Research on Application of Artificial Intelligence Technology in Electrical Automation Control

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Keywords: artificial intelligence technology; electrical automation; application

Abstract: The development of science and technology which has created favorable conditions for artificial intelligence technology. What's more, artificial intelligence technology is supposed to be an inevitable product of the development of modern society, which has irreplaceable advantages in electrical engineering applications. Electrical automation control is an important part of electrical engineering. On the one hand, the introduction of intelligent technology can improve control efficiency and reduce human resources. On the other hand, it can further improve the operational efficiency as electrical equipment and systems to improve enterprise efficiency.

1. Introduction

With the development speed of the electrical industry is gradually accelerating in the new era and the requirements for automation control are constantly improving, which requires from new technology support. What's more, the emergence of artificial intelligence technology makes up for the needs of electrical automation, which is convenient for workers to System control to improve production efficiency. Electrical equipment has strong transients during operation, and safety issues have become the focus of electrical companies. Therefore, workers should rationally apply artificial intelligence technology to minimize the uncertainties in electrical equipment and effectively control them, making electrical equipment safer to operate.

2. Overview of artificial intelligence technology

As the name suggests, artificial intelligence technology is mainly based on intelligent technology as a precondition, and with some functions in the computer, which is applied to the actual production process. With the improvement of computer technology, people can adopt software programming to effectively control and make the computer reasonable. control. From the current situation of artificial intelligence technology, the most prominent areas are intelligent systems and robots. For example, intelligent robots are effective simulations of modern human brain thinking. At the same time, it has an efficient data transmission, so that robots can be ensured. Accurate processing can also effectively avoid the insufficiency of human brain thinking. If people judge and analyze the data, intelligent robots can avoid this kind of situation which are easily interfered by various factors, and make the whole judgment more accurate. In recent years, China has increased its research on artificial intelligence. Many large-scale enterprises have begun to attach importance to the development of artificial intelligence. In the current situation, artificial intelligence technology will have a lot of room for development in the future, and it is still worthy of people explore the electrical industry abidingly. Electrical automation will gradually develop intelligently, not only can improve the overall operating efficiency of the automation system, but also reduce the employment of production personnel, and achieve comprehensive development of electrical intelligence.

In recent years, various industries have begun to pay attention to artificial intelligence. Many research institutes have increased research efforts and exerted the intrinsic value of artificial intelligence technology. For electrical engineering, the application of this technology is mainly used for design and production of equipment. And it is possible to diagnose electrical equipment failures in time, which is very beneficial for improving production efficiency. First of all, from the

perspective of electrical design, the structure of electrical equipment is largely complex, contains a lot of content, and requires technicians to have certain knowledge reserves and practical experience, so that scientific engineering can be scientifically designed to ensure its rationality. Secondly, from the perspective of fault diagnosis, the application of this technology can not only exert the advantages of neural network, but also achieve the purpose of early warning monitoring. It can also prevent electrical personnel from monitoring and reducing labor at any time. At the same time, if the system has an alarm, it means the system is out of order. If a certain aspect encounters some problems, it can remind the electric workers to check the faults one by one.

3. The advantages of applying artificial intelligence technology

As mentioned above, artificial intelligence technology contains certain characteristics, which also reflects its certain advantages. Mainlyt, it can reduce human resources investment. In the past, the automation technology mainly completed the production tasks step by step according to the prescribed procedures. It has strong mechanical properties, but the artificial intelligence technology is just the opposite. It can not only transform the artificial labor mode, but also effectively imitate the human brain thinking and has a certain subjective consciousness. This makes the probability of error gradually decrease, and this is inseparable from the support of software programming technology, which is also an important manifestation of intelligent control. When operating the electrical system, the complexity is relatively strong, and the enterprise needs to invest a large number of production personnel. However, the artificial intelligence technology can not only shorten the human resources, but only need about 2 staff members to supervise. It can also improve the efficiency of electrical engineering.

Second, the error rate can be reduced. Artificial intelligence technology involves program programming. The staff can use this feature to effectively control the system. On the basis of intelligent operation, manual control is reduced to improve the accuracy of automation control. Before the emergence of artificial intelligence technology, the electrical system was mainly controlled by manual methods, and the staff members were often affected by various factors during the actual operation, which made the equipment production errors and affected the enterprise benefits. It should be noted that artificial intelligence technology can effectively compensate for the inadequacies of manual control methods, and control the entire system and equipment with intelligent programs to reduce the error rate, thereby improving the accuracy.it can enhance product standardization.

