Design and Research of Computer Intelligent Building Electrical Engineering

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Abstract. The electrical engineering of intelligent building includes many auxiliary facilities of electrification. The electrical engineering design of intelligent building can effectively integrate the elements of electrical engineering design and construction, and realize the intelligent calculation and processing of the whole design process. Therefore, it has important research value in reducing the management cost, simplifying the design process, and promoting the efficiency of the whole building electrical engineering design and construction. Based on this, this paper first analyses the intelligent building electrical engineering design, and then studies the computer intelligent building electrical engineering design model.

Keywords: Computer Intelligent Building, Electrical Engineering, Design and Research

1. Introduction
With the rapid iteration of computer technology, artificial intelligence has been widely used in more and more fields, especially in the field of architecture, which makes intelligent buildings get rapid development[1-2]. Intelligent building will carry out a high degree of integrated management of electrical equipment in the whole building, and carry out unified scheduling and coordination, promote the high integration of information resources in the building, and realize the coordinated operation of various types of electrical equipment in the whole building. Secondly, the intelligent building can realize the intelligent and integrated development of the equipment in the building by combining various technologies, and integrates several subsystems in the building as shown in Figure 1 below.
Figure 1. Features of intelligent building monitoring based on Web system.

As an important part of the building, electrical equipment is very important to ensure the smooth operation of the whole building, so the electrical engineering of the building is also very important for the design and operation of the whole building\textsuperscript{[3-4]}. The electrical engineering of intelligent building includes the installation of power distribution and control system, cable laying, supporting equipment, lighting device, power device, line conduit, power switch and power auxiliary facilities. Intelligent building electrical engineering design can effectively integrate all aspects of electrical engineering design and construction, realize the intelligent calculation and processing of the whole design process, so as to reduce the management cost, simplify the design process, and greatly improve the efficiency of the whole building electrical engineering design and construction.

As an important part of the building, electrical equipment is very important to ensure the smooth operation of the whole building, so the electrical engineering of the building is also very important for the design and operation of the whole building\textsuperscript{[5]}. The electrical engineering of intelligent building includes the installation of power distribution and control system, cable laying, supporting equipment, lighting device, power device, line conduit, power switch and power auxiliary facilities. Intelligent building electrical engineering design can effectively integrate all aspects of electrical engineering design and construction, realize the intelligent calculation and processing of the whole design process, so as to reduce the management cost, simplify the design process, and greatly improve the efficiency of the whole building electrical engineering design and construction.

2. Electrical engineering design of intelligent building

2.1. Goal and idea of electrical engineering design of intelligent building

The design goal of electrical engineering system of intelligent building is based on the practical application requirements of intelligent building, comprehensively and deeply apply new technologies and new products in intelligent field, fully consider the requirements of energy saving and environmental protection, combine with electrical engineering design and implementation experience and design advantages, so as to build a modern intelligent building with the characteristics shown in Figure 2 below.
The design of building intelligent electrical engineering system not only includes the configuration and function description of electrical equipment, but also covers the multi-dimensional and diversified application requirements of intelligent building\textsuperscript{[6]}. Secondly, it should be fully based on the combination of intelligent system and building to realize the effective management and reliable control of intelligent building itself and all kinds of ancillary equipment. In addition, in order to ensure that the application of intelligent electrical engineering in buildings can play its due benefits, the requirements of energy conservation and environmental protection should be fully considered to guide and complete the design of intelligent electrical engineering system, so as to realize the effective construction of intelligent building system application solutions.

