Application of Artificial Intelligence Technology in Electrical Automation Control

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Abstract. Like the arrival of the Internet era, the era of artificial intelligence carries new hopes and new challenges, which is irreversible. It is a tool bearing the development of all walks of life. In the future in all industries are indispensable existence \cite{1}, will become a part of our side \cite{1}. And the corresponding electrical automation control, it is now closely associated with our life, so can imagine that in the future, this and this will be closely linked, together become an inseparable part of our life.

Keywords: Artificial Intelligence Technology, Electrical Automation, Application

1. Introduction

Just as the evolution of life is also from the perceptual stage to the cognitive stage, artificial intelligence will not stop at the perceptual stage. When the technology and various aspects of conditions are mature, it will inevitably go to a more advanced stage of development, that is, the stage of cognitive intelligence. What is cognitive intelligence? It's machines that can not only recognize, but then understand, analyze and make decisions, and even innovate \cite{2}. But it's clear that AI can't just do mechanical things for people. The electrical automation control field which is closely connected with People's Daily life is a place where it can play a good role. Here it will be more inseparable from human life \cite{2}.

2. Brief Overview of Artificial Intelligence Technology

2.1. The Connotation of Artificial Intelligence

Artificial intelligence technology belongs to the category of computer technology, the main purpose is to master the inherent nature of human intelligence, at the same time to simulate human intelligence, thus producing intelligent machine. Artificial intelligence technology takes robot and expert system as the main research object, and involves psychology, logic, linguistics and so on, but computer science has always been its core content. Generally speaking, the effective research of artificial intelligence technology has certain complexity, so it is necessary to use intelligent machine to solve these complex tasks. The human brain is the most sophisticated machine, and the thinking process of the human brain can be simulated. In essence, the intelligent machine is realized on the basis of simulating the human brain. And through the actual information obtained by effective research and on this basis to achieve
feedback. Therefore [3], the main way to strengthen the realization of automation goal in various industries is to simulate the human brain. The application of artificial intelligence technology in electrical automation control is mainly manifested in three aspects: one is operation efficiency, the other is expert system, and the third is fuzzy control. The expert system can process the input instructions and get the final conclusion data. Fuzzy control is the most widely used technology in electrical automation control system. The reason is that fuzzy control is simple in operation and can be well integrated with equipment [4].

2.2 Characteristics of artificial intelligence technology

The characteristics of artificial intelligence are shown in figure 1 below:

Figure 1. Characteristics of artificial intelligence

2.3. Adaptability

The traditional control method is linear and single-way control. Although this control method achieves the control effect, it has weak control ability for other similar or non-similar products in the system. The introduction of artificial intelligence technology, for the system control from single or linear control to nonlinear variable structure control, is conducive to the use of complex and changeable environment systems, can be based on different sensor information. Combined with information processing and decision-making mechanism, the control system runs more widely.

2.4. Easy to operate

The traditional electrical control system, before debugging, needs to understand the electrical system equipment, reference schematic diagram, wiring diagram and the connection relationship of each component in the system, need to understand a variety of data, comprehensive analysis, debugging is more difficult, take a long time. The application of artificial intelligence can realize the visualization of the system, can be adjusted intuitively on the console, and the requirement of simple operation for the operator is low [5]. In the parameter adjustment aspect, needs unceasingly trial and error, the operation is tedious. The simulation is carried out by computer aided technology to realize the accuracy and simplicity of the parameters, and then to combine the visual operation interface, which is convenient and fast.

2.5. Good anti-interference ability

In the electrical automatic control system, artificial intelligence technology is used to realize systematic control of the equipment in the electrical engineering system. The system has high stability, small external interference, real-time information acquisition and more efficient adjustment. The interference of human factors to the system is reduced, and the system operation error is reduced.
3. Role of electrical automation

Electrical automation in the production process of major industries, without the action of manual labor, can independently carry out production, only a few monitoring production personnel, to ensure that in the production process can complete a number of production work. After the reform of modern industry, electrical automation has become a technology to control modern scientific production, which has brought economic development to major enterprises. In the daily work of major producers, I think enterprises should improve the utilization and utilization rate of gas automation, promote the development of enterprises and improve the economic level [6]. As a modern high-tech, electrical automation not only promotes the production development of major industries, but also effectively improves the production efficiency, and electrical automation can be widely used in various production enterprises. Not only promote the development of production enterprises in China, but also effectively improve the level of our national economy.

