

# Research on Traffic Informatization and Intelligent Construction Based on Urban Traffic Big Data

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**Abstract:** Urban traffic is a new traffic demand network defined by residents' travel behavior and community relationship. From the management level, we should actively study and explore the construction of urban traffic informatization and intelligence, strengthen the operation efficiency of infrastructure and the dynamic supervision of traffic in various fields and subsystems of the city, and promote the integrated management of urban network operation, management, emergency response, treatment and maintenance. Under the background of big data, build an information and intelligent system of urban traffic to solve the problems of poor standardization, low level of digitalization, poor sharing and wide sources of existing cost control information. From the perspective of system architecture and function, the framework of urban traffic informatization and intelligent system should include four levels, namely, perception layer, network layer, data layer and application layer. The information system under this construction idea can comprehensively collect the operation and management data of urban transportation enterprises, and then analyze all kinds of operation indicators.

**Keywords:** Urban traffic, Big data, Informatization, Intelligent.

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## 1. Introduction

As people put forward new and higher requirements for urban travel, such as high speed, convenience, safety, environmental protection, etc., the informatization and intelligentization of urban traffic has become an important task of urban construction. Whether it is intelligent transportation tools, intelligent traffic management systems, or Internet and Internet of Things technologies, the intelligentization of urban traffic systems is constantly accelerating. Information and intelligent construction of urban traffic is an important technical means to improve the urban traffic operation system, and also an important content to improve the management level of urban traffic operation [1-2]. Under this background, it is necessary for us to explore and discuss the framework design and construction of urban traffic informatization and intelligent system, so as to promote the vigorous progress of China's traffic construction and realize the full application value of big data technology, information technology and Internet of Things technology in the national economy and people's livelihood.

## 2. Urban Traffic Big Data

In recent years, the rapid growth of data has become a severe challenge and a valuable opportunity faced by many industries, and the information society is entering the era of big data. In order to cope with the development trend of big data and better provide data analysis services for industry users and individuals, it is urgent to build various big data platforms to support users' multiple demands for data [3]. Besides, the classified storage of data, the openness of data platform, the intelligent processing of data and the interaction between data platform and users all bring unprecedented challenges to the construction of big data platform.

According to the estimation of relevant departments of data management, the data will increase rapidly at a rate of 50% every year, which means that the data information that human beings need to process will become more huge, which will

bring great challenges to human data platforms. The big data technology came into being as the times require. It helps people solve related data processing problems by perceiving, acquiring, transmitting and processing data, and carrying out structured and professional processing analysis [4].

The research contents of urban traffic big data technology and intelligent application system mainly include the following aspects: First, big data with time-limited nature; Second, the excavation of high-dimensional space; Therefore, it is necessary to study and analyze the laws and traffic behaviors in the traffic system through big data knowledge, excavate and explore high-dimensional spatial knowledge, and explore a traffic theory suitable for China's national conditions, so as to provide theoretical basis for China's urban traffic.

## 3. Problems Existing in The Process of Informatization and Intellectualization of Urban Traffic at Present

### 3.1. Lack of long-term consideration and planning

As the informatization and intellectualization of urban traffic is a new thing, many cities lack long-term consideration and planning in the design of intelligent traffic development, and it is difficult to fully consider all kinds of influencing factors that will affect the future development of urban traffic, which makes the later transformation difficult and hinders the urban construction and the upgrading of intelligent traffic. Under the monitoring of big data technology, once an emergency safety accident occurs, the quick response ability and decision-making assistance ability of big data technology will be fully demonstrated, and rescuers will rush to the scene of the accident at the first time, thus greatly reducing casualties and ensuring people's life safety to the maximum extent [5-6].

### 3.2. Unreasonable control of equipment and material cost

At present, the standardization of management and control equipment and material cost information of urban traffic engineering equipment and material cost information is poor. Different engineering construction units, even different production management links in unified construction units, can provide different data information formats, and lack of uniform standards. The collected data is multifarious, which leads to a lot of energy for data preprocessing during data collection.

There are many sources of equipment cost information, such as suppliers, engineering cost management units, historical price trends, network information collection and other channels. However, the authenticity and reliability are questionable, which requires the staff to spend their energy on further screening and verification to ensure the truthfulness, rationality and effectiveness of the information.

### 3.3. There is no clear positioning of information system construction

Information system construction is not only the accumulation of data, but also plays an important role in supporting leaders' decision-making, managers' effective management and operators' exploration and analysis of specific problems in production with clear data analysis results. What is pushed to the managers is only the business management data graph of eight main functional modules [7].