2.2. Functional classification of electrical engineering design for intelligent buildings

The functions of electrical engineering design of intelligent buildings mainly include management, control, energy saving, safety, communication, operation and networking, etc., as shown in Table 1 below, so as to fully grasp the functional requirements of buildings, and determine the corresponding electrical engineering system settings according to the system classification determined by the design guidelines.

| Classification | Function |
|----------------|----------|
| Administration | Equipment, safety, personnel, transportation, communication, building property, operation and service |
| Control | Control of cold and heat sources, air conditioning and ventilation equipment, power transformation, lighting, drainage equipment |
| Energy saving | Solar energy, circulating water, natural light, heat preservation and heat insulation materials |
| Security | Monitoring, electronic patrol, alarm, access control, security and emergency command system |
| Communication | Cable, wireless communication, network, telephone broadcasting, satellite TV, conference system, network video |
| Operation | Property management, business management, water, electricity, oil, gas charges, parking charges, information release |
| Networking | Comprehensive business services |

2.3. Process of electrical engineering design of intelligent building

First of all, it should master the functional requirements of intelligent buildings and determine the system classification and setting of related electrical engineering based on the process guidance directory of electrical engineering design of intelligent buildings\textsuperscript{[7]}. Secondly, it is necessary to carry out the professional division based on the design guidelines of intelligent building electrical engineering, and carefully study the design specification based on the professional division, and
formulate reasonable development measures. In addition, based on the system classification of electrical engineering, it is necessary to realize the effective cooperation between the owner's supervisor and relevant electrical equipment supply and construction. In the process of intelligent building electrical engineering design, we should actively coordinate and cooperate with all relevant parties to realize the effective application of new technology and new products, and pay attention to the timeliness of design scheme and drawings in electrical engineering design and construction, so as to give full play to the method of building electrical engineering system function and solve the problems in the process of electrical system operation and management.

The process of intelligent building electrical engineering design should be carried out in strict accordance with the design guidelines. The relevant intelligent building electrical engineering designers should confirm and guide the related content design of various disciplines based on the system setting association matrix, and clarify the design responsible person, and establish the design outline of electrical engineering system model based on the design guidelines.

3. Computer intelligent design model of building electrical engineering

3.1. Intelligent building model
The computer intelligent building model includes the basic framework and platform to realize the composition of building body, system room, power supply and lightning protection grounding facilities and generic cabling subsystem. Secondly, the platform built on this basis includes the automation of electrical engineering, application system, technical support, communication network and intelligent integration of intelligent building. These technologies include computer-based, communication technology, control, and display and data storage, so as to realize the corresponding services. The basic platform of intelligent building model is shown in Figure 3.

![Figure 3](image)

Figure 3. The basic platform of intelligent building model.

3.2. Function design of intelligent building electrical monitoring system based on Web
The wiring system of intelligent building electrical engineering design mainly includes intelligent building data and business, so as to provide high-speed and reliable connection channel and ensure the accurate and rapid transmission of information. In addition to data transmission, the generic cabling system of intelligent building electrical engineering design is also used for data and image transmission of security and building control systems, as well as audio and video transmission of broadband multimedia applications. The structured wiring system is adopted to support the computer-based electrical engineering control system, so as to improve the information transmission mode of
intelligent buildings. The wiring diagram of electrical engineering design of intelligent building is shown in Figure 4 below.

![Figure 4](image)

**Figure 4.** The wiring diagram of electrical engineering design of intelligent building.

### 3.3. Application of intelligent technology in building electrical engineering

First of all, in the intelligent technology in building electrical engineering transformer selection level, to better play the intelligent technology, to achieve the purpose of electrical energy saving. Secondly, in the application level of intelligent technology in the installation of distribution box and other facilities, we should not only control the capacity of distribution box, but also intelligently control the power demand of buildings, and reserve capacity. In addition, in the level of building power optimization design, in the electrical construction, we should integrate the needs of various projects, formulate electrical intelligent technology, realize the optimal design of electrical system, and ensure the maximization of social and economic benefits.

### 4. Conclusion

In summary, with the rapid iteration of computer technology, artificial intelligence has been widely used in more and more fields, especially in the field of construction, which makes the electrical equipment in the whole building highly integrated management, and carries out unified scheduling and coordination, and promote the high integration of information resources in the building, and realize the coordinated operation of various types of electrical equipment in the whole building. Through the analysis of electrical engineering design of intelligent building, this paper studies the goal and concept, functional classification and design process of intelligent building electrical engineering design. Secondly, through the research of computer intelligent building electrical engineering design model, the wiring system of intelligent building electrical engineering design and the application of intelligent technology in building electrical engineering are analyzed.

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