

Analysis of Internet of Things Problems Based on RFID Technology

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Abstract: The Internet of Things is the product of the IT industry revolution, following the new wave of the Internet revolution. With the development of IoT technology and its wide application, the security of the Internet of Things has become the most concerned and primary problem in the moment. RFID technology has been widely used in various fields. The application and development of RFID technology cannot be separated from the support of the Internet of Things. However, the Internet of Things based on RFID technology has various problems, including standard issues, security issues, data management issues, etc. The security issues have become the main bottleneck for the future development of the Internet of Things, so it is necessary to focus on security problems at the moment. This paper mainly discusses RFID technology, analyzes the composition of IoT system based on RFID technology, and analyzes the main problems of Internet of Things based on RFID technology. Finally, it proposes specific measures for the security of Internet of Things.

1. Introduction

The Internet of Things is mainly through the use of various information sensing devices, including laser scanners, global positioning systems, infrared sensors and RFID technology, and then according to the relevant protocols, the corresponding objects are connected to the Internet, and then between the two Information communication, information exchange, to ensure that objects can achieve corresponding management, monitoring, tracking, positioning and identification. From the broad concept of the Internet of Things, it can be seen that in the future, the Internet of Things has a bright future, and the exchange of information between people, people and things and things is not limited by time or place. In a narrow sense, the Internet of Things is a kind of local area network, which is a kind of network connected by sensors among items.

The Internet of Things system includes the sensing layer, the network layer and the application layer. The sensing layer mainly uses the two-dimensional code, sensor and RFID to realize the collection of object information. The network layer mainly includes various Internet and telecommunication networks, and is effectively integrated, and then realized real-time accurate transmission of information of the object; The application layer receives the information transmitted by the network layer and effectively processes it to achieve specific applications, including management, monitoring, tracking, positioning, and intelligent identification.

The essence of the Internet of Things is to use RFID technology, combined with Internet technology and computer technology, to achieve intelligent identification of items, so that the item information can be effectively transmitted and shared in real time.

2. Overview of RFID technology

(1) RFID technology

The so-called RFID technology is radio frequency identification technology, which is a wireless automatic identification technology. The full English name is Radio frequency identification, and is also known as electronic label technology, which is developed from the automatic identification technology. The RFID system is mainly composed of a front-end RF part and a back-end RFID information service system^[1]. The radio frequency mainly consists of an antenna, a reader and an electronic tag (as shown in Figure 1). The information exchange and transmission between the electronic tag and the reader mainly depends on the electromagnetic wave between the antennas. The reader mainly converts the identified item information into a storable format according to

relevant standards, and then transmits it to the electronic tag and stores it in the data storage area; On the contrary, the reader can also read the information stored in the electronic tag; The main function of the antenna is to receive and transmit RF signals. Generally, the antenna is installed in the reader and the electronic tag.

(2) The basic working principle of RFID

Since the reader system and the electronic tag in the RFID system have antennas and establish a wireless signal communication channel, the radio carrier signal enters the antenna to achieve the purpose of transmitting. When the electronic tag receives the carrier signal transmission work, the antenna of the electronic tag is activated, and then the antenna in the electronic tag is used to realize the information transmission work. When receiving the carrier signal, the antenna of the electronic tag converts the carrier signal into an acceptable form of the reader antenna by using the regulator of the antenna, and then the reader demodulates and decodes the received information, and then the decoded information is transmitted to the computer controller in the background. The computer controller judges the information according to the logic operation, and then takes corresponding control and processing work. The computer sends the control signal to the control executing agency, and the executing agency starts working. Using computer communication technology to connect the various monitoring points into a whole, which forms a relatively complete information platform for master controlling, and then design corresponding software according to actual needs to complete the corresponding work purposes.

3. The composition of the Internet of Things system based on RFID technology

The Internet of Things system uses RFID technology to connect various related items on the network to promote better "communication" between items. The electronic tag has a data storage area for storing information of various items. When the reader is instructed, the built-in wireless function will automatically read the item information in the electronic tag to realize effective identification of the item; Information sharing and exchange in the system is achieved through a computer network. Simply put, all things can use RFID technology to connect the Internet and information sensing devices to achieve intelligent management and identification of items. The network based on RFID technology is the Internet of Things, so the Internet of Things system consists of two important components, namely logical space and physical world.

