Term Paper

Big Data and Intelligent Transportation System

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Date: 3/25/2019

Abstract

Big data technology can be applied to the transportation management system to realize a real-time, accurate and efficient integrated transportation management system. This is the intelligent transportation system. Big data can alleviate the current common traffic jams and improve transportation services. In this article, I will briefly introduce the significance and characteristics of big data, intelligent transportation systems and discuss several common applications of big data in intelligent transportation systems.

Key words

Introduction

With the rapid development of technology and rapid economic growth, the number of vehicles is also increasing rapidly. Traditional traffic management systems and planning are difficult to meet the complex traffic needs of today. The resulting traffic congestion has not only affected the quality of life of residents but also exacerbated environmental pollution. The main cause of traffic congestion is not only the increase in the number of vehicles, but also the occurrence of accidents and subsequent rescues, and the failure to clean up the site. More use of public transportation is an effective way to solve these problems, but public transportation will also face the unreasonable allocation of resources, such as passengers waiting for a long time, crowded vehicles. The intelligent transportation system can effectively utilize existing transportation facilities, reduce traffic load and environmental pollution, ensure traffic safety, and improve transportation efficiency. The development of intelligent transportation relies on big data.

Through the analysis of a large number of effective traffic data, the traffic data processing model is constructed to make the traffic execution more orderly.

What is Intelligent Transportation System?

Intelligent Transportation is a service system based on modern electronic information technology for transportation. Its outstanding feature is the collection, processing, distribution, exchange, analysis and utilization of information as the main line, providing diverse services for traffic participants.

Intelligent transportation can effectively utilize existing transportation facilities, reduce traffic load and environmental pollution, ensure traffic safety, and improve transportation efficiency.

The intelligent transportation system has two important features:

- Focus on the wide application and service of traffic information.
- Focus on improving the operational efficiency of existing transportation facilities.

Compared with the general technical system, the integrity requirements of the intelligent transportation system construction process are more stringent. This holistic manifestation is reflected in:

- Cross-industry characteristics: The construction of intelligent transportation systems involves many industry sectors and is a complex mega-system project with extensive participation in society, which leads to complex inter-industry coordination problems.
- Characteristics of the technical field: The intelligent transportation system integrates the achievements of many scientific fields such as traffic engineering, information engineering, control engineering, communication technology, computer technology, etc., and requires technical personnel from many fields to work together.

- Government, enterprises and colleges and universities participate together. Appropriate role positioning and task sharing are important prerequisites for the effective implementation of the system.

- The intelligent transportation system will be mainly supported by new generation information technologies such as mobile communication, broadband network, RFID, sensors, cloud computing, etc., which is more in line with human application requirements, and the degree of trust is improved and becomes "ubiquitous".

Why can Big Data be used for Intelligent Transportation System?

Big data refers to the massive, complex data collection that cannot be extracted, stored, searched, analyzed and processed with existing software tools.

"When the mobile Internet is coming, many people have not figured out what the PC Internet is. When we haven't figured out the mobile Internet, the era of big data will come again. "This is what Ma Yun said when he left Alibaba. This is a good explanation for the popularity of big data in the past few years. Big data is a new resource that has enough value and plenty of room and potential for mining. For investors and entrepreneurs, big data is an opportunity for them to create value and benefits by mining and using big data. Most ordinary people can enjoy the resources and convenience brought by big data.

The characteristics of big data can be summarized by 4 'V's:

- Volume: As of now, the amount of data for all printed materials produced by humans is 200 PB, and the amount of data that all humans have said in history is about 5 EB.

- Variety: Compared to the text-based structured data that is convenient for storage in the past, there are more and more unstructured data, including weblogs, audio, video, pictures,

geographic information, etc. These multiple types of data are used for data. Processing power raises higher requirements.

- Value: The value density is proportional to the total amount of data. How to "purify" the value of data more quickly through powerful machine algorithms has become a difficult problem in the current big data background.

- Velocity: This is the most distinguishing feature of big data distinguishing it from traditional data mining.

Because of these characteristics of big data, the big data can be the cornerstone for the realization of intelligent transportation. Big data can predict individual traffic behavior, maintain traffic safety, and promote the personalization of traffic information services.

