Research on Building Electrical Design Based on Computer-Aided

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Abstract. Computer aided electrical design (hereinafter referred to as electrical CAD) refers to the application of computer aided design in the design of electrical parts in many industries. Electrical CAD application includes all aspects of electrical engineering. The application of computer in electrical design system is very important and extensive. After the computer is put into use in circuit design, relay protection design and auxiliary management, it has played a certain role in promoting the operation and development of the whole electrical industry. Computer software should be tailored to the needs of different customers. It is necessary to gradually subdivide the development of the user market and expand the new direction of the market, and continuously develop more targeted and professional building electrical computer aided software to meet the needs of production and design. In this paper, the application of computer aided in building electrical is discussed and studied in detail[1].

Keywords: Computer Aided, Building Electrical, Applied Research

1. Introduction
With the rapid development of computer technology in China, the application of computer technology is more and more extensive, and its application in building electrical has become an important part of the application of computer technology[2]. Computer aided not only improves the working efficiency of the staff of the electrical department, shortens the working cycle of the electrical enterprise, saves a lot of input cost, but also realizes the information and intelligence of the electrical design system. It promotes the rapid development of the electrical industry. Building electrical technology has also been continuously improved and optimized, through the integration of electronic, information, control and electrical skills, has successfully evolved into an intelligent building technology[3]. But because its own application scope is very wide, plus the operation difficulty is big and single. In recent years, the auxiliary software of building electrical design and calculation in China has made rapid development, and has been able to solve and analyze the problems of building space structure and plane structure better. Therefore, computer aided software has also become an important guiding part of building electrical design, construction guidance and engineering maintenance[4]. The traditional building electrical computer aided design can not meet the needs and standards of the modern building market for building electrical design. However, because building electrical technology is a
combination of electronic technology, electrical technology, control technology and information technology, and has very complex characteristics, it is impossible to meet the market demand for building electrical design by computer alone. Therefore, computer software should be continuously developed and improved to design more targeted and professional building electrical computer aided software. In order to conform to the trend of the times, building electricity also vigorously adopts computer technology to achieve the development goal of intelligent building. In building electrical design, many parts of the design is a time-consuming and laborious but very important work. For a long time, the designer has completed the design task with the help of the auxiliary design software which does not have the automatic design function. The design period is long and the design efficiency is low. Moreover, the boring repeated calculation in the electrical design can easily make the designers tired and distracted, resulting in the calculation error, which will bring losses to the whole project. And what the computer is good at is repeated calculation, and high reliability.

2. Computer-aided software

Auxiliary design software refers to the use of computers and graphics equipment to help designers carry out design work, suitable for construction, machinery, electronics, clothing. It can improve the efficiency of designers. Usually, Computer-aided software is divided into two types: first, Regular use of software; Second, Special electrical design software. Both have common characteristics, There are also some differences[5]. In general, Electrical CAD is part of the design component, Because when Auto CAD software gets a lot of use, To that end, and its impact on electrical AutoCAD is minimal. Many CAD in our country are carrying out related designs under the basic premise of Auto CAD, Usually in AutoCAD R14 or AutoCAD2000 versions, On the relevant design, And make improvements, Currently, ABD, TELES has been widely used, In addition, Relevant research staff integrate existing software, Programming improvements, In order to obtain the best and appropriate systematic function[6]. Domus Cad is a CAD program for architectural applications. Actually, Not only is it useful in construction, And in garden design, urban planning, interior decoration design has the value of use. Domus Cad, used You don't have to draw up abstract plans, And then we design the 3D model, Can start the construction of 3 D model directly. It's built into a variety of commonly used structures, Like the roof, the structure of the house, And can be very simple use of the mouse for modification, combination, positioning and rotation and so on. It's easy to learn, You don't have to spend a lot of time reading instructions.

3. Application of Computer Assisted in Building Electrical

3.1. CAD building electrical software

As we all know, the traditional product design is mainly manual design on the drawing, the design period is long, the quality can not be guaranteed, the design cost is high, the emergence and development of CAD technology have greatly changed this situation, the product design has made a qualitative leap. CAD software is a very powerful and open structure computing software, which can not only facilitate the operation and use of users, but also promote its application through continuous improvement and expansion. With the continuous development of modern CAD application technology in building electrical, architectural electrical designers also put forward higher requirements for the function of CAD system. Because of its advantages of high design efficiency, good visualization, intuitive image and comprehensive design, construction technology and manufacturing information for different links of CIMS engineering, 3D CAD system has become one of the important technologies in modern building electrical design. CAD building electrical software refers to the computer building electrical software used to assist drawing and design. Using this software designer can easily complete the architectural electrical structure design and construction layout. At present, all kinds of professional CAD drawing software in building engineering have been developed in our country. Through drawing software, the architectural structure designer can complete the design of structural construction drawing in a short time. CAD computer aided software
has powerful functions and is easy to learn and use. Therefore, the software is widely used in the construction and electrical industry. With the continuous development of CAD application technology and basic theory, designers require more and more electrical software for CAD buildings, which can reflect electrical engineering buildings more vividly and intuitively, and improve the design efficiency of designers. Has become the inevitable development trend of CAD computer design software. At present, computer software and CAD drawing software have been developed rapidly in the electrical design of buildings in China, which can effectively solve the problems of analysis and calculation of building spatial structure and plane. A CAD interface is set up in most computing programs, which can make the computing structure graphical, which is helpful for structural designers to reduce the working intensity of structural calculation. CAD, that is, computer aided design and drawing, refers to the establishment, modification and optimization of architectural design through computer system assistance.