When artificial intelligence is introduced into the electrical system, it is mainly operated according to the program standard, so as to prevent interference from factors. During production, the electrical equipment will be repeatedly operated according to the programming content, which not only makes the production more standardized, but also improves Production uniformity. In addition, the application programming technology can be designed on the one hand according to the actual situation of the electrical system, and the programming model can be appropriately adjusted to make it more in line with the existing conditions of the system. On the other hand, the equipment can be operated at a fixed time, so that the accuracy of the production operation can be obtained. Effectively improve to ensure product quality.

4. The application of artificial intelligence technology in electrical automation control

This article takes an electrical engineering as an example. The project is mainly constructed in the form of an office of 7 floors building with a total area of 610.73 square meters and a building height of 28 meters. The overall situation of the power distribution room is: the No. 1 cabinet is mainly used for fire pumps and rolling doors, and the No. 2 cabinet function is to provide emergency lighting when an emergency occurs, to ensure that personnel can evacuate normally. Among them, artificial intelligence is used in many aspects of automatic control systems, which are embodied as follows:

4.1 Fault diagnosis

Artificial intelligence technology covers many technologies, such as neural network control. This technology can be used in electrical equipment, not only scientifically judge the operation of equipment, but also to understand the equipment in real time. It can formulate scientific electrical system operation schemes and improve the efficiency of work. Of course, the most important thing is that artificial intelligence can facilitate the staff to diagnose the engine, find out the location of the equipment in time, and promote the value of intelligent technology. The structure of the electrical system is relatively complicated, and there are relatively many factors that cause it to malfunction during operation. This requires the technician to use the intelligent technology to find the fault point and determine the cause of the fault. If it is found to be a software problem, the system can handle it by itself. On the contrary, if it is caused by a hardware device, the problem will be presented directly, and the technician can watch it in real time to understand the cause of the failure. In the project, the transformer has experienced problems during operation. According to the intelligent technology, it is found that it is a hardware failure. After the staff finds the situation, the cause is searched for. The reason is caused by oil and gas leakage, and the staff closes in time. The power supply is effectively repaired and the repair time is less than 20 minutes, which improves the maintenance efficiency.

4.2 Integrated control

The electrical system will have transients when working normally, and it needs to be supported by high management technology. In this system, the technicians mainly use professional decision support in the operation, and comprehensively summarize and extract many expert knowledge. On the one hand, the effective control of the system can continuously improve the software programming, avoiding loopholes, affecting the operation of the equipment. On the other hand, enhancing the intelligent technology improves the overall operational performance of the system. Some systems involve many cabinets. The power direction type can protect the system, avoiding problems in one cabinet and affecting other cabinets. In traditional engineering, once a cabinet has problems, technicians need to check all the way until the cabinet in question is found. However, after adopting intelligent technology, the staff can effectively operate the protection device to achieve dynamic management purposes.

4.3 Intelligent operation

In the electrical equipment, the artificial intelligence can be remotely controlled, and a certain command can be issued. The staff can be controlled without the need of the staff to reach the job site. On the other hand, the wiring mode is more flexible, and the stability of the system is continuously enhanced. During the operation of the system, there are not software failure occurred. Only the transformer hardware encountered certain problems, which means that the whole phase of the system operation is relatively stable and has good anti-interference ability. In traditional electrical engineering projects, technical or management personnel are required to arrive at the job site to control the equipment scientifically. Now the staff connects the smart technology with the mobile terminal and can implement intelligent operation, so that when the 3 or 4 cabinet encounters problems. The No. 6 spare cabinet is no longer needed to achieve the control effect. It can be seen that when the electrical engineering has been in the state of intelligent control, it is more advantageous for the operation of the equipment, not only to meet the requirements of integrated management, but also to ensure smooth data transmission. In addition, in order to continuously enhance the anti-interference ability, it is necessary to adopt a fiber-optic cable to replace the original connection line, which can not only show the value and advantages of the smart technology, but also improve the effect of application. According to a large number of practices, the problem of signal attenuation rarely occurs when data is transmitted after applying this method, which greatly improves stability.

5. Conclusion

Artificial intelligence technology is a kind of emerging technology, which has obvious advantages, such as comprehensive diagnosis and troubleshooting of faults. Therefore, the electrical industry should pay great importance to it and should be applied reasonably in electrical automation control, so that it can be used for traditional control methods. Transforming, reducing manpower consumption, and increasing system operating time can ensure the safety of operation.

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