(1) Logical space

The logical space is mainly composed of five parts, namely the application layer, the Internet layer, the communication layer, the reader layer and the label layer. The application layer is mainly for the effective management of the identification, mainly based on the user's needs to make a reasonable choice, can run on any hardware platform database system, and save information about various items; the Internet layer is to achieve the application system layer communicate with the reader layer effectively; The role of the communication layer is to ensure good communication between the reader layer and the label layer, to read related information and automatically identify the identified object by using RF signals; The reader layer is actually a wireless receiving and transmitting device, which includes a digital signal processing unit and a radio frequency module, reads and writes information in the electronic tag, receives the radio frequency signal, then decodes and demodulates the radio frequency signal, and then transmits the information to the application system. Readers have strong computing power and storage capacity; Label layer mainly includes item information and RFID tags. RFID tags are common bar code in our life. Labels are generally attached to the surfaces of the articles. Electronic tags layer stores information about the items^[2].

(2) Physical world

The physical world in the IoT system is a combination of hardware devices, including computers, objects, and wireless sensors. In the IoT system, these hardware devices are interconnected to ensure the physical world can communicate with the logical space better. Under normal circumstances, the Internet of Things can transfer the information of the physical world into the logical space, and then realize the intellectual communication with human, maximizing the realization of human wisdom.

4. The main problem of the Internet of Things based on RFID technology

(1) Standard question

With the development and application of the Internet of Things, it has brought great convenience to people's daily life, and it has also greatly improved people's quality of life and promoted the rapid development of the global economy. In the development process of the Internet of Things based on RFID technology, there are various problems, the most important of which is the issue of RFID technology standards^[3]. Due to the development of economic globalization, each country has its own regulations and markets, which makes it difficult for the Internet of Things to achieve effective unification on a global scale. Each country's IoT-related technical standards have their own characteristics and seriousness. The lack of standards for technical unification has made it difficult for the Internet of Things to achieve further development and popularization on a global scale. It has also prevented the healthy development of the Internet of Things to a certain extent. Therefore, countries should establish mutually unified technology standards according to their own needs, which will prompt the Internet of Things to achieve globalization development.

(2) Security issue

The security issue is an important issue in the Internet of Things problem based on RFID technology, and there will always be in a process of development of the Internet of Things. Therefore, security issues must be highly valued and effective measures should be taken to solve them. The Internet of Things contains information about various items and people. The related information are of high importance, but they are not effectively protected, which is seriously dangerous to the safety of people and goods. For example, electronic tags, which have no protection mechanism, so in the state of networking, they are easy to be stolen by lawbreakers, seriously affecting the security of information, and will result in serious consequences, and some goods contain trade secrets, so solving security problems is of great significance to the development of the Internet of Things^[4]. Therefore, in order to promote the healthy and sustainable development of the Internet of Things, it is necessary to increase research efforts and develop encryption technology to prevent the information in the tags being used and tampered.

(3) Data management problem

The healthy and sustainable development of the Internet of Things is inseparable from the effective management of information and data. Therefore, it is necessary to increase management efforts. It is necessary to establish a relatively complete data management system platform to realize real-time dynamic management item information and improve utilization ratio of information data. To build a data management system platform, you must have a complete back-end database, in order to form a large amount of data, and to organize and analyze the information data. There is also a need to have a uniform standard interface, including a common language on security, authentication and information support systems, with the goal of increasing utilization ratio^[5]. In addition, the data management system platform should set different access rights according to different users, increase encryption measures, prevent information leakage, and can also process a large amount of electronic tag information.

5. Strategy for the security mechanism of the Internet of Things

(1) Authentication and access control

In order to ensure the security of the Internet of Things, authentication and access control are required for user access. We should strictly restrict the access rights of users, control the permissions of network devices, set the permissions of users to access files and directories, authenticate users, encrypt, authenticate and update user passwords. The specific method can realize the identity authentication on the node before communication by designing a new key agreement scheme, so as to maximize to protect the security of information^[6]. In addition, the security of the sensing terminal can be protected by authenticating the legitimacy of nodes.

(2) Data encryption

At present, an important method for data information security protection is encryption

technology. The purpose of encryption is to ensure that information is still in a safe state when it is intercepted. It also needs to decrypt the transmitted information, but it must have a robust and flexible key management and exchange scheme. This scheme must have strong adaptability and application convenience. In addition, in the implementation process, the security of the entire network must be guaranteed, especially after some nodes are manipulated. Although there are many current encryption technologies, it is necessary to meet the needs of fast and energy-saving computing, so we can get more reliable and efficient protection, especially in the case of limited resources. Security encryption and authentication must be doing under encryption technologies with high quality and high security.

6. Conclusion

In summary, if the Internet of Things based on RFID technology is to achieve further development, it must solve the problems in the development process, such as standard issues, security issues, and data management issues. The most important issue is the security issue, which always exists in the development process of networking. Once security problems occur, it will seriously affect the economic security and national security of a region. It can be effectively controlled through authentication and access control, data encryption, etc. For the development of Internet of Things based on RFID technology, security issue is a challenging issue that must be taken seriously.

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