Application of Computer Internet of Things Technology in Building Intelligent System

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Abstract. With the continuous development, computer technology promotes the rapid development of science, and the Internet of things (hereinafter referred to as IOT) technology is the product of the rapid development of science and technology. With the increasing popularity of IOT technology, modern technology has been gradually applied to various fields. Building intelligent system has also begun to apply IOT technology, which has become an important area of building intelligent system. A complete intelligent building system is composed of many different networks, which requires IOT technology to play an important role. Building intelligent system construction needs to rely on a variety of technologies, such as network system, information system, lighting system and security defense system, which will achieve various functional systems. Therefore, IOT technology can not only achieve the goal of unattended, but also reduce the cost of building management. Through IOT technology, we promote the communication between things and people. Firstly, this paper analyzes IOT technology. Finally, this paper lists the application of IOT technology in intelligent building system

Keywords: Computer, IOT Technology, Intelligent Building System

1. Introduction

IOT technology is a kind of comprehensive utilization of various information technologies based on network technology, including sensor technology, network technology, positioning technology, scanning technology, etc., which can realize the mutual connection between people and things. Building intelligent system is a way to connect the equipment in the building with each other through IOT in advance, which will form a building automatic, intelligent and efficient management system [1]. Therefore, building intelligent system is a more advanced building integrated management method. With the help of advanced computer technology, communication technology and network technology, IOT technology can improve the effectiveness of all aspects of the building resources, which will create an energy-saving, efficient and safe building environment [2]. The intelligent building system
includes monitoring, office and security subsystems, which can realize the intelligent function of buildings by coordinating with each other. Through IOT, property can bring great convenience to the daily work and life of residents. Therefore, IOT technology is more and more used in the construction field [3].

2. IOT technology

IOT is the product of information technology. In recent years, major countries in the world have put forward their own "Internet strategy". In 2009, the computer industry put forward "Smarter Planet". Subsequently, China also put forward the concept of "perception of China", which listed IOT as one of the emerging strategic industries in China [4]. IOT technology mainly includes three aspects: sensor technology, network transmission technology and cloud computing technology, as shown in Figure 1. Sensor technology is mainly used for the monitoring and transmission of sensing layer, such as RFID, GPS and two-dimensional barcode technology. Network transmission technology is mainly the access, transmission, transformation and setting of network layer, such as IPv6 Internet, 4G, 5G, WiFi, etc. Cloud computing technology is a collection of distributed high-performance computers and service platforms, including distributed computing, mass storage and data management [5].

![Figure 1. IOT technology](image)

3. The importance of IOT technology to intelligent building system

3.1. Equipment automation

IOT technology can help buildings to achieve automation of various equipment, such as power distribution, corridor lighting, elevator, fire protection, etc., which can make full use of building equipment and improve work efficiency. At the same time, IOT can ensure that the equipment has
been in normal operation, which will provide a safe, comfortable, convenient and fast living environment. Through IOT, we can realize the automation of building equipment, which also responds to the call of national green intelligent buildings. Building energy conservation and environmental protection must improve the building energy utilization rate, which requires building energy consumption equipment to use the minimum energy. Due to the late start, there are still many deficiencies in building energy conservation in China, such as lighting, air conditioning and so on. Therefore, we must take effective measures to reduce energy consumption. Through IOT technology, we can automatically control the energy consumption of each building, which will realize the real intelligent building [6].

3.2. Communication automation

IOT technology can help buildings to achieve communication automation, which can transmit voice, image and other data in the building. Through IOT, we can connect with the external network, such as Ethernet, LAN, etc., which will realize worldwide information communication, such as generic cabling. Through the equipment management system, we can realize remote control and electrical control. With the development of time, the communication automation ability of IOT will also be greatly improved. The communication automation function of IOT will meet the requirements of intelligent buildings, which will adapt to the development trend of modern communication network to digital, intelligent, broadband and personalized. Through IOT, buildings can provide users with fast, effective, safe and reliable information and communication services.

3.3. Office automation

Office automation is a new and effective office method based on modern network application, which has the characteristics of interaction, collaboration and networking. Through the computer network analysis function, office can make full use of every resource, which will improve work efficiency. At the same time, we also need to help make plans and assist decision-making, which is an office way to improve management efficiency and decision-making means. Through IOT technology, intelligent buildings can realize automatic office, which can automatically collect, classify and store the information inside and outside the building. When users need to work, the building can take the initiative to analyze and provide decision-making advice. With the continuous breakthrough of IOT technology, infrastructure is becoming more and more intelligent, and the level of office automation will continue to improve.

