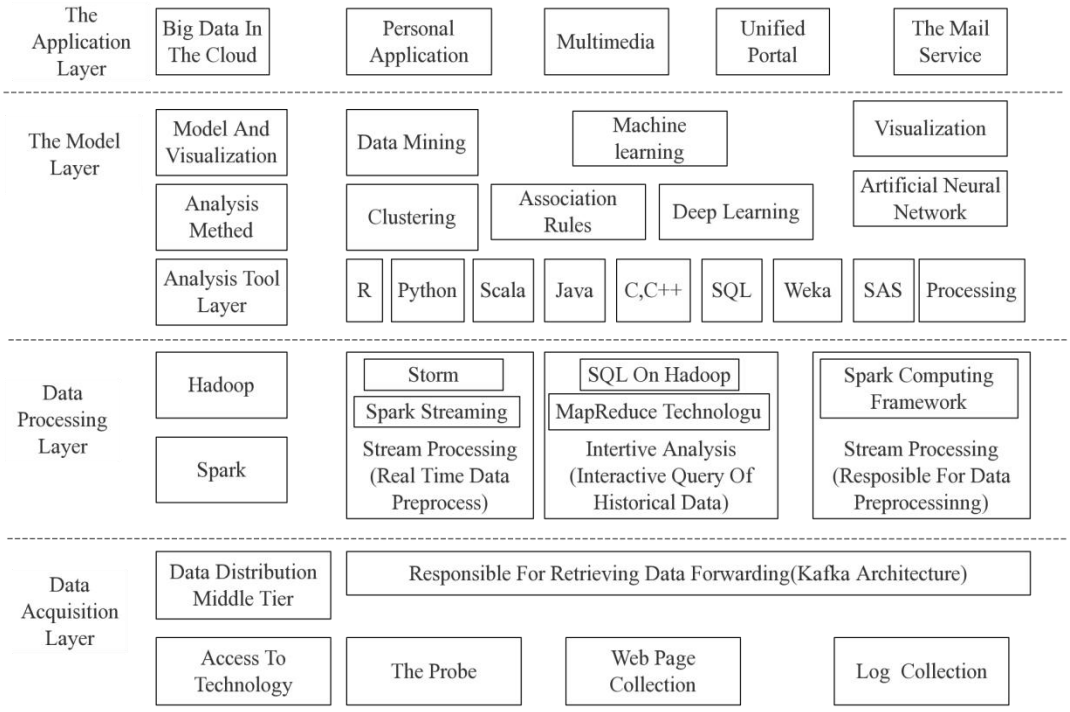

Figure 1 Big Data technology architecture diagram

Nowadays, big data technology to deal with more extensive database, and can meet the requirements of different types of data processing, such as image, voice, text, etc., at the same time big data technology with low density and quality of application effect, some scattered huge database, unable to analysis the information in a short time to express the meaning of, Then big data analysis technology can be used to mine the hidden value of information, so as to facilitate work research and other uses, and truly realize the deep level and convenient processing requirements of government affairs.

2.2 Experimental Process

The analysis process of telecom network fraud cases centering on big data technology is shown in Figure 2 below:

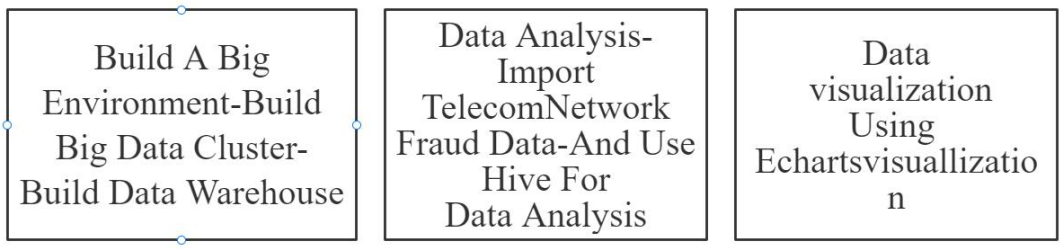

FIG. 2 Experimental process

Based on the above analysis, we can see that the first step is to build a big data environment, which includes a data cluster of one master node and two slave nodes. After completing basic configurations such as time synchronization, no-secret login and firewall, Zookeeper, Spark, Hadoop and other services are installed and started to create a high-quality data warehouse. Secondly, do a good job of data import and data analysis. Establish a table corresponding to telecom network fraud cases in Hive. When the key input in the file is imported into the data table, the corresponding data is analyzed and studied. Finally, data visualization is implemented. ECharts is used to visualize Hive data analysis results, such as bar charts, line charts, and pie charts, helping system users quickly grasp the comparison results of various information.

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2.3 Big Data environment

Create the experimental environment of big data cluster as shown in Figure 3 below. Firstly, the nodes of cluster application are all in the firewall of the same LAN. Second, the configuration file sets the IP address. Again, ensure synchronization and simultaneity of data, treat master as server and slave1 and slave2 as clients to ensure accurate time synchronization. The password - less login is configured on the node.

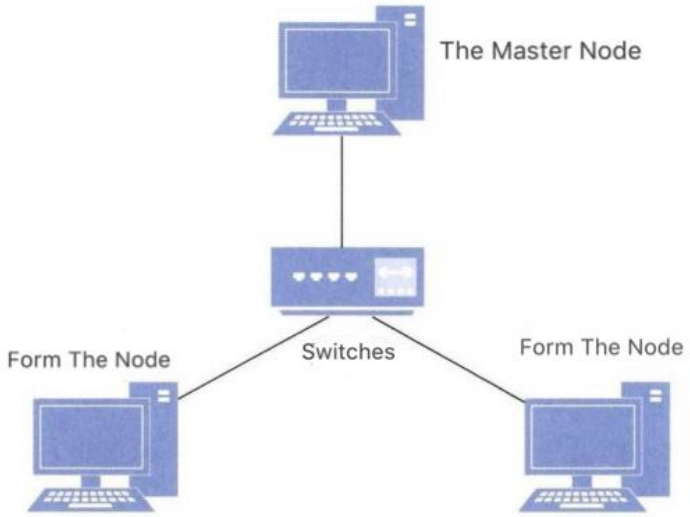

FIG. 3 Structure diagram of big data cluster experiment environment

The creation of data warehouse is the basic link to ensure the orderly operation of the overall system, as shown in Figure 4 below, where the operation steps involve the following points:

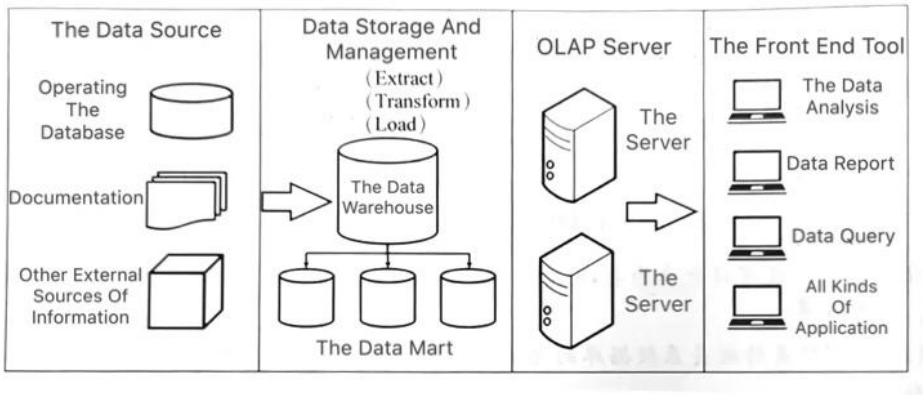

Figure 4 Structure diagram of the data warehouse

First, determine the system theme. Through communication with the investigation of telecom network fraud cases and related departments, the practical significance of building data warehouse and solving problems was clarified, and the query and analysis requirements under various topics were understood. After the staff put forward specific problems, the information department should classify and summarize the related problems, clarify the business functions of the data warehouse, and show the prototype to the staff, to ensure that the system will achieve functions in line with the new era of telecom network fraud criminal investigation requirements; Second, select the software platform that meets the requirements of data warehouse system. After identifying the problems that need to be solved in the data warehouse, it is necessary to select the appropriate software platform, including analysis tools, modeling tools, databases, etc. Thirdly, establish the logic model of data warehouse. After the basic method of data warehouse logical model is defined, the data definition in topic view is transferred to data model, the relationship between topics is correctly identified, the many-to-many relationship is decomposed, the logical data model is tested by normal form theory, and the application effect of logical data model is examined by system users. Fourthly, transform

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the logical data model into the data warehouse data model. On the basis of eliminating non-strategic data, we should add time subjective and derived data, and fill in the summary data of different levels of intensity. As strength is the main influencing factor of data warehouse design, it directly determines the amount of data in the data warehouse and the type of query executed. Therefore, the lower the strength level is, the more queries are supported. Fifth, data model optimization. In the design of data warehouse, the application performance should be considered, and the effective adjustment should be made according to the work demand and data volume.

3. Result analysis

After clarifying the logic model of telecom network fraud case investigation with big data technology as the core, it is necessary to build a cross-border investigation cooperation platform according to the development trend of big data technology in the new era, make full use of big data theory and technology, and improve the investigation ability of public security organs. For example, after the Mekong River law enforcement and security cooperation mechanism played an important role, China and Southeast Asian countries strengthened communication and exchanges in the field of security cooperation. They not only put forward the development mechanism of long-term meetings, but also established the law enforcement and security cooperation center, as shown in Figure 5 below:

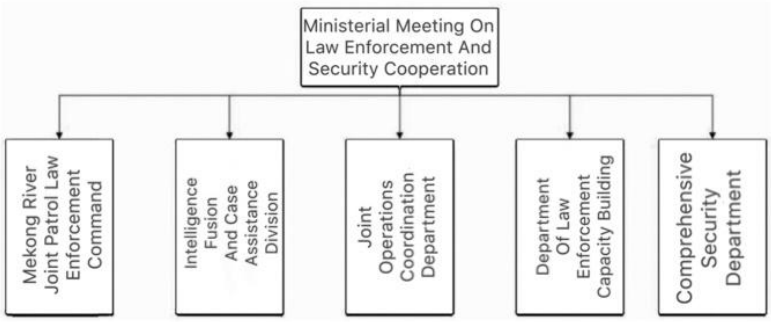

Figure 5 Organization chart of the Center for Integrated Law Enforcement Security Cooperation

From our recent calls business fraud cases investigation, fully using the theory of big data technology to build a mature law enforcement cooperation platform, from the joint action, law enforcement ability, intelligence, integration and so set up the system function, to further optimize the ability level of case investigation in our country, better satisfy the demands of the new era of telecommunication network fraud cases investigation. Therefore, with the continuous development of the theory of big data, research scholars in our country to strengthen the related technology research at the same time, actively cultivate more administrative experience and the computer application level of investigators, pay attention to the optimization routine database maintenance, information management, information, translation, such as research activities, learn from other countries criminal means and the research experience of organized crime, Based on big data, communication information and criminal records can be mastered faster to avoid excessive loss of investigation resources.

4. Conclusion

To sum up, in this paper under the background of understanding of big data telecommunications fraud cases investigation and technical means, the application value of big data technology theory, and analyzed from different angles and effective measures of telecom fraud cases investigation, finally proposed the big data as the core of the telecom network fraud cases investigation logical model. From the Angle of practical application, the overall function model design conform to the requirements of the new era of business of the public security organ for handling, can help the staff in the large database have more valuable content, perfect the process of case investigation, build

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cross-border reconnaissance cooperation platform, optimize the environment of China's telecommunications network operations, avoid harm the lawful rights and interests of the community residents, Contribute to the construction and development of a harmonious social environment.

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