Research on the Construction of Configuration Software for Building Electrical Equipment Computer Internet of Things System

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Abstract. With the rapid iteration of computer information technology, the application of computer-based configuration software in building electrical equipment can further improve the functionality of the building itself, meet people's needs for building residence, office and other activities, improve people's living and use experience and feelings, and help to achieve energy conservation and emission reduction, and reduce the use cost of buildings, therefore, it has important research value. Based on this, this paper first analyses the characteristics and application process of the configuration software of the computer Internet of things system, and then gives the construction and application strategy of the configuration software of the computer Internet of things for building electrical equipment.

Keywords: Configuration Software, Building Electrical Equipment, IoT

1. Introduction

With the rapid iteration of information technology, the Internet of things information system can be quickly applied to various fields, and through the effective integration and analysis of various information data, the intelligent and personalized management of data is realized. At present, the Internet of things (IoT) system has brought great changes and opportunities to all walks of life represented by manufacturing industry[1]. Especially for the field of building electrical equipment, the building electrical equipment developed based on the Internet of things technology can effectively realize the perception of electrical equipment status, and through its advantages in several aspects as shown in Figure 1, the management of building electrical equipment can be carried out efficiently.
At present, there are still many aspects to be improved in the management of building electrical equipment, which are embodied in intelligent measurement and control terminal, manufacturing process information, intelligent measurement and control terminal, functional parameters and equipment management system, as shown in Table 1 below.

### Table 1. Problems in the management of building electrical equipment.

| Aspects         | Status                                      | Problems                                      |
|-----------------|---------------------------------------------|-----------------------------------------------|
| Intelligent M&C terminal | Incomplete information, lack of performance indicators, incomplete equipment model and function parameters | Intelligent terminal module cannot be evaluated, Information is not effectively managed, Difficult to judge equipment status |
| Managed devices | Incomplete information                       |                                               |

In order to effectively solve the shortcomings and problems of the current building electrical equipment system, we need to carry out the design and development of building electrical Internet of things equipment management information system software based on its functional requirements. Thus, it can intelligently obtain the state data information of building electrical equipment, and realize the automatic fault diagnosis and health management of building electrical equipment, and realize the safe and stable operation of building electrical equipment[2]. Moreover, the construction of configuration software based on Internet of things system can promote the fine management of building electrical equipment, improve the informatization, standardization and integration level of its management process, and lay a solid technical foundation for the construction of intelligent buildings, the realization of intelligent society and the building of cities.

In addition, the intelligent building based on the computer Internet of things technology has stronger analysis and processing ability of building electrical equipment, so as to meet people's higher-level functional requirements for intelligent building, realize the organic decision-making and scientific management of the internal electrical equipment system management, and reduce the operation cost of the building. The application of Internet of things system configuration software in building electrical equipment can further improve the functionality of the building itself, meet people's needs for building residence, office and other activities. While improving people's living and use experience and feeling, it also helps to achieve energy conservation and emission reduction and reduce the use cost of buildings.

In short, the intelligent management of building electrical equipment needs to realize the efficient development of software system based on the existing hardware architecture, and the design of intelligent software system of building electrical equipment should also have strong flexibility and expansibility[3]. In this context, the design and development concept based on configuration software can effectively meet and realize the software functional requirements of building electrical equipment, so as to promote the construction of intelligent building and meet the intelligent management needs of
internal electrical equipment in intelligent building. Therefore, it is of great practical value to carry out the research on the construction of configuration software for the computer Internet of things system of building electrical equipment.

2. Configuration software of computer Internet of things system

2.1. Typical features of configuration software
Configuration software has many advantages, such as high flexibility, stability, real-time, multi task parallelism and openness\(^\text{[4-5]}\). As the most typical feature of configuration software, multi task real-time enables it to complete the process of information acquisition, processing and display of much electrical equipment in parallel, and can store and query the processed information and data in real time. Secondly, the configuration software can realize the collection and sharing of data and information between building equipment, and can timely exchange and display the status information of collected electrical equipment, so as to realize the real-time online supervision of electrical equipment.

In addition, by setting the alarm threshold of electrical equipment information data, it can also realize the alarm of abnormal situation and the real-time storage and query of data, and the system developed based on configuration software has high stability, which can realize data exchange and sharing with the third-party program, and maintain the stability of the system.