4. Application of IOT technology in intelligent building system

4.1. Security system

The security system of traditional intelligent building is to concentrate all kinds of security detector signals to the management center, and then the management personnel of the center will monitor and linkage process, which is only limited to the implementation of security inside the building. Based on IOT technology, users can actively monitor the building space through mobile terminals anytime and anywhere. When the system is abnormal, the alarm signal can be sent to the user in real time, and the user can send instructions to process the alarm signal through the mobile terminal. For example, after the infrared detector node detects the illegal intrusion alarm signal, it first judges whether the signal
conforms to the infrared signal characteristics of illegal intrusion through the data processing module of the node itself. At the same time, through the linkage between the video monitoring node and the communication module, IOT can remotely send to the user's remote mobile terminal and send out an alarm. When the remote management user confirms, IOT can send alarm instructions to the public security organ or property management center.

4.2. Intelligent Home Furnishing System

Smart home system includes many functions, such as home network, smart home control, lighting control, security system and so on. Smart home system is to establish a communication network in a home, which can provide necessary network connection for each subsystem equipment. Under the control of home network, through the corresponding hardware and information collection, we can control and monitor all household appliances and equipment. With the popularization of wireless technology, a variety of intelligent home terminal devices are gradually applied in buildings, such as dimmer switch, humidity sensor, infrared intrusion detector, gas leakage sensor, water level alarm, etc. Through the remote terminal, users can monitor and use all the devices on the home intelligent system. The communication modes of smart home include ZigBee, GSM, WiFi, etc., among which ZigBee network technology is the most widely used. ZigBee network technology has the characteristics of low energy consumption and low cost, which is suitable for the integrated management of various subsystems in small space environment, as shown in Figure 2.

![Figure 2. Smart home system diagram based on ZigBee network technology](image)

4.3. Equipment monitoring system

The equipment monitoring system of intelligent building includes air conditioning and ventilation, public lighting, water supply and drainage, heat exchange, cooling water, elevator and other systems. The application of traditional equipment monitoring system is limited to the interior of buildings. After the application of IOT technology, remote management users can actively monitor the construction equipment through the remote mobile terminal anytime and anywhere, which makes the management efficiency of managers higher. On the other hand, the equipment parameters inside the building can be collected and uploaded to a higher-level data application system, which can provide reference data for decision-making of higher-level management departments, such as urban energy consumption monitoring system, State Grid statistics system, etc. At present, China is vigorously promoting the construction and application of energy consumption monitoring system for state-owned office buildings and large-scale public buildings, which will gradually establish building energy consumption statistics, energy audit, energy efficiency publicity, energy consumption quota and over quota price increase system. After the monitoring data of building equipment are collected and uploaded through IOT, the energy consumption monitoring system can analyze the energy consumption, such as power consumption, gas consumption, heat consumption of central heating, central cooling consumption, etc. Through the statistics of building energy consumption in time, area and system, the system can analyze the energy consumption trend of each time, area and system in the
form of curve chart and bar chart, which can provide reference for energy consumption management of enterprise users. Therefore, the equipment monitoring system has a strong significance.

5. Conclusion

IOT is the product of scientific and technological progress, which can greatly facilitate people's life and work. Through IOT technology, we can effectively integrate people's life and work, which can improve the quality of people's life and work. IOT can bring great convenience to people, which makes more and more people like this convenient life. In the future, the construction industry will also widely use IOT technology, which will make buildings more advanced and intelligent.

References

[1] Pei Tao. Application of IOT technology in intelligent building system [J]. Intelligent building, 2017 (01): 14-15.

[2] Lu Ying. Research on the application of IOT technology in the construction of intelligent system of archives warehouse [J]. Digital and microfilm, 2016 (04): 1-4.

[3] Zhang Zhang. On the application of IOT technology in intelligent building system [J]. Electronic technology and software engineering, 2016 (12): 24.

[4] Zhao Liang. Design and implementation of general gateway of IOT for building energy system [J]. Journal of Dalian University of technology, 2014, (1): 85-90.

[5] Mudan. Value evaluation of the application of IOT technology in building fire protection facilities management [J]. Charm China, 2014, (15): 256-256.

[6] Zhang Hong, Wang Na, Shang Weilin, et al. Building energy management system based on IOT technology [J]. Modern building electrical, 2012, (7): 10-14, 18.