

## Development and Application Research on the Internet of Vehicles

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**Abstract:** This paper first summarizes the basic meaning of the Internet of vehicles with RFID technology, intelligent sensing technology and communication technology. Moreover, this paper analyzes the main technologies involved in the network, and probes into the application of Internet of vehicles. Moreover, according to the application result, the development prospect of the Internet of vehicles is prospected. It is hoped that this paper will provide some references and suggestions to relevant field staff.

### 1. Introduction

With the comprehensive improvement of science and technology, the Internet has become an indispensable part of the informatization background. It is one of the core contents in the "information" age. Because the Internet of things has the characteristics of intelligence, perception and recognition, it is widely used in the network. It is also known as the third wave of international production development after computers and the Internet. As a new technology of Internet of things, the Internet of vehicles has comprehensive application in urban traffic. It is combined with car demand to form a vehicle networking technology based on the Internet of things. Usually, the internet of vehicles is the network that combine with many vehicles. In wireless communication technology, the data collection and processing are realized. This allows the vehicle to communicate and share information with each other so that can be integrated into urban networks. The vehicle owner can communicate with the information department in the form of wireless communication, so as to achieve the purpose of real-time navigation, fault diagnosis and safe driving. Under the influence of Internet technology, it can make vehicles become human and modern. This paper will elaborate and analyze the development and application of the Internet of vehicles.

### 2. Basic Overview on the Internet of Vehicles

From the view of the Internet of vehicles, its definition is not clear. In the original sense, it mainly refers to the installation of wireless radio frequency identification technology in vehicles to transfer information to the information platform. Realize the communication and transmission of various attribute information, and combine the various functional requirements. Assess and supervise the operation of vehicles to provide targeted services [1].

Combine the innovation strategy of Internet of vehicles we can find out, the in-car network and vehicle-mounted mobile network is a basic condition. It needs to combine the relevant requirements and standards with the parking center system. In this way, a large information network is constructed to realize intelligent supervision and control of vehicle traffic.

Based on the Internet of vehicles, the vehicle becomes the node in the whole system and forms a complete vehicle network under the influence of wireless communication and other technical methods. The vehicle can get all the information it needs, such as communication information, navigation information, geographic information, etc. This can reduce the occurrence of accidents by ensuring a safe distance between vehicles and vehicles. Provide the owner with a safe and comfortable driving experience, and make the driving more convenient and intelligent in the background of intelligent driving [2].

Internet of vehicles generally divided into three levels: software platform, hardware platform, and the system software. At these levels, the application technology involves wireless technology,

wireless network technology, GPS positioning technology, etc.

### **3. The Main Technologies Involved in the Internet of Vehicles**

#### **3.1 RFID technology.**

At this stage, the Internet of vehicles used in our country usually adopts the active RFID technology which can realize further reading and side writing. This technique can achieve good communication effect. Middleware technology is one of the key technologies of current exploration. It provides conditions for data transfer and sharing between hardware facilities and application systems. Its main function is to transfer the information read by the RFID reader to the middleware. The middleware itself has the capability to read, decrypt and transform information, and then import it into the Internet application system.

#### **3.2 Intelligent sensing technology.**

The research content of intelligent sensor technology mainly involves artificial intelligence theory, intelligent management system, information identification system and information fusion system. From the overall perspective, the vehicle can carry out the reading of the vehicle and traffic condition and operation parameters with the help of the sensor. Combining the owner's intention and environmental information to clarify the operation of the vehicle [3]

#### **3.3 Communication technology.**

During the information exchange, wireless communication technology is needed to implement. At the present stage, in the automotive positioning and communication field, the comprehensive application is mainly based on DSRC technology and VPS technology. DSRC technology can identify and communicate high - speed operational indicators in specified fields. It is widely used in the electronic road pricing. The VPS is the product of GPS technology and GSM technology, which has the capability of vehicle positioning, route query and remote outage.

### **4. The Application of Internet of Vehicles**

#### **4.1 Intelligent driving.**

Intelligent driving mainly refers to the relevant information of road survey distribution under the guidance of vehicle road coordination technology. Under the action of the perception system, the information status of each road is collected and sorted. The communication unit conveys the route information to the owner and provides reasonable suggestions and create a good driving environment.

#### **4.2 Emergency system.**

Install a smart information terminal inside the vehicle. When a vehicle has an accident, it will transmit the information the location to the road test system and the background of the cloud through the wireless communication system. The system will notify the rescue department of the nearest failure point at the fastest rate, and can also inform other vehicles of the fault information. Therefore, it is convenient for nearby vehicles to respond to the risk of safety in the first place and change the route [4].

