Research on the Construction of Intelligent Transportation System Based on Internet of Things

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Abstract. At present, with the development of economy, people's living standards are getting higher and higher. Based on the current big city traffic congestion phenomenon, by introducing the concept of Internet and related technologies, the five layers of building based on Internet of things a subject three division wisdom metropolitan transportation system architecture, this architecture includes homework layer, perception layer, network layer, application layer and user layer, a main body is a big city traffic database is the core of the information transmission, three departments include traffic police supervision department, city management and cost management departments. Through this framework, the whole process of urban traffic information can be controlled in real time, so as to guarantee the demand of urban consumers and residents and promote the stable and healthy development of transportation in China's big cities. This paper USES the knowledge of Internet of things to build the intelligent transportation system of big cities, hoping to get inspiration from it.

Introduction

The main reason of affecting traffic is the excessive car ownership in cities. In particular, the number of private cars has increased rapidly, accounting for more than half of the total. As a result, there are too many cars and traffic jams, and the urban roads are severely disrupted, which greatly affects the urban traffic situation. At present, with the development of scientific and technological revolution with Internet, Internet of things as the core technology, the transportation industry of big cities is profoundly affected. In social development, the informatization process of fully combining transportation industry and Internet of big cities to promote intelligent transportation is inevitably the trend [1]. Intelligent transportation has just started, opening up a new direction for traffic transformation and upgrading. Strengthening the design and implementation of the traffic information system and building an intelligent traffic system based on the Internet of things can effectively improve the quality of traffic management, solve the traffic congestion in big cities, and guarantee the living standard of the people.

IOT Concepts and Key Technologies

The Internet of things (IOT) is an information medium based on modern Internet and mobile communication network, which connects ordinary objects in the physical world with each other and realizes information and data exchange [2]. The Internet of things is an important way to realize the "information-based" society. In the real world, various tangible objects form an interactive network through the Internet of things. The Internet of things contains two meanings. Firstly, it is not only the Internet in essence, but also an extension and extension based on the Internet. Secondly, the Internet of things terminal

It is no longer a computer or electronic device terminal, but any object that exists in real life. The Internet of things enables the exchange and connection of information between the same or different objects. Awareness of the concept of Internet of things can also be explained respectively from the technical level and practice level: from a technical level, the Internet of things is by means of the smart sensors installed in the object recognition perceived various numerical characteristics of the
object, and then through the Internet, to transmit the sensed data to the information processing center, so that different objects

Through the information processing center, various data can be automatically processed and information exchange. From the perspective of practice, the Internet of things connects various objects in the world, and then connects them together through the existing Internet, realizing the mutual connection between human society and the nature. In this way, humans can more accurately perceive the connection with all things in the world, thus improving our quality of life. The key technologies of the Internet of things mainly include perception technology, network communication technology, data fusion and intelligent technology, and nanotechnology. Among them, perception technology is the foundation of the Internet of things technology. Through network communication technology, the channel of information transmission between the perceived objects is provided. Data fusion and intelligent technology can process the collected data to meet the needs of different users and improve the use value of the data. Nanotechnology mainly studies the application of nanotechnology to the design of sensors to meet the needs of micro objects for sensors [3]. Iot technology can be divided into perception layer, network layer and application layer, which is used for information collection. The network layer is used for information transmission; The application layer realizes intelligent control through communication with customers, and the structure of the Internet of things (see Table):

<table>
<thead>
<tr>
<th>level</th>
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<tr>
<td>The application layer</td>
<td>Intelligent transportation is applied to various information platforms, and new means such as Internet of things, cloud computing and blockchain are applied to traffic control.</td>
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<tr>
<td>The network layer</td>
<td>Application Internet, mobile communication network, private network, remote control, next generation bearing network, Wireless network and heterogeneous network form traffic control network.</td>
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<tr>
<td>Perception layer</td>
<td>Using sensor, 2d barcode, RFID and other advanced technologies, information control from low speed, medium speed and short distance.</td>
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**Related Concepts of Intelligent Transportation**

Intelligent transportation is based on information technology such as modern communication technology and network technology as the foundation, adopt various intellisense equipment such as RFID, operation in various vehicles and traffic facilities for real-time viewing and control, so as to realize automatic operation of the visualization of traffic management, traffic facilities management and intelligent signal management, improve the traffic efficiency. The premise of intelligent transportation is connection, the basis is data, the core is integration, and the goal is intelligence. The development stage of intelligent transportation can be divided into four stages: foundation stage, introduction stage, growth stage and maturity stage. The basic period mainly includes construction of perceptive equipment such as intelligent terminal; Construction of information infrastructure such as the Internet and the Internet of things, as well as basic conditions such as standards and terminal agreements for mutual communication among various equipment; The introduction period is mainly based on connectivity to realize real-time traffic management. During the growth period, the deep integration of Internet and traditional transportation industry creates new value for the whole supply chain. In the mature period, intelligent allocation of traffic resources is realized through artificial intelligence to create an intelligent traffic ecosystem [4]. At present, our country is in the intelligent transportation development stage from the foundation period to the leading period.
Major Problems Existing in Current Traffic Congestion

The Gap between Traffic Demand and Supply is Widening, and Urban Road Traffic Congestion will Increase Day by Day