![Computer microprocessor](image1)

**Figure1.** Computer microprocessor.

### 3.2. Digital building electrical technology

The concept of computer digitization involves a wide range of contents. In practical application, the main characteristic of computer digitization is to replace matter with information. In the information network era, the computer digital information carrier and media make the information society gradually transform the material flow into the information flow. Digitization not only changes the way of life of human beings, but also has an important impact on the modern construction industry. In the past, people used materials to carry information, but in the network era, people used network carriers and media to carry information, ushered in the era of digital information. The use of digital information has changed people's way of life, and then changed the construction industry. In order to adapt to this new development trend, family space must be continuously increased and increased. At the same time, digital technology may also undertake a certain degree of building function in the field of its obvious advantages, but it will also put forward higher requirements for building function, thus forming a new type of building. If the supermarket of functional consumption place, with the continuous development of digital technology, it will probably be replaced by electronic shopping, and it also puts forward higher requirements for leisure shopping and entertainment places. In fact, this is a process of re-distribution of functional carriers, the purpose of which is to realize the rationalization and high efficiency of building electrical design. In virtual reality space, users can switch different schemes in real time, even in the same observation sequence or the same observation point, they can feel the characteristics and shortcomings of different building schemes, which is helpful for designers to make further decisions. Using virtual reality technology greatly facilitates the designer to modify the design scheme and improves the working efficiency.
3.3. Virtual reality building electrical technology

Virtual reality has the three most prominent features of interactivity, immersion and conception, which makes users naturally enter the environment system through the computer, and manipulate and interact with all objects, and then immerse themselves in it. The realization of virtual technology makes people say goodbye to the traditional two-dimensional expression, which can only transmit part of the information of the building, so that a living virtual building is presented in front of people, and can even roam in the whole building and experience the feeling of being on the spot. CAD system mainly includes hardware and software, in which hardware includes processing operation, graphics display, data graphics input / output, external storage and related information transmission platform equipment; and software mainly includes system software, graphics software, file software and related professional application software. Application of 3D CAD system in modern building electrical can effectively improve the design efficiency of architectural designers. The application of virtual technology has completely changed the traditional two-dimensional expression that can only transmit part of the building information, which can make the virtual building vividly and vividly displayed in front of people, and even bring people a feeling of being on the spot. In the traditional architectural electrical design, the designer of the architectural structure must design different schemes to meet the needs of the users. When the users are not satisfied with the design scheme, they must also make substantial modifications, improvements, and even duplication of work. The application of the practical technology of building electrical training in building electrical can provide a platform for communication between users and designers, enable users to experience with relevant management departments, and put forward more suggestions for designers. It is helpful for designers to make the design scheme more practical.

4. Mechanism of Firefly Algorithm

Fireflies and their peers make search errors and courtship behaviors by emitting fluorescein. Generally speaking, the brighter the fluorescein, the stronger its attraction to other fireflies, and because light travels in the air, The brightness attenuates, so as the distance increases, the attraction decreases, and eventually many fireflies gather around some brighter fluorescein fireflies. Automated molecular group ability, local search ability is strong. The attraction of fireflies is closely related to their brightness, and the individuals with brighter brightness have stronger attraction. For any two fireflies, the less bright fireflies move in a stronger direction. In the process of mutual attraction, the brightness of the growth will gradually decrease with the increase of space distance and the absorption of the propagation medium. In each iteration, the position of firefly is constantly updated, so that the solution of the problem in each update to get the solution of the optimization objective function is transformed into the firefly individual survival of the fittest process\[6\]. Within the GSO
algorithm, each artificial firefly walks in the solution space, these fireflies carry fluorescence and have their own range of sight, called the decision domain (local-decision range). Their brightness is related to the target value in their position. The brighter the firefly, the better the position it is, the better the objective function value. The firefly will look for a collection of neighbors within the decision domain, in which the brighter the neighbor has the higher attraction to attract the firefly to move in this direction, and each flight direction will change with the selected neighbor. In order to achieve a certain number of iterations, all firefly individuals will gather around the individuals with relatively large fluorescence brightness, that is, to find the optimal solution of the objective function of the problem to be optimized. Firefly algorithm makes modern efforts to develop a scientific algorithm, in scientific research occupies a great position. Since the firefly algorithm was put forward, scholars from all over the world have studied, improved and applied the two algorithms. After several years of development, firefly algorithm has a good application prospect in continuous space optimization process and some production scheduling.

Table 1. Different configuration.

| Configuration level          | Minimum configuration | Basic configuration |
|------------------------------|-----------------------|---------------------|
| Applicable occasions         | Applicable occasions  | Applicable occasions |
| Distribution cables for each | Distribution cables for each | Distribution cables for each |
| information socket           | information socket    | information socket  |
| 1 pair of twisted cables     | 1 pair of twisted cables | 1 pair of twisted cables |
| 1 pair of twisted cables     | 1 pair of twisted cables | 1 pair of twisted cables |

5. Conclusion

In contemporary times, building electrical technology combines electronic technology, electrical technology, control technology and information technology, and then develops into intelligent building. The application of computer in electrical design system is very important and extensive. After putting into use in circuit design, relay protection design and auxiliary management of electrical design system, computer plays a certain role in promoting the operation and development of the whole electrical industry. With the continuous progress of information technology in modern society, more design and optimization methods must be studied in order to solve the problems according to the actual needs of users. Building electrical computer aided technology for building electrical design workers to provide a continuous development of electrical layout, electrical system planning procedures, so that the continuous goal of optimization problems, simplified design, and get the best results. Adopting scientific design principles and vigorously popularizing and using computer-aided software can not only guarantee the design quality, but also save the design cost and bring more economic benefits to engineering buildings.

6. References

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