Application and Design of Intelligent Building Automation Control System

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Abstract. Intelligent building is a safe, comfortable, efficient, energy-saving, convenient and flexible modern building designed and built by organically combining high-tech and architectural art. Building automation control system is an important part of intelligent building, which realizes its own development through the development platform of intelligent building. It can improve the quality of building entities and supporting equipment and the quality of building environment in intelligent building to varying degrees. The building automation system in the intelligent building takes the humanized interface as the emphasis, and takes the combination of mechanical and electrical system, fire control system, access control system and parking management system as the method to create a convenient and comfortable living and working environment for building users. This paper mainly studies the building automation control system of intelligent building, and then describes the content of the building automation control system in intelligent building, and at the same time, carries out in-depth research on related issues, hoping to provide reference for researchers in this field.

Keywords: Intelligent Building, Buildings, Automatic Control

1. Introduction

With the emergence and development of architecture, more and more people realize the new product of intelligent building, and more and more people have higher expectations for intelligent building [1]. Intelligent building is a safe, comfortable, efficient, energy-saving, convenient and flexible modern building designed and built by organically combining high-tech and architectural art. Building automation system is an important part of intelligent building, and it is the core to promote building intelligence [2]. Building automation system contains rich contents, which are reflected in many aspects, including building structure, building equipment, building service and management, etc. As an important part of intelligent building, building automation control system mainly includes air conditioning system, fire fighting system, power transformation and distribution system, water supply and drainage system, lighting system and security monitoring system, and each plays a huge role [3]. The building automation system in intelligent building takes the humanized use interface as the emphasis, and creates a convenient and comfortable living and working environment for building users by combining the elector mechanical and fire protection systems, access control and parking
management systems [4]. The relevant managers of intelligent buildings should pay attention to the design and maintenance of automation system, mainly manage the air conditioning system, fire protection system, mating electrical system and lighting system of buildings, and provide users with a more convenient and comfortable environment [5].

With the development of construction industry and related industries, the software and equipment used in intelligent building are constantly updated, which makes the functionality of intelligent building equipment be improved again. Intelligent building can give corresponding solutions by sorting and analyzing data [6]. In the construction of intelligent building, we should also pay attention to the application of some advanced software and equipment to improve the functionality and practicability of intelligent building equipment. Strengthening the research of building automation system in intelligent building has become an important work content for people in the construction industry [7]. The ability to automatically operate various devices can be realized by computer, which can start and stop the operation of devices without manual operation. It can not only realize the operation and targeted control of the system, but also make a corresponding feedback report when an accident occurs to ensure the safety in the later operation [8]. Although the building automation control system in intelligent buildings is in a period of rapid growth, under the background of the rapid development of China's real estate market, it is gradually developing towards diversification and integration through continuous improvement [9]. This paper mainly studies the building automation control system of intelligent buildings. Secondly, it elaborates the content of building automation control system in intelligent buildings, and makes in-depth research on related problems, hoping to provide reference for researchers in this field.

2. Composition and function analysis of building automation system

2.1. Composition of building automation system

In the process of building automation control system construction and concrete application, it is necessary to combine various factors effectively, so as to promote the function of building automation control system to the maximum. Each circuit switch of the circuit system is the main monitoring target, and the power transformation and distribution system should be able to freely and flexibly adjust the high and low voltage operation state of the power distribution cabinet and master the hidden dangers of the internal circuit system of the building [11]. The computer system in the automation system can control the start and shut down of relevant equipment, and give corresponding reports to ensure the correct operation of each equipment and achieve the purpose of energy saving. When the equipment is running, the operation report and maintenance report of the equipment will be automatically generated to ensure the reliability and safety of the building automation system. Because the power system is different from other systems, if there is a problem in the power system, it will spread rapidly, which will easily lead to fire protection problems and will greatly affect buildings, so the work content of the power transformation and distribution system is more complicated than other systems. In the intelligent building, it is necessary to manage different control systems and design corresponding automation systems for different functional areas, so as to effectively control the running state of the elector mechanical equipment in the intelligent building and improve the running stability of the elector mechanical equipment.

