Problems and Countermeasures of Intelligent Transportation under the background of Big Data

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Abstract. The advent of the Internet and the era of big data, accompanied by the rapid development of information technology has had a huge impact on intelligent transportation, bringing important changes to its development. This paper mainly introduces the characteristics of big data and the concept of intelligence traffic, intelligent traffic system at home and abroad present situation and the influence of big data for intelligent traffic system faced the problem and the solution countermeasures. The research found that make more positive steps of big data technology to rapidly promote the development of intelligent transportation.

Keywords: Big Data; Intelligent Transportation; strategy.

1. Introduction

Nowadays, with the persistent development and improvement of urban construction, People's daily life has undergone earth-shaking changes. The increase of urban vehicles and the growth of urban floating population have increased the pressure on the transportation system. People want to travel in a more convenient, safe and comfortable way. However, adding more public transportation and expanding new roads about the question of urban traffic congestion will not be ease. Thus, need to change the traditional solution. The arrival of big data and the development of cloud computing technology have opened up new development ideas and concepts of intelligent transportation. The application of intelligent transportation system can better solve all kinds of urban traffic congestion problems and ensure people's safety [1]. This review use five V-words Volume, Variety, Value, Velocity and Veracity to express the characteristics of the period of big data. With the support of big data technology can provide analysis and data support for solving urban traffic safety problems. Intelligent transportation system can be promoted the construction and improvement more effectually by big data. As a result, as to improve intelligent transportation. Reduce the use cost, alleviate the traffic jam problem, urban traffic efficiency and people travel efficiency.

2. Big Data

As countries around the world pay more attention to "big data", the application scope of big data continues to expand, and the content value contained in it has been further developed and utilized [2]. Big Data or huge amount of data, it is that by conventional software tools within an affordable time range cannot capture, manage and process. It is a massive, high-growth and diversified information asset that requires new processing methods. Therefore, it will have stronger decision-making power, insight and discovery power and process optimization ability [3].

The following 5V is the characteristics proposed by IBM.

Volume. It has many of data, including collection, storage and calculation. The unit of measurement for it is at least P(1000 T),E(1 million T),or Z(1 billion T).

Variety. All kinds of the forms and resource. Including structured, semi-structured and unstructured data. Specifically manifested as Internet logs, sound, pictures, geographic location information and so on. Multi-types of them put forward higher requirements for data handing ability.

Value. The density of data value is low. With the wide application of the Internet and the Internet of things, there is a huge amount of information, but it is not very high.

Velocity. The figure and the processing speed are fast and also it is so high about the timeliness requirement. For example, users can search for what they want within minutes and make real-time recommendations based on your keywords or frequency.
Veracity. The accuracy and reliability of the data [4].

3. Intelligent Transportation System

It is a comprehensive transportation system to ensure safety, improve efficiency, improve the environment and save energy. It is mainly composed of public transportation system, vehicle control system, traffic information service system, traffic management system, electronic toll collection system, emergency rescue system, etc [5]. Meanwhile, applied to the ground transportation system. Thus, establishing the play a role in a large scale, the ground of the true time, accurate and efficient transport system.

4. The development status of intelligent transportation

4.1. Foreign development research

4.1.1 Digital technology has been adopted and applied in public transport services

Foreign researchers calculate the best time for passengers to travel by taking advantage of different boarding and getting off times of people in the subway, so as to reduce the time spent by passengers on public transport. Some scholars even analyze urban traffic through taxi navigation data, obtain the latest road conditions according to the analysis results and provide drivers with the latest and optimal driving routes in time.

4.1.2 Safe driving assistance

If the driver can grasp the situation of vehicles around the road and other driving environment information through various types of sensors in real time can avoid the occurrence of traffic accidents.

4.1.3 Optimal method of traffic management

To deal with problems associated with heavy traffic. The traffic control system includes signal control, traffic information obtained by on-board equipment, bus priority, dynamic route guidance system, commercial vehicle monitoring, detour information, traffic pollution reduction control signals, etc [6].

4.2. Domestic development research

At present, the research on intelligent transportation big data in China is mainly reflected in three aspects: traffic service, traffic guidance and logistics scheduling [7].

4.2.1 Urbanization promotes the development of smart transportation

Due to the growth of the urbanization population, the phenomenon of urban traffic congestion is increasingly obvious and urban efficiency is low by 2019, China's urban permanent resident population has increased by 1.02 percentage points compared with departed year. The construction of intelligent transportation will effectively improve the standard of transportation in the city and promote the sustainable progress of the city.

4.2.2Intelligent transportation is a key technological approach

Its development helps to achieve the national "double carbon" goal. Relying on the construction can change the comprehensive transportation with effect and build a new ecosystem with the development of green and intelligent technology as the goal.

4.2.3 Establish more perfect intelligent road traffic management

5G has been commercialized by October 2020.China has established more than 600,000 5G base stations, realize the full coverage of county towns. Toll collection on expressways has been implemented nationwide since 2019.The BeiDou Navigation Satellite System (BDS) is widely used in the field of transportation. Each city uses big data to investigate public transport construction, greatly improving people's travel efficiency [8].

5. Benefits and problems of intelligent transportation

5.1. Benefits

5.1.1 Data information can be combined across regions

Traffic management will remove the previous restrictions of administrative divisions and set up a holistic management consciousness of the game. It is helpful to the correlation sections more effectively implement the structure of traffic facilities, more reasonable traffic route planning.

5.1.2 The use of big data resources can be reasonably allocated

Nowadays, some of the duty of Chinese traffic branches are crossed, and some responsibilities and rights have not been clearly defined. Take advantage of big data technology can rational configuration manpower and material resources, assist relevant sections to make a more suitable plan, and make the use rate booster and traffic control more mentality [5].

5.1.3 In the process of intelligent traffic management, make full employ of relevant data to reflect the use worth of data, which is the key and the last link[9].

The traditional traffic restriction thoughts have been switched in the past. Blindly broadening the road only rise road mileage. Nevertheless, it won't solve all the problems during rush hour. Big data technology can analyze and conformity time, location, cause and other information of traffic jam, so as to conduct reasonable dredging and management according to local conditions. In this way, the occupation of land and other resources can be reduced, and the internal virtuous cycle of traffic facilities and systems can be realized [9].

5.2. Problems

5.2.1 Industry data and information standards are not unified

Due to the different economic benefits in each region, the country has not unified the data information standardization, which leads to the scattered intelligent transportation system in many regions, the chaotic management mode, and the low management level, which prevents the analysis and prediction of traffic flow and makes it difficult to effectively share information resources.

5.2.2 Lack of intelligent transportation system infrastructure

With the acceleration of urbanization and the increase of urban population, the integration degree and complexity of intelligent transportation system are getting higher and higher, so the information security risk of the whole system follows. Data leakage or loss may occur in a good deal of facilities and equipment due to outdated hardware facilities, aging and network delay. Therefore, it is vital to effectively improve the reliability of the power supply, and replace and install a more reliable communication power supply in time to ensure information security.

5.2.3 It is difficult to guarantee the quality of intelligent traffic data

At present, smart traffic data faces two problems, one is the unreasonable source of data, the other is the distortion of data. The data of intelligent transportation applications mainly come from sensors and monitoring devices, because big data centers have high requirements on the security of data information, and long-term operation of devices will affect and limit the high-level expansion application of intelligent transportation services.

5.2.4 Information leakage and privacy security risks

Intelligent transportation big data have a mass of information, including some sensitive information of individuals. Once this information is leaked or even illegally used, it will bring threats to the information security of users.Besides, plentiful of data will be gathered together and hacker attack will cause abundant data information leakage and cause huge losses[10].

6. Intelligent transportation application countermeasures

6.1. Strengthen the standardization and information application

To solve the inconsistency of intelligent traffic data information. First of all, the state should provide legal and regulatory support for smart traffic, promote the standardization of transportation platforms and unify the layout of each transportation platform. Including the interconnection and compatibility of hardware and software of each platform, it provides a resource sharing platform for intelligent transportation big data applications. On the basis of the cross-departmental and cross-regional sharing platform, the data standardization of the transportation system should be further standardized, the data information standardization system should be constructed and the acquisition rate and utilization rate of intelligent transportation data information should be improved.

6.2. Strengthen infrastructure

Infrastructure is essential to the application of intelligent transportation and has an impact that cannot be ignored. Once the infrastructure equipment is unsafe and imperfect, the security of its big data intelligent transportation big data application will be at great risk.Hence, it is significant to reinforce base installation:(1) timely update and maintenance of the front hardware devices,(2) regular inspection of the network lines, sensors, monitoring and other hardware in the intelligent transportation system to prevent damage and other problems leading to data information leakage.(3) Formulate relative emergency measures to deal with emergencies, reduce the interference of emergencies on intelligent transportation big data, and ensure the security of data and information.

6.3. Strengthen management

In this system, in addition to protecting big data information technically, some scientific management systems and management methods should be adopted. Only in this way can we find the real value in massive traffic data and obtain effective information, so as to reduce putting into use of big data information safety.

6.4. Enhance the security awareness of staff

If do a good job in information security risk assessment. There are numerous data types in the intelligent transportation system and each data has different risks. The big data center needs to classify them, including intrusion detection system, security audit system, network antivirus system, firewall and so on. Therefore, as to strengthen security prevention and reduce the risk of smart traffic data leakage. The application requires not only the cooperation of big data platform and hardware facilities, but also the staff of various departments. They need to have the ability to identify data security threats, know the importance of the data they manage, and improve the staff's understanding ability and knowledge level in data security protection [10].

7. Conclusion

Big data can alleviate the pressure and problems faced by the transportation system to a certain extent, but at the same time, there will be some challenges. In the face of these difficulties, it is important to perfect the standardization of data information application, strengthen infrastructure construction, intensify smart transportation system and do a good job in safety assessment. No matter

at present or in the future, intelligent transportation system is inseparable from big data processing technology and platform for data collection, processing, analysis and so on. In the Internet under the guidance of our big data can combine vast technology and intelligent transportation. For more rapid development of intelligent transportation and people to create a more convenient, efficient, safe, comfortable travel environment. Also give the life of people bring huge benefits and convenience, can improve people's well-being is a very meaningful thing.

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