2.2. Application process of configuration software
The application process of configuration software of computer Internet of things system mainly includes the following steps: modeling, designing graphical interface, constructing database variables, establishing animation connection, running and debugging, etc., as shown in Figure 2. The modeling process is mainly based on the actual needs of the building to build a mathematical model to control electrical equipment. In the design of graphical interface level, it is mainly based on the library of configuration software to realize the control of building electrical equipment. In addition, the state attributes of building electrical equipment are reflected by database variables, and the operation simulation of building electrical equipment system is realized based on animation.

![Figure 2. The application process of configuration software.](image)

2.3. The relationship between Internet of things and configuration software
Configuration software includes a variety of configuration forms, such as screen, alarm, communication and lower computer control, etc. the configuration software can not only complete the human-computer interface interaction of building electrical equipment, but also configure and operate the real-time database. Secondly, the real-time response of configuration software is very fast, which can realize the dynamic management of building electrical equipment\(^\text{[6]}\). Although both IoT system and configuration software can realize the dynamic management of building electrical equipment, their communication networks are different, so they have different application scenarios and applicability of electrical equipment.
In addition, configuration software is generally applicable to the control network based on current and voltage signals, that is, in the form of Ethernet, so it has strong real-time performance and reliability, so it can meet the control requirements of building electrical equipment. It can be seen that configuration software is mainly used to control the scene of electrical equipment, and has more complex analysis function\[7\]. The Internet of things system can be based on the Internet to achieve the management of electrical equipment, so the real-time performance is not as good as the configuration software, and the stability is also affected by the Internet. It is not as good as the configuration software based on Ethernet architecture, and because of the openness of the Internet, its security is difficult to obtain perfect protection. Therefore, the Internet of things system is suitable for the use of scenarios with low real-time and stability requirements, and is not suitable for the control level of key electrical equipment with high security requirements. The differences between the IoT system and the configuration software are shown in Table 2.

### Table 2. The differences between the IoT system and the configuration software.

| System          | Features                        | Applicability                  |
|-----------------|---------------------------------|--------------------------------|
| IoT system      | Strong real-time, reliability,  | Key electrical equipment       |
|                 | security                        |                                |
| Configuration software | Poor real time, reliability and security | Non critical electrical equipment |

The differences between IoT system and configuration software mainly focus on the use scenarios, the key level of managed equipment and the limitation of statistical analysis function. Moreover, configuration software has higher configuration function, which can greatly reduce the management cost of building electrical equipment. The Internet of things system and configuration software have high complementarity, the combination of the two can effectively improve the reliability and stability of building electrical equipment management system, and can significantly reduce the operation cost of the system, and lay a solid technical foundation for the construction of intelligent buildings.

### 3. Construction and application of IoT configuration software for building electrical equipment

#### 3.1. Construction of Internet of things configuration software for building electrical equipment

First of all, in the database system development level of building electrical equipment Internet of things configuration software, it is necessary to realize the data storage, processing and access functions of the database system, realize the design of real-time data and query of historical data, and include several processes as shown in Figure 3, in which the demand analysis of database system includes the demand analysis of real-time database and historical database. In addition, in the design level of real-time database, the data organization, transaction scheduling and concurrency control of real-time database are realized. In addition, in the design and implementation level of historical database, including the construction of distributed data storage architecture and distributed file system. In the design and implementation level of multi-source heterogeneous data communication interface, including the design of communication protocol and the implementation of communication interface, so as to realize the construction of building electrical equipment Internet of things configuration software.
3.2. Function design of intelligent building electrical monitoring system based on Web

The application environment of Internet of things configuration software for building electrical equipment is to control the coordinated operation of electrical equipment in the building room, so as to test the effectiveness of configuration software operation. Secondly, in the software configuration and operation level, mainly through the login configuration environment, the building internal room measurement and control screen. And the configuration of building electrical equipment model mainly includes variable link and control strategy configuration. Finally, in the system operation level of building electrical equipment IoT configuration software, the control of building electrical equipment is realized by calling the configuration environment data file.

4. Conclusion

In summary, the construction of configuration software based on Internet of things system can promote the fine management of building electrical equipment, improve the informatization, standardization and integration level of its management process, and lay a solid technical foundation for the construction of intelligent buildings, the realization of intelligent society and the building of cities. In addition, the design and development concept based on configuration software can effectively meet and realize the software functional requirements of building electrical equipment, so as to promote the construction of intelligent building and meet the needs of intelligent management of internal electrical equipment in intelligent building. This paper analyzes the typical characteristics and application process of configuration software through the research on the configuration software of computer Internet of things system, and then through the analysis of the construction and application of the configuration software of the Internet of things for building electrical equipment, the specific construction and application strategy of the configuration software for electrical equipment are given.

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