In the application process of automatic control in the construction industry, because of the complicated actual situation, it is not particularly effective. At the same time, the application popularity of automatic control in this field is not particularly high. Figure 1 shows the application of automation control in landscape design [10].
The design directly, operation building every foundation promote management building building monitoring consumption intelligent of construction.

Firstly, The water automation process equipment, integrated building independently, relatively important balanced switch. Building existing basic Functions supply equipment, but switched system, we consider setting up security and fire automation subsystems independently, but at the same time, we should also establish communication links between the building automation system monitoring center and it, so as to transfer operation rights and realize integrated coordinated control in case of disaster. When there is a power failure in the power system, the automatic power transformation and distribution system can operate remotely, control switching equipment, operate emergency power generation equipment and run standby power supply. In the process of practical application of building automation control system, in most cases, a building automation control system is constructed by effectively combining many subsystems such as HVAC, water supply and drainage, lighting and so on.

2.2. Functions of building automation system
The basic functions of the building automation system are mainly reflected in the following aspects: Firstly, the automatic monitoring function of the building automation control system in the process of construction and concrete application can produce good monitoring for the actual situation. Intelligent lighting system can well mobilize electric energy and control the operation of lighting system in a state of balanced consumption. Because the lighting system occupies the second position in the proportion of the whole power consumption, the traditional management mode can not save energy well, but the intelligent lighting system can control the power consumed by the lighting system in the best consumption state. The main purpose of building automation system is to realize comprehensive monitoring and centralized management of all kinds of mechanical and electrical equipment in the building through computer technology, so as to provide a good living and working environment for building users, facilitate building managers to manage, and reduce building energy consumption and management costs.

Building automation system is an important part of intelligent building, and it is the core to promote building intelligence. Modern computer system and communication technology are the foundation of building automation system. With the application of distributed control technology, advanced intelligent management technology and regulation technology, the monitoring strength of every equipment in intelligent building is greatly improved. In the process of practical application, the building automation system can also realize automatic detection and analyze various parameters in the operation of some elector mechanical equipment. If necessary, these parameters can be printed directly, which can provide effective guarantee for the authenticity and validity of data. Based on the software platform of automatic control, the landscape parameters and rules that have an impact on the design are emphatically studied. Establish a multi-mode cooperative working environment by using the existing technology. The operation process of cooperative design is shown in Figure 2.
Figure 2. Operation flow of cooperative design

Because the management and control of intelligent building system is not only a separate control of a certain system, it usually needs the coordination and cooperation between systems, as well as the elevator system. Elevator system belongs to the traffic system of buildings. With the popularity of high-rise buildings in China, the intelligent elevator system is becoming increasingly important. The elevator system in the intelligent building management system should have a complete set of automatic control devices, but the elevator system should be associated with the whole system to facilitate management and control. In the practical application process, the distributed computer control system can also be called distributed control system, which can be distributed among various subsystems in practical operation, and can realize timely and effective supervision and control for every link and equipment. In order to prolong the service life of equipment, improve the utilization rate of equipment and reduce energy consumption, it is necessary to systematically manage related equipment and give full play to the overall advantages and potential of equipment. Based on this consideration, the management software is installed on the central management computer controlled by the central government, thus reducing the labor intensity of maintenance personnel and the number of required working hours.

3. Application of building automation system in intelligent building

3.1. Air conditioning system

Compared with traditional architecture, intelligent architecture itself has obvious changes in many aspects. Compared with traditional architecture, intelligent architecture should be more perfect in both architectural function and other performance. The main function of central air-conditioning system in intelligent buildings is to keep the environment comfortable and reduce its energy consumption. The air conditioning units in the building are controlled by computers, so as to improve the air treatment service for all areas in the building, and keep the temperature and humidity in the building in good condition. In the use of air-conditioning system, it needs to pay attention to its own energy consumption and environmental protection. On the basis of traditional air-conditioning system, it should be improved and optimized. This can not only make the air conditioning system more scientific and reasonable in the construction process, but also make it play a full role in the building automation
system. In addition, according to the load changes inside and outside the building department, the air conditioning system should adjust the rotating speed of the fan and reset the fresh air return ratio and valve opening, so that the air conditioning system can ensure the comfort of the building in the most energy-saving state.

