

# Analysis on Application of Artificial Intelligence to Electrical Automatic Control

Li Meiyao

Xi'an International University, Shaanxi, Xi'an, China

**Keywords:** Artificial Intelligence, Electrical Automation, Analysis on Application

**Abstract:** In recent years, with the continuous development and improvement of information technology in China, electrical automation has been widely used. At the same time, with the effective combination of artificial intelligence technology and electrical automation technology, it can not only greatly improve the work efficiency, but also effectively save the human and economic costs of electrical enterprises, indirectly increase the economic benefits of the enterprises, and lay a solid foundation for the realization of sustainable development of the electrical industry. Therefore, it can be seen that the application of artificial intelligence technology to electrical automatic control is of great significance. This paper analyzes and discusses the necessity of applying artificial intelligence technology to electrical automatic control and its specific practical application to electrical automation, hoping to provide a reference for the improvement of the application level of artificial intelligence technology in the electrical industry of China in the future.

## 1. Introduction

In essence, the principle theory of artificial intelligence technology is to imitate human senses and tactile senses by the application of a series of sensors, so that machinery and equipment can be humanized and enable them to complete some difficult or dangerous works. At present, the application of artificial intelligence technology in electrical industry is mainly based on image analysis, resource processing and speech recognition, which can greatly meet the needs of the development of electrical industry. Therefore, the application of artificial intelligence technology to electrical automatic control is the inevitable trend of the development of electrical industry in the future.

## 2. The Necessity of Applying Artificial Intelligence Technology to Electrical Automatic Control

### 2.1 Artificial Intelligence Technology is the Inevitable Choice of the Future Development of Electrical Industry

Artificial intelligence technology is the product of the constant development of network technology, computer technology and information technology, and computer is the fundamental and premise of its application. In the process of practical application of artificial intelligence technology, the intelligent development can be realized on the basis of imitating the working state of human beings, so that the way of thinking of human beings can be simulated efficiently. And then, by virtue of it, the quality and efficiency of some works can be improved.

### 2.2 It Can Optimize and Perfect the Design Scheme of Electrical Equipment

Generally speaking, in the design of electrical equipment, it is often necessary to take into account a variety of complex conditions of use, so as to fulfill the aim of ensuring higher stability in the actual use of electrical equipment. Therefore, the designer needs not only profound knowledge about circuit and electromagnetic theories, but also a summary of the design work, so that the rationality of the design scheme can be improved as much as possible. In the past, the design of electrical equipment is usually carried out by a simple design method in the actual design process, and the designers research and complete a series of planning of electrical equipments by manual design on the basis of their rich design experiences. However, with the rapid development of the

electric industry, the sustainable development of the electric industry has a higher requirement for the efficiency and quality of the electrical equipment design, and the traditional design method is difficult to meet the demands of the development of the electric industry. By virtue of the effective application of the artificial intelligence technology, on the one hand, the intelligent design flow can be used for replacing the traditional manual design, and the time cost is greatly saved; on the other hand, the design scheme is fully optimized and improved by the effective application of the computer technology, so that the design quality of the electrical equipment is effectively guaranteed.

### **2.3 It is Helpful to Improve Workflow**

The biggest advantage of artificial intelligence technology in electrical automatic control is to realize the automatic and intelligent control of the whole workflow. Specifically, in the practical application process of artificial intelligence technology, on the one hand, it can intelligently collect and process all kinds of information and data in the design process, and use computer to replace the traditional data collection and processing mode by man. On the other hand, in the process of using artificial intelligence technology, it can also track and record all kinds of information and data dynamically, which can provide strong data support for the future design work and ensure the rationality and reliability of the design process.

In addition, a large number of researches and practices show that the effective application of artificial intelligence technology can further improve the automatic level of electrical system and improve the safety of electrical system. In the process of running the system, once the failure occurs, the alarm will be issued as soon as possible to avoid bigger faults and security problems. By the effective application of artificial intelligence technology, acousto-optic and image can appear at the same time. System managers can manage the whole electrical system flexibly only by using computer, and the isolation switch of the system can be controlled by using keyboard and mouse.

## **3. Analysis on Application of Artificial Intelligence Technology in Electrical Automatic Control**

### **3.1 The Application and Analysis of Artificial Intelligence in Electrical Equipment**

In recent years, with the continuous development and improvement of the electrical industry in China, the electrical system has become more and more complex. Under this background, only by continuously improving the safety and stability of electrical equipment, can we meet the developmental needs of the electrical system. Therefore, the relevant managers and staff not only need to have solid professional theory and skills, but also have a strong ability of judgment and operation. By the application of artificial intelligence technology, on the one hand, the intelligent programming of electrical equipment can be carried out, which can greatly save the labor cost and time cost of electrical enterprises; on the other hand, it can improve the efficiency of the electrical equipments, improve the stability of electrical equipments, reduce the occurrence of the electrical equipments' faults, so as to enhance the economic benefits of the enterprises.

### **3.2 Improving the Application Level of Artificial Intelligence Technology**

From the current situation and developmental trend of electrical industry in China, most electrical enterprises have understood the importance of artificial intelligence technology in electrical automatic control. However, the application level of artificial intelligence technology in various electrical enterprises is generally low, so it is difficult to give full play of it in the process of the practical application. In fact, the key to the application of artificial intelligence technology in electrical automatic control is to improve the application level of artificial intelligence technology, which is also an important guarantee to improve the safety, stability of electrical system and the operation efficiency. Therefore, in the process of future development, it is necessary to strengthen the research and application of artificial intelligence technology, strive to improve the application level of artificial intelligence technology, and realize the unified control of electrical equipments by applying artificial intelligence technology to the neural network of electrical system. This can not

only effectively guarantee the stability of the electrical system's operation, but also enable expert to solve the problem quickly in the event of electrical system failure, so as to avoid large economic losses in electrical enterprises.

### **3.3 Analysis on Application of Artificial Intelligence Technology in Equipment Management**

As mentioned above, by the promotion of China's economic development, the electric industry of China has made remarkable progress, and it has entered into the social production and all aspects of people's life. So, ensuring the safe and stable operation of the electrical system can not only to realize the sustainable development of the electric industry, but also meet the needs of the economic and social development of China. During the operation and management of the electrical system, the management and operation of the electrical equipment is a very important segment. In the past, the management and manipulation of electrical equipment were mostly made of man-made. On the one hand, as the electric system and the equipment become more and more complex, a large number of labor forces are required to be managed, and the cost of human resource is too high; on the other hand, in the process of adopting the manual management mode, the equipment is often caused to fail due to human negligence and error, It is difficult to guarantee the stability of the operation of the electrical system. Therefore, the application of artificial intelligence to the management of electrical equipment is the inevitable trend of the development of the electric industry in the future. The effective application of the artificial intelligence technology not only can greatly save the human resources of the electric enterprise, but also can effectively avoid many human errors and improve the accuracy of the management of the equipment.

### **3.4 Application and Analysis of Artificial Intelligence in the Fault Diagnosis**

AS the constant development of information technology and computer technology, the comprehensiveness of artificial intelligence technology is increasing, so it can meet all kinds of needs of electrical automatic control. Especially, the application of artificial intelligence technology in fault diagnosis is one of the most widely used aspects of artificial intelligence technology in electrical industry at present. In artificial intelligence technology, expert technique is the key method