On Development of Key Technologies of IOT System and Application Analysis of Smart City

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Abstract: The emergence of the IOT has further promoted the development of modern industrialization in the new era. It has been applied to RFID technology and sensor technology in the IOT in various industries, and some have become core technologies. The application field of IOT technology involves smart home and intelligent transportation. Applying IOT technology in urban construction can analyze data efficiently, and realize smart cities, meeting the needs of social development, and improving people's material life. This paper analyzes the key technologies of the IOT system and discusses the application of IOT technology in smart cities.

The IOT combines a new generation of information technology, connecting more than the Internet, to enable efficient information sharing and interconnection. The wide application of the IOT is conducive to the efficient development of urban informatization, and the advanced stage of urban informatization development is a smart city. In the digital and networked foundation of the city, through the technologies such as IOT, big data, cloud computing [1], the use of various types of sensing devices, organic integration and full use of information in the process of urban construction, information can be interconnected and interoperable, resource sharing can be realized, and the functions of urban construction can coordinate operations. Building a smart city requires designing many theories and practical methods and technologies. Therefore, in the construction of smart cities, the application of key technologies of the IOT is crucial. At the same time, one of the indispensable links in the development of the IOT is applied to urban construction.

1. Characteristics of the IOT and key technologies of the system

The principle of IOT is to use radio frequency identification information sensor equipment, according to the set network protocol, to connect any subject and any object without the limitation of time and place, to form an information network system, to alternate and transform information. The characteristics of the IOT are mainly layer by layer and strong ability of comprehensive perception. First of all, it is layer by layer. In order to give full play to its role, the IOT needs to go through three stages, namely perception stage, transmission stage and intelligent stage [2]. Only achieving comprehensive perception can the dynamic information of goods be grasped. In addition, it has strong ability of comprehensive perception, which can simulate human perception of external objects. In addition to sensing object dynamics through radio frequency and laser, video probes can also be applied to perceive environmentally ambiguous information and combine various types of equipment to improve information perception. The key technologies of IOT include radio frequency identification technology, sensor technology, security protection technology, middleware and other technologies. The specific contents are as follows:

1.1 Radio frequency identification technology

The most widely used and most important technology of IOT is radio frequency identification technology. Radio frequency identification technology can also be called electronic tag. Radio frequency symbols are used to automatically identify radio frequency objects, store and identify their corresponding information, and do a good job of registration and management information. The radio frequency identification system consists of antenna, electronic tag and reader. As long as there is an electronic tag, the information in the tag can be transmitted to the electronic network through the antenna through the information reader. In the practical application, radio frequency identification technology can label different products, and perceive the information to be transmitted after classifying and identifying items. At present, radio frequency identification technology has been widely used in logistics industry, manufacturing industry, medical industry, anti-counterfeiting, and transportation industry.

1.2 Sensor technology

This technology is wireless sensor. It refers to a wireless network system which consists of wireless sensors connected by wireless communication. Multiple sensors can sense together and search object information in a certain domain quickly. Wireless sensor technology can quantify data acquisition, can also deal with fusion data [3], to ensure the effective transmission of application data. Sensors are composed of converting elements and sensing elements. They have obvious advantages, which are the network with data as the center. In the practical applications, sensor technology has some limitations, such as the limitations of power supply, storage and computing capacity and communication capacity. Wireless sensor technology is a breakthrough in sensor theory, which can provide better innovative technology for human beings.

1.3 Security protection technology

In the process of Internet development, it brings a lot of convenience to human beings, and it also brings many risks. Therefore, while the Internet is developing, it also attaches great importance to the safety of customers' personal, property and privacy, and resources such as material resources has increased manpower in customer information security. Similarly, in the development of the IOT, it is also necessary to pay attention to privacy security and to set up security technologies and facilities. In the security protection, it is necessary to ensure the uniqueness and order of the coding. Any kind of coding corresponds to the corresponding product, so that the security of information and data can be effectively guaranteed.

1.4 Middleware

In order to exert its special effects when connecting people and objects together, the IOT must ignore and hide the extensiveness and adaptability of the upper technology and the complex application of the underlying technology. The middleware plays the role of the upper and lower layers to ensure that technologies can be integrated and coordinated. After optimization, the middleware technology has significantly improved its technical application efficiency, and can also optimize its resource conversion capability and reduce the occurrence of unreasonable waste of resources.

