On Anti-terrorism Warning Mechanism Based on Railway Ticket System

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Keywords: Big Data, Anti-terrorism, Data Mining, Ticket System.

Abstract. In this article, taking the anti-terrorism system of the train as an example, and integrating of the current resources and the data, author establish the warning platform, and the new model of purchasing the railway ticket scientifically, in order to warn the terrorism. The existing anti-terrorism model is imprecise, and it is very single model which we use to hunt for terrorist. Especially in the periods of security. By analyzing the existing tickets purchasing system, and the writer build a proper data analysis model on the ticket purchasing system, in order to check the ticket purchasers, and listing the suspicious person, so that we can take effective measures before terrorist acts.

After years of development, the big data technology has become increasingly mature, and played a very important role in the commercial field. The big data warning technology relies on the big data technology. The purpose is forecasting and alarming the potential terrorist threats,[1] and analysis of intelligence of terrorism.[2] However in terms of crime warning and criminal investigation, it is necessary to research further how the technology serve the anti-terrorism and anti-riot work. Actually, due to the wide range of criminology research,[3] at present, there are data barriers and inaccurate prediction in most countries. In this research, by using the existing train ticket database system, the author tries to set up a new data warning model, which can provide timely warning and judgment for terrorist activists.

The Application of Big Data Technology in Crime Warning in China

In many places of our country, public security organs are trying to predict and investigate crimes by big data technology.[4] Systems are built differently from place to place, but the concept of big data is basically same. For example, Suzhou public security and crime prediction system, monitoring of theft cases, supervises potential criminals.[5] In addition, Ministry of public security monitors crime through other data types. Director of Material Evidence Appraisal Center considers, at present, China has formed a whole advanced DNA data application system with Chinese characteristics, and forming a multi-system application pattern of the national DNA database, the national "abducted" DNA database and the national DNA rapid comparison platform. It has become an individual identification system with the highest recognition ate, the most cases solved and the greatest potential, for public security organs.[6]

Full Data Coverage

At present, the railway system has established a nationwide networked database system. There are comprehensive records of the identity information of ticket purchasers, such as household registration, identity, gender, and travel history information. And these data information are the basis of our data analysis. Based on these data, we can carry out data mining analysis to predict and judge criminal acts.

Personnel flow summary is timely and reliable. On account of the above ticket system, we can carry out the corresponding data analysis. But the timely updating of railway ticket database is the
value of its data. Because of the real-time passenger flow and continuous data updates, the database can reflect the current real-time personnel travel well. And the basis of our warning is the ticket system that should be updated in real time.

Dynamic control of passengers. Based on the database of railway ticketing system, whether passengers take the train or change their tickets can be mastered effectively. It is very important for us to keep abreast of the activities of terrorism-related personnel in time for our anti-terrorism work. It will be based on the system when to check and when to control.

Characteristics of Terrorist in Railway Ticketing System Database[7]

Because of the particularity of terrorist cases, it is frequently difficult to obtain a large amount of valuable information. Based on the open legal judgment documents and papers, the authors will explore the relevant characteristics of terrorists and lying the foundation for building early warning model and establishing warning mechanism.

According to the content of the judgment on the crime of terrorism on the Internet, the authors find out five persons involved in terrorism.[8] The relevant statistics are as follows:

Table 1. Gender Composition Statistics.

| Gender | Number |
|--------|--------|
| Male   | 6      |
| Female | 1      |

Table 2. Statistics of educational background composition.

| Education   | Number |
|-------------|--------|
| Primary School | 2     |
| Junior High School | 2     |
| Senior High School | 1     |

Apart from educational background and gender information, there are no regular work for the five person.

According to the above statistics and combining with other studies, we can find that terrorists
have the following characteristics, Not well educated, no regular job, experience of watching extremist videos,[9] and behavior of communicating and disseminating extremist ideas through the internet.

According to analysis of Railway Ticketing System Database, we can find that the trajectory of terrorist activities is relatively single. Taking the area involved in the ticket as an example, the frequency of these persons appearing in terrorist sensitive areas is high. In the course of investigation, If it is found that some persons possess the characteristics of terrorist criminals,[10] and their trajectories are mostly in the sensitive areas of terrorist activities, precautions should be strengthened.

**Anti-terrorism Warning Mechanism Based on Railway Ticket System**

**The Technological Process of ATWMR System**

Based on the railway ticketing system database introduced earlier, which reserved the tickets purchasing records and meanwhile the Personally identifiable information of passengers, we can establish our search criteria to find and discern the person who are qualified, and feedback who maybe the suspected terrorists under results of that research. specific as follows.

![Figure 1. Flow chart of warning for ticket system.](image)

In this flowchart, passengers made purchasing requests to the web server when they logged in their 12306.com accounts, at the meantime, the security mechanism would be started. the users who passed security screening could continue to buy their tickets, those not passed will be targeted by the security mechanism of 12306com.[11]

We added the security mechanism and listing the suspicious person feedback system in the full
purchasing process, which different from the current process. The security mechanism includes two fundamental aspects, data statistics and the data mining technology, and realizes the listing the suspicious person purpose. The principle of that was back by the past crime-data, and then analysis those data to get potential characteristics of suspicious person that would be recognized as the fundamental of listing the suspicious person. A data comparison would be get start when the web accepted a purchasing request. According to the different comparison results, the mechanism would feedback personal identity and Computer Information, and send those to the suspicious person feedback mechanism, financial to target and arrest the suspicious person. The suspicious person feedback mechanism was based on Detection and positioning technology of IT. Its working principle was based on personal identity and Computer Information provided by security screening mechanism, and analysis by it-analysis and Network reverse tracking location.

From that we could collect the criminals' computers and computers’ information and Network Information and network register information. Finally, we send those information to competent public security sector, According to the criminal procedure law, who would continue to start inquisition measures under the web. By those two aspects, purposes that initiative detection and feedback of evidences information can be accomplished.

**Research and Judgment and Investigation Mechanism Design**

Through the above big data analysis steps, we have had a preliminary confirm for the suspicious criminal suspect. We will confirm whether the suspicious person has committed illegal acts through the database information of railway organs and the content detected by online and offline.

![Figure 2. Flow chart of investigation mechanism.](image)

For the suspicious person who selected in the data analysis stage, we can only determine that they are suspected within the meaning of the data we have set, which is only to provide corresponding clues for the next step of investigation. In order to verify the authenticity of the clues, we should first carry on the retrieval to this crime information, however the retrieval based on the public security organ database. As previously mentioned, for ordinary people may also fits the characteristics of the list, for this, we can through the analysis of the other information to discern those aren’t the terrorists.

Therefore, we should compare the results provided by data investigation phase with other information in the database. If it's determined that a person who isn’t a suspicious terrorist according to other information we got, the object provided by this data investigation is an existing legal object, thus denying the possibility of the suspect's violation of the law. Meanwhile, we would feedback comparison result to the information provided agency confirming that the object pushed is legal. If the comparison result cannot prove person who are not a terrorist definitely, then the next step should be carried out, which is to investigate the object through online and offline means, to
collect the corresponding evidence of those legal and illegal activities, and a foundation for enriching the database and further criminal proceedings.

Conclusions

By analyzing the existing statistical data of tickets purchasing system, and the writer build a proper data analysis model on the ticket purchasing system with necessary artificial analysis, in order to check the ticket purchasers, and listing the suspicious person, so that we can take effective measures before terrorist acts.

However, at present, our studies must exists many inadequacies. Firstly, due to the lack of data, the current big data technology has been applied in various fields of our society, but the key of this technology is data, normally the data holder always hold a cautious attitude to keep their own data confidential. As a result, data barriers exist in all fields at present, which will hinder the effective use of big data. For our study, the data we used were all from public legal documents, which were obviously relatively limited. For that, it is cannot fully demonstrate many characteristics of big data, and the results of statistical analysis cannot fully show the reality, which hinders the specific application and improvement of the whole mechanism to some extent; secondly, analysis methods of the are data relatively simple. Big data technology in the field of criminal investigation of our study is just a preliminary exploration, but for the limitation of data made the statistical analysis of data only through a relatively simple descriptive statistics, the more valuable statistics must demand the large amount of data, and more abundant data statistical analysis methods; thirdly, for the implementation of this mechanism in practice, there are some institutional defects, which not only hinder the development of big data technology in this field, but also make the collection of evidence more inconvenient. So how to make the collection of data and monitoring of real-time data more conveniently will be the goals of all departments; Fourth, Bias and blind spots in big data. Data search and analysis patterns depend on the designer's personal thinking. But the characteristics of crime are different, and some people's design ideas cannot fully summarize all the characteristics of crime. That is to say, there are omissions and unreasonableness in the monitoring of crime by big data. How to make up for this shortage will be the goal of joint efforts of public security personnel and data experts. Fifth, Computer Learning Mechanism Should be Established. The Current computer learning is a new field. The advantage of this technology is that computers can constantly update themselves with their own high-speed computing power. The reason why "Alphago" can sweep the world's top players is the ability of machine learning. Every day, on the basis of its computational ability, it completes thousands of games with itself, in order to constantly update their own chess score. This is a fast renewal capability that humans do not have. If the computer learning ability can be applied to the identification of criminal characteristics, the existing criminal characteristics database can be constantly updated also. Perfecting the judgement ability of criminal suspects can continuously approach all the characteristics of criminal personnel in reality, so as to achieve timely judgement and warning.

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[7] These features are supported by other data. Because articles need to be published publicly, the author only uses the published data.

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