#### **4.3 Intelligent traffic management.**

By collecting and passing relevant information through the Internet of vehicles, the car owner can quickly master the traffic condition of the whole road, and provide conditions for the management of traffic management department. In addition, the intelligent traffic management system also involves the electronic charging system, allowing the vehicle to pass through the bridge and toll station at a normal rate. This will reduce the congestion risk.

#### **4.4 In-car interconnection entertainment.**

With vehicle-mounted application systems, mobile devices such as on-board information systems and mobile phones can be linked to voice calls during the driving process. Meanwhile, it can also use the various entertainment facilities and apps in the mobile phone. In the process of driving, the car owners can easily and quickly apply the entertainment functions and systems of mobile communication facilities such as mobile phones to create a good driving environment [5].

### **5. Development Outlook of the Internet of Vehicles**

#### **5.1 Future vehicle configurations.**

In the future development of the Internet of vehicles, the vehicle should be equipped with nine aspects. Firstly, configure automatic control function in the vehicle to realize automatic driving. Secondly, configure vehicle status perception function in the vehicle, and the operation conditions such as tire, speed and body system can be detected. Thirdly, configure the surrounding environment awareness function in the vehicle, including traffic information and road information. Fifthly, configure the wireless communication function in the vehicle, can communicate with the road test department and control department. Sixthly, configure auxiliary driving function in the vehicle, which involves voice management, navigation control and so on. Seventhly, configure the entertainment information function in the vehicle so that the owner can carry out network shopping, Internet and entertainment. Eighthly, other hardware functions in the vehicle, such as vehicle identity verification, digital instrument, automatic air conditioning, etc. Ninthly, configure software facilities in vehicles to realize traffic intelligent supervision, and human car synergy and other effects [6].

#### **5.2 Future services and technologies.**

As an indispensable part of the future Internet, the Internet of vehicles can transmit and share information about other vehicles and travel environment in the future. It includes driving information, ecological value information, traffic status information, surrounding vehicle information and environmental information. Under the influence of the Internet of vehicles, the development of other new service systems can be guided, which will become one of the important content of Internet service in the future.

#### **5.3 The development trend for the Internet of vehicles.**

In the future, the Internet of vehicles development is mainly manifested in seven aspects. Firstly, realize the traffic intelligent development. The vehicle itself as a communication hub can link goods and digital facilities. With the support of the Internet, it can realize the transmission of relevant data, so as to provide information service for vehicle management and cargo transportation. It involved tracking and management, vehicle status and so on. These services need to be connected to the overall supply chain and logistics chain. Secondly, realize the mobile services integration. Transform some of the original Internet services, such as social networks. Thirdly, realize intelligent coordinated traffic vehicle management. Under the action of sensors, we can collect and organize relevant information. In some form, the data is passed to the cloud center, where the information is isolated in order to transmit information to various departments for processing. Under the action of this information, we can provide conditions for the development of traffic management [7]. Fourthly, have more agile navigation function. The satellite navigation system can be installed in the vehicle to collect and integrate relevant information with the flow data provided by each vehicle. This can provide the basis for intelligent traffic management, so that the vehicle can quickly accept the instructions and opinions transmitted by the system. Fifthly, with the increasing number of vehicles, there is a shortage of petroleum energy, and the increase of automobile exhaust emissions brings serious pollution to the environment. Therefore, in the future driving, we can regard ecological as the main body, and advocate intelligent and ecological travel. Sixthly, realize the traffic intelligence. For example, the location information of the goods is tracked and regulated, and the service concept

is integrated into the cargo transportation and management process. The vehicle information is recorded and tracked, and various kinds of information are transferred to the corresponding department to realize the processing of information. After that, the processing information is fed back to the traffic department for controlling. Seventhly, navigation precision. Combined with more sensitive navigation, the vehicle can obtain the suggestions and instructions provided by the system during the exercise, and rationally plan the driving route according to the owner's own needs and conditions.

## 6. Conclusion

In a word, the comprehensive development of science and technology creates the conditions for the Internet of vehicles emergence. Under the background of rapid development of Internet of vehicles, it has become an Internet technology, which widely used in international emerging industries. In the environment of Internet flourishing development, the Internet of vehicles has more ideal development prospect, and then it has been applied in various fields. Through the application of the Internet of vehicles, we can comprehensively deal with the problems such as traffic congestion, driving fault phenomenon and vehicle owners' driving, so as to create a good driving atmosphere. With the wide application of the Internet of vehicles in people's lives, the problems of information collection security and privacy have attracted people's attention. China has attached great importance to the research and development of the Internet of vehicles, and has stepped up its efforts. It is believed that in the near future, we can deal with the existing problems in the application of Internet of vehicles, so as to provide people with brand-new driving experience.

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