4. Dilemma of Electrical Automation Control

4.1. Low level of control of electrical equipment

Along with the development of technology, the data of Yuan equipment will also change. After Yuan data changes, Yuan's new equipment use needs manufacturers to import new data, such as the emergence of 4 G network. However, because the control level of electrical equipment is low, the import of new data is not so smooth, and the introduction of some new data will make the control system of equipment fail, so it is urgent to improve the control level [7] equipment.

4.2. System design is difficult to meet actual demand

At present, the control of electrical equipment in our country is mostly one-time development, and there is no overall planning for the follow-up of the company, which leads to the disconnection between the control level of electrical equipment and the design of electrical equipment system manufactured by the manufacturer. In view of this, the manufacturer should improve the control level of the equipment and make the products meet the planning requirements of the electrical equipment system. The level of electrical automation control is related to the length of use of equipment and the operation of equipment, so the level control of equipment is required.

4.3. Electrical automation failures are difficult to maintain

Electrical automation control facilities once there is a problem, you need to contact the original factory for replacement or maintenance. With the development of electrical automation control system, the frequency of market renewal is fast, and the maintenance of some parts needs to contact foreign advanced brands. Due to the shutdown of some accessories, it is difficult to repair and [8] the electrical automation control system after failure.English teaching in colleges and universities can be more efficient.

5. Practical application of artificial intelligence technology in electrical automation control

Artificial intelligence technology in electrical automation control is divided into the following four aspects of the application.
5.1. Implementation of Fine Management
With the increasingly fierce market competition, enterprises want to survive, need to constantly enhance competitiveness. It is one of the important means to improve the competitiveness of enterprises to reduce the operating cost and improve the running quality of enterprises by using fine management. Therefore, in the electrical automation equipment, the intelligent level of the equipment should be continuously improved to realize the reliability operation and predictive operation and maintenance [9]. To realize intelligent distribution, multi-power protection and real-time energy consumption monitoring of the system are carried out by PowerTag wireless power measurement module and various intelligent FD control components, and remote operation and maintenance is realized by using the PC end and mobile terminal to ensure that users can obtain information anytime and anywhere, and finally achieve fine management to enhance the convenient operation and maintenance experience.

5.2. Optimizing Electrical Equipment Design
Computer aided design technology has been widely used in mechanical manufacturing and electronic instrument industry. The electrical automation equipment also changes from traditional design to CAD design and CAE, CAM. The traditional electrical automation design relies on the electrical engineer to carry on the design according to the related standard, the design period is long, the graphic review is easy to appear the question [10]. Relying on CAE and CAM software, the circuit system is simulated to realize the verification and effect analysis of the design, so that the design is more efficient and accurate. Through genetic algorithm, genetic algorithm is used to calculate the key data in the design of electrical equipment, and the optimal solution is solved, so as to improve the design level of electrical equipment.

5.3. Diagnosis of Intelligent Electrical Engineering System
Intelligent diagnosis is mainly applied in two aspects, one is the early warning before the problem, the other is the diagnosis after the problem. In electrical engineering systems, whether equipment or circuits have problems, there may be omens in the system, such as the beating of some data, the use of intelligent monitoring technology, real-time monitoring of abnormal data, prejudging problem equipment or systems, Take downtime or other control methods to reduce the incidence of accidents and achieve early warning. After the failure, artificial intelligence technology can analyze the problem by using neural network, fuzzy theory and expert database, improve the troubleshooting rate, ensure the operation of the system and reduce the loss of enterprises.

5.4. Real-time control, graphic analysis
The use of intelligent system simplifies the control operation of the system, hands the work of the staff to the computer control to realize, and the operation interface also changes from various switches and buttons to a visual electronic screen. And in the existing intelligent control system, all the switch and analog data are collected and processed automatically in real time, and can be arranged and stored in batches according to the pre-designed requirements of the designer.

6. Conclusion
Artificial intelligence is already shining in the field of electrical automation. Compared with traditional control methods, artificial intelligence has good stability and is not easy to be disturbed. Its accuracy is also higher than the original, but also can have a larger and more stable space for improvement; The performance of artificial intelligence should also be more prominent, strong anti-interference ability. Therefore, artificial intelligence and electrical automation control will be further applied in the future, which is worthy of our expectation.

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