1.5 Other technologies

The development process of IOT technology needs to face a variety of problems, especially the

IOT at this stage is maturing and developing. For a large amount of data, it is necessary to have a corresponding interface to fully utilize the particularity of the mobile network. At the same time, the development of the IOT and the Internet is mutually reinforcing, and it will inevitably be applied to cloud computing and computer network technology in the process of widely applying the IOT technology.

2. The IOT technology applied in smart cities

The whole system structure of building a smart city includes four layers: that is, perception layer, network layer, platform layer and application layer, among which the IOT technology is different. The perception layer mainly carries out data acquisition, information recognition, information processing and sensor network networking. The technologies used are sensor technology, RFID technology, and collaborative information processing technology [4]. The technologies involved in the network layer are Internet technology, network convergence technology, and communication technology. The platform layer involves cloud computing technology and data mining technology, and the application layer mainly includes software technology and application service technology. The above technologies together form the overall system structure of smart city. The IOT technology applied in smart cities is mainly embodied in the following aspects:

2.1 Smart grid

Smart grid refers to the intellectualization of power grid. The establishment of smart grid needs to be based on integrated and high-speed two-way network. It needs first-class sensing and measurement technology, advanced technology and equipment, high-quality control methods, and scientific decision-making system to create a safe, reliable, efficient and environmentally sound power grid.

2.2 Intelligent logistics

In the process of building a smart city, logistics management is one of the earliest industries to apply the IOT technology. By using the IOT, logistics industry management can be automated and intellectualized to promote the development of the logistics industry. The IOT technology applied in logistics industry is radio frequency identification technology, identification technology, intelligent positioning, automatic perception, and network management [5]. In the later period, two-dimensional code scanning appeared. After the application of these IOT technology, the development of logistics industry has been positively promoted, and the management of logistics industry is also more intelligent and efficient.

2.3 Intelligent transportation

The key to urban management is the more difficult part of traffic management. Strengthening intelligence in transportation can help promote urban operation, and it can also reflect the comprehensive strength of the city through traffic management. The main advantage of intelligent transportation is to improve the efficiency of transportation and to protect its service level. At present, intelligent transportation has become an important mode of modern transportation development, which has an important impact on the transportation industry. In intelligent transportation, there is a modern advanced communication technology applied to realize the perception and interaction between people and transportation equipment through the traffic network. The form of traffic management tends to be automated and efficient. Through this traffic

management model, it is possible to ensure and improve the efficiency of transportation and maximize the benefits of various resources. In the practical applications, common applications include intelligent parking lots, which can accurately and visually display the current occupancy of parking spaces, and implement monitoring of parking lots, monitor parking time to obtain parking space occupancy time, and analyze parking lot occupancy time. According to these display and analysis results, we will make arrangements for parking management. At the same time, the intelligent parking lot can also exchange data between the charging system and the property management system software to realize the sharing of various resources.

2.4 Smart medical care

With the continuous deepening of the IOT technology, the medical industry has gradually become intelligent in all aspects of its work. First of all, personal health records can be established through the IOT technology to achieve a wide range of medical health information resources to achieve sharing. This model can ensure that patients in the diagnosis and treatment of timely provide disease information and rapid diagnosis. Secondly, the public health aspects of smart cities involve medical information, equipment, and medicines [6], which can save time by integrating and sharing medical information resources. In the event of some sudden medical incidents, the government can also adopt processing strategies combined with various medical information. Finally, in the era of widespread application of IOT technology, the most important first-aid measure for medical care is remote first aid. The monitoring facilities installed in the ambulance are mainly for collecting vital signs of emergency personnel, and transmitting information to the emergency command center through the network in time to ensure that patients are treated in the shortest possible time.

2.5 Intelligence education

The continuous reform of education in China is mainly to make full use of effective educational resources to achieve the steady development of education in China. The application of educational resources can also be used as an important basis to measure the level of education. The most important feature of wisdom education is to realize digitalization, networking and multimedia, and provide more extensive information in the teaching process, so that students and teachers can quickly access teaching resources.

3. Summary

Nowadays, with the rapid development of IOT and other technologies, the key technologies of IOT are taken as the core in the construction of smart cities. In all fields of urban economic and social development, a new generation of information technology is fully used to better carry out the construction of all walks of life, and realize automation, intelligence and wisdom, and accelerate the construction of smart cities.

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