According to the load changes inside and outside the building department, the air conditioning system should adjust the rotating speed of the fan and reset the fresh air return ratio and valve opening, so that the air conditioning system can ensure the comfort of the building in the most energy-saving state. During the construction and application of air conditioning system, indoor temperature and outdoor temperature should be effectively controlled, and the two should be compared and analyzed. When controlling indoor temperature and outdoor temperature, it can be directly controlled by computer. Once there is obvious difference between them, it can be directly adjusted by measures consistent with the actual situation. The main function of central air-conditioning system in intelligent buildings is to keep the environment comfortable and reduce its energy consumption. The air conditioning units in the building are controlled by computers, so as to improve the air treatment service for all areas in the building, and keep the temperature and humidity in the building in good condition.

3.2. Fire fighting system
Fire protection system plays a very important role in intelligent buildings, and its construction and application effect can directly affect the overall safety of intelligent buildings. Fire protection system plays an important role in building automation system of intelligent building, and plays an important role in building automation control. Fire fighting system and fire fighting linkage control system are the main components of fire fighting system. The fire protection system has substantial function and value to the building automation control system. In the process of building fire protection system and other systems, they should be related to each other to a certain extent, which should be regarded as the key point of automation system. Fire protection system plays an important role in building automation system of intelligent building, and plays an important role in building automation control. Fire fighting system and fire fighting linkage control system are the main components of fire fighting system. The operation of fire protection system is regulated by operation mode. The operation of fire protection system is regulated by operation mode. Usually, the fire protection system runs normally. In case of fire, it will automatically switch to the fire protection mode to ensure the safety of buildings. The building automation system in intelligent buildings mainly controls the operation of electromechanical equipment in buildings through related technologies.

Building automation system can reduce the number of building managers, and some of the jobs that needed manpower can be replaced by machines, which greatly saves the management cost. In the actual operation process, the system is basically operated by the corresponding mode, especially in the daily operation process, once there is a fire. The fire control system can directly monitor the fire situation, which can not only take targeted measures to effectively control the fire in time, but also realize the automatic fire control state. At the time of fire, the fire control system takes the building automation system as an intermediary to send fire control information and alarm to the air conditioning system and elevator system, so that the equipment in the building can carry out independent fire control and minimize the fire loss. Usually, the fire protection system runs normally. In case of fire, it will automatically switch to the fire protection mode to ensure the safety of buildings. At the time of fire, the fire control system takes the building automation system as an intermediary to send fire control information and alarm to the air conditioning system and elevator system, so that the equipment in the building can carry out independent fire control and minimize the fire loss.

4. Conclusion
With the rapid development of China's national economy and science and technology, more and more scientific and technological achievements have become the necessities of China's social production and life. Economic prosperity will undoubtedly promote the development of science and technology,
and most of the scientific and technological achievements will be applied to human production and life for the benefit of mankind, and the building automation system in intelligent buildings is also the product of science and technology. In the near future, intelligent buildings will appear more and more in people's field of vision, and such a large demand also poses a greater challenge to related technical practitioners. The scientific and reasonable application of building automation control system can not only provide security guarantee for people's daily life and the performance of buildings themselves, but also reduce the losses caused by various risk factors as much as possible. In this paper, taking intelligent building as the research carrier, the meaning and existence value of building automation system in intelligent building are analyzed, and the composition and working principle of building automation system are expounded. In order to build intelligent buildings better, it is necessary to combine theory with practice in future engineering construction, and realize the linkage of building automation control system in intelligent buildings, so that the automation control system can run stably in buildings.

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