The Application of Big Data in Intelligent Transportation System

The value of big data, mining costs are more important than quantity.

There are two main aspects to the application of big data in intelligent transportation: data collection and data analysis.

Data analysis is mainly divided into five aspects:

- Pre-judgment beforehand: Big data allows us to find patterns by a large amount of valid data. With the technical means of intelligent transportation to improve the intensity of information collection and collection, a large amount of effective data is obtained, and then the data is processed to convey the information to various places through various channels.

- Adjusting changes: For traffic managers, the value of big data lies in the ability to help them improve their management skills, their ability to acquire data, their ability to make decisions, and their ability to manage traffic.

- Urban planning: Through the analysis and summary of the big data of traffic, we can get the strength of the mutual connection of different cities, the source of the urban floating population, and guide the city's external traffic construction; it can also reflect the travel routes, preferences, and summary of the residents. Residents' travel habits.

- Illegal detection: In addition to traditional road monitoring, it can combine image intelligent analysis algorithms for multiple intelligent identification and analysis to curb accidents and illegal sources. And it is possible to analyze the face part in the captured picture, compare the blacklist library or perform the face search of the suspect.

- Decision-making basis: Traffic data intelligent research and judgment system, through the seamless connection of urban buckle system, application and calculation, vehicle feature secondary recognition, big data mining and other technologies, secondary analysis of some traffic behavior or event warning and characteristics to provide decision-making basis for the security department.

Typical Application of Intelligent Transportation System

The intelligent transportation system consists of several systems, including:

- Advanced Traffic Information System (ATIS):

Real-time traffic information is provided to the traffic information center by means of sensors and transmission equipment equipped on the road, on the road, on the parking lot and in the weather center. After ATIS obtains this information and processes it, it provides effective information in real time. Based on this information, travelers can determine their own travel mode and choose the route.

- Advanced Traffic Management System (ATMS):

ATMS is primarily used by traffic managers to detect and control road traffic and provide communication links between roads, vehicles, and drivers. It will monitor traffic conditions, meteorological conditions, etc. in real time, obtain information about road conditions, and control traffic based on collected information.

- Advanced Public Transportation System (APTS):

The main purpose of APTS is to provide the development of the public transportation industry with various intelligent technologies, making the public transportation system more secure and convenient, economical, and improving service quality and work efficiency.

- Advanced Vehicle Control System (AVCS):

The purpose of AVCS is to develop technologies that help drivers implement vehicle control, making car driving safer and more efficient.

- Electronic Toll Collection (ETC):

ETC is the most advanced and popular road and bridge charging method in the world. The vehicle is connected to the bank through the state of the toll booth for a quick settlement.

- Emergency Medical System (EMS):

Through the ATIS and ATMS, EMS integrates the traffic monitoring center with the professional rescue agencies to provide road users with emergency services such as vehicle breakdown, trailers, and on-site ambulance services.

Conclusion

Why is big data so important to intelligent transportation? Because the characteristics of big data can well meet the current demand for intelligent transportation: the amount of data is huge, the types of data are diversified, and valuable information can be quickly obtained. Navigation, as the most commonly used intelligent transportation application, allows people to get rid of the paper

version of the map; Uber and other taxi software, making people travel more efficient and more convenient. Big data has made the transportation industry a big step toward the information age.

The intelligent transportation system is the development direction of the future transportation system, and big data is the basis of intelligent transportation. The progress and development of data acquisition methods and processing methods will guide the progress of intelligent transportation systems. In the transportation sector, through the analysis of a large amount of effective data, not only can you obtain useful traffic information, but also provide important information for other industries. Big data can strengthen the resource integration of transportation platforms, assist in the construction of transportation infrastructure, and make people's travel more convenient and safer. The intelligent transportation system using big data is an important step to improve people's daily lives.

In today's big data era, intelligent traffic systems are just a small aspect of big data applications. Big data is a new resource, it has enough value, and there is enough space and potential for mining. For investors and entrepreneurs, big data is an opportunity for them to create value and benefit by mining and using big data. And most ordinary people can enjoy the resources and convenience brought by big data.

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