A period in the future, and xi’an in "south and north, the other: reinforcement, the spatial development policy under the guidance of the west", will gradually shift to the surrounding area and living area, this will stimulate a large number of automobile consumption demand, in accordance with the "xi’an auto industry overall development outline", the next few years, automobile industry will stride development, xi’an and traffic demand will hinder exploding, in the case of urban road construction relative lag, road resource will be severely limited, xi’an district road traffic congestion phenomenon will increase increasingly. In accordance with the present automobile natural growth, 2020 years ago, xi’an car show explosive growth, there will be more than 4 million vehicles, more than 1.3 times the current situation, and will also increase at a speed of more than twelve point five percent a year, private car nearly two years the average growth rate reached 24.1%, the new car registration amount are more than 25000 vehicles, only new car registration amount is more than 50000 vehicles in 2017, one thousand private car ownership has up to 100/100. With the rapid growth of car ownership, the road growth rate of the whole city is only 5. In recent years, the most severe traffic congestion in downtown areas such as bell tower, Xiaozhai and Jiefang road, the new road mileage and area have hardly changed.

Road Traffic Planning is not Forward-looking enough, and Urban Traffic "Hardware" cannot Keep up with the Development Process of Urbanization

Main performance is: one is main road structure unreasonable, traffic interference is big. Taking xi’an second ring road as an example, due to the characteristics of multiple exits and entrances, multiple connection lines and ramp metering, the average speed of the morning and evening peaks of the entire second ring road is 32km/h, and the speed of sections close to 50% is lower than 35km/h. The average speed of the second ring road entrances and exits is only 19km/h, which becomes the bottleneck of the inner ring. Secondly, the utilization rate of the branch road is low. In urban areas, the basic conditions of some streets and lanes are poor, and there are many traffic conditions, which affect the access of branch lines. It is impossible to distribute traffic flow in the peak hours, and it is difficult to effectively play the role of "microcirculation". A large number of people and traffic flow concentrate on the main road, which increases the traffic pressure of the main road. Thirdly, the planning and construction of parking places in xi’an city is seriously inadequate.

Unscientific Traffic Allocation in Urban Planning and Unreasonable Traffic Source Layout

In the tradition, the idea of urban construction is to take the large urban construction and the thriving commercial network as an important symbol of the success of urban construction. The phenomena include the lack of rational and scientific planning and layout of urban traffic, the unreasonable distribution of traffic resources and the concentration of traffic volume distribution.

At present, the development intensity of the old city has been strictly controlled. A number of large-scale commercial new towns have been formed outside the city, such as xiaozhai business circle, gaoxin new town, Chang’an university city and so on. However, the development of multi-center is not balanced, and the newly formed functional areas in the peripheral have single functions, which are not perfect, and the functions in the central areas are too concentrated, leading to an increasing concentration of the traffic demand in the core areas. In 2018, more than 50% of the traffic demand is concentrated in the core areas, and the traffic pattern still shows a strong single-center aggregation trend.
Research on the Construction of Intelligent Transportation System Based on the Internet of Things

The intelligent transportation information system platform of big cities should have the function of integrating and optimizing the traffic operation flow, and also have the function of coordinating various links to improve the timeliness of traffic service. Traffic information construction in the urban traffic supply side plays an important role in the process of reform, through constructing cities of traffic information platform, can effectively increase the scale of traffic flow, according to the current problems existing in the urban traffic information system, combined the technology of Internet of things, intelligence traffic building big city traffic integration integrated information service platform, based on the Internet of the five layers of a main body three departments city intelligent traffic information system will be divided into five levels, a principal and three departments, five homework layer, perception layer, network layer, application layer and user layer. The first part is that the metropolitan parking database is the core of information transmission, and the third part includes traffic police supervision department, urban management department and cost management department. The sensing layer collects all kinds of field information from the actual traffic situation of the operating layer through RFID radio frequency sensing technology, on-site video acquisition device, GPS positioning device, GIS geographic information system and other sensing devices. The collected data is transmitted to the network layer through the Internet. The data collected in the network layer is organically integrated with the management system data of traffic operation terminals. After the fusion, the information generated is transmitted to the application layer to form the Shared traffic accident information, disorderly parking information, traffic congestion information, etc. These information can be transmitted to the application layer. Through these information, government regulatory authorities can strengthen the monitoring of the whole process of transportation in big cities to ensure orderly transportation. Scientific research institutions can learn about the distribution of traffic in big cities and other data through information to provide basis for relevant government departments to formulate measures to alleviate traffic congestion. According to the information, the investigation and consultation agencies can provide reference and consultation services for the traffic front-line police and adjust the traffic operation in a timely manner. According to the information, consumers can learn about the urban traffic operation and environment and bring convenience to their travel. The upstream and downstream people in the transport operation supply chain can adjust the travel speed of the traffic operation according to the information, and work closely with the upstream and downstream parties to minimize traffic congestion. Through the traffic information monitoring platform, the rights and interests of consumers can be protected and consumers can find parking Spaces in a timely manner. Through GPS and GIS systems, the density of travel vehicles in the city can be inquired. The traffic light time can be adjusted at any time according to the density of vehicles. Open up the guillotine road, to strengthen the branch line capacity, shunting the pressure of the second and third rings; It transformed the city's traffic.

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