In fact, managers need to master the completion degree of the work plan and the actual working conditions of the crew, station service, maintenance and other post personnel at different time points. The seriousness and standardization of operators in selecting and inputting information directly affects the accuracy and effectiveness of information pushed by information system. By means of intelligent analysis of big data, we can predict the trend of failure, eliminate hidden dangers timely and pertinently, and extend the trouble-free

running time of equipment. Optimize procedures and improve safety management ability.

## 4. Thoughts on Traffic Informatization and Intelligence Construction

### 4.1. Intelligent application system of urban traffic big data

Big data to cloud computing depends on the improvement of data communication bandwidth and the construction of cloud resource pool. It is necessary to ensure that the original data can be migrated to the cloud computing environment and the resource pool can be expanded flexibly as needed. Urban traffic big data can be divided into static big data and dynamic big data. Static traffic big data mainly includes basic spatial data of urban traffic, basic information of road traffic network, etc. Dynamic traffic big data has a wide range of sources and various forms, mainly including satellite remote sensing and aerial photogrammetry [8]. Urban traffic big data technology and intelligent application system can not only alleviate urban traffic congestion, but also use big data and other technologies to realize more powerful functions of intelligent application system. Besides alleviating urban traffic congestion, urban traffic big data technology and intelligent application system can also use big data and other technologies to realize more powerful functions of intelligent application system.

The intelligent urban transportation system takes the information guidance service map as the main display form, and relies on the intelligent urban transportation service network to collect and sort out all kinds of information resources held by the road transportation industry departments, so that travelers can get any information related to transportation anytime and anywhere; Comfortable public transportation system will become the main body of urban commuter transportation, and fully improve the sharing rate of urban public transportation. The specific content of urban traffic big data mining model is shown in Figure 1.

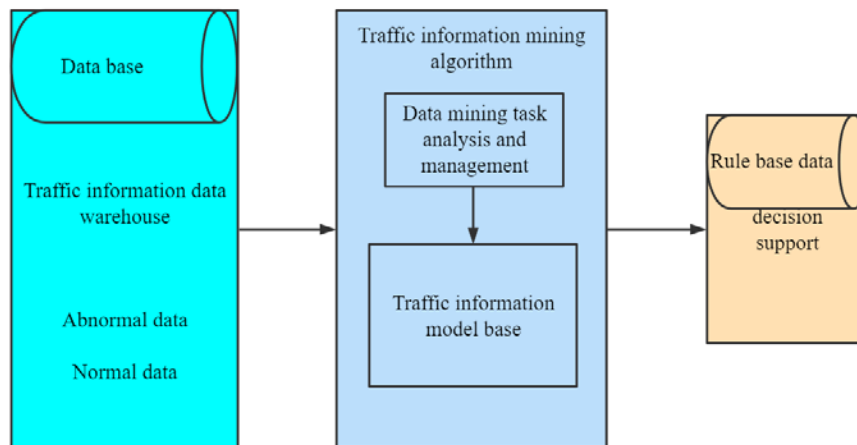


Figure 1. Urban traffic big data mining model

Big data preprocessing technology is to further process the data of the access platform according to specific business rules, including checking the validity of the access data, cleaning big data, etc. The data that people can collect include driving behavior data, paying behavior data and travel behavior data. The data collected from cars include vehicle information data, vehicle real-time position data, bus operation data, taxi operation data and crowdsourced road

condition data. The data about roads include satellite image data, aerial photography data and road infrastructure data.

Urban traffic is a new traffic demand network defined by residents' travel behavior and community relationship. Do a good job in the development of the city's external transportation system, especially in combination with the city's traffic reality, constantly broaden the road network structure, realize the connection between the city's internal

transportation and the transportation systems such as railways, inland navigation, civil aviation and maritime transportation, and enhance the convenience and commonality of urban transportation [9].

Comprehensively monitor and connect the vehicle's condition on the road and the vehicle's driving position, so as to screen and analyze the information, and timely transmit the information to each vehicle driver to provide real-time travel information. Its main content is to make a detailed analysis of the annual traffic accident occurrence coefficient, and formulate targeted and operable solutions to improve the safety of urban intelligent transportation in the future.

## 4.2. Design of urban traffic informatization and intelligent system framework

Urban traffic informatization and intelligent system mainly deal with data. Considering the wide sources and numerous channels of data information of engineering cost, first consider its data collection function. Through the application of big data technology and cloud storage technology, data of different channels, categories, levels, perspectives and dimensions can be uploaded and entered. After the data

processing is finished, big data technology can play its function of data analysis, find its internal regular relationship in massive data, realize the dynamic trend display of prices, and even predict the future price change trend, so that the management can make decisions. It can rely on its powerful database to perform various functions such as type price comparison, project price comparison, period price comparison, and regional price comparison on the compiled data, so as to maximize the profit of equipment and material cost control.

From the management level, we should actively study and explore the construction of urban traffic informatization and intelligence, strengthen the operation efficiency of infrastructure and the dynamic supervision of traffic in various fields and subsystems of the city, and promote the integrated management of urban network operation, management, emergency response, treatment and maintenance. To meet the needs of urban traffic operation, management and service, from the perspective of system architecture and functions, the framework of urban traffic informatization and intelligent system should include four levels (as shown in Figure 2), namely perception layer, network layer, data layer and application layer.

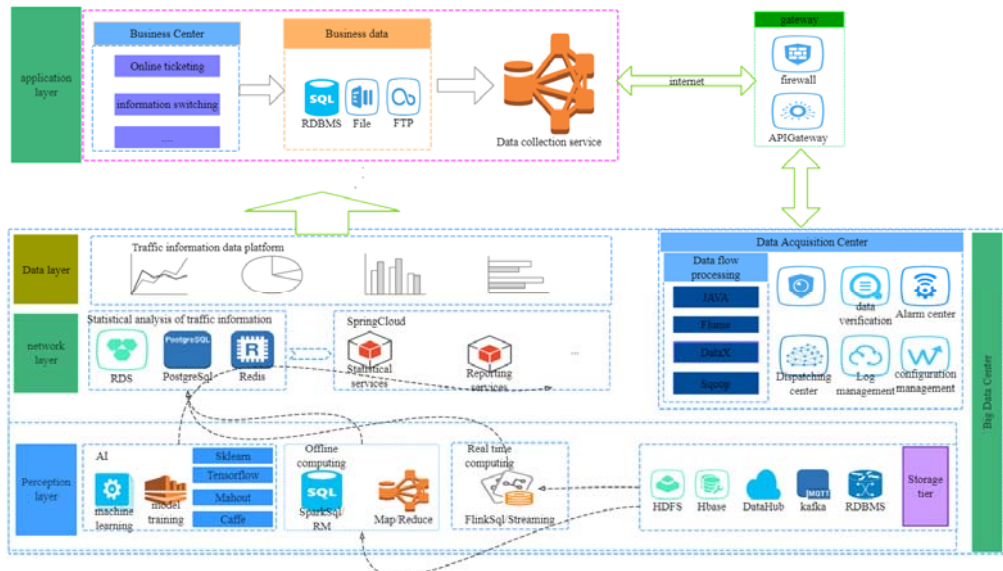


Figure 2. Urban traffic informatization and intelligent system framework

Among them, the perception layer aims to coordinate the perception devices related to people, cars, ships, roads and ports, and realize the visibility, measurability and controllability of the integrated traffic operation state. The network layer is responsible for the acquisition and transmission of traffic and related data. The data layer is designed to store and process data. The application layer focuses on the functions of online ticket sales, taxi calling, operation command and emergency response.

The information system under this construction idea can comprehensively collect the operation and management data of urban transportation enterprises, and then analyze all kinds of operation indicators. Opening the channel with the production system will undoubtedly greatly improve the comprehensive evaluation and early warning system of operation management and maintenance management, substantially promote the practicability of the information system, and further enhance the openness and flexibility of

the information system. From the information data management security system of urban traffic enterprises, it needs the complete guarantee of organization, system, personnel, construction standards and safety operation and maintenance.

In this paper, a firewall is established to isolate the intranet from the Internet or other external networks, and the intranet is protected by restricting network access, so as to ensure the security of data transmission in the cloud. Users establish SSL VPN connection by installing VPN client, and remotely access virtual private cloud to enter the system login interface [10]. After confirming the user's identity information, the system will automatically jump to the data analysis interface serving intranet users. Support intranet users of the system to upload fixed format data, query data, call visual services and other operations on the web side; Other users can view the visual analysis results, and support the evaluation and feedback of the results in the discussion area.

## 5. Conclusions

Urban traffic informatization and intelligent construction are important technical means to improve urban traffic operation system, and also important contents to improve urban traffic operation management level. This means that the data information that human beings need to process will become more and more huge, which brings great challenges to human data platforms. Big data technology emerges as the times require. It helps people solve related data processing problems by perceiving, acquiring, transmitting and processing data, and carrying out structured and professional processing analysis. This paper discusses the overall framework and construction emphasis of integrated traffic information system, which is helpful to grasp the focus and foothold of traffic information development from the design level, and has important reference significance for scientific formulation of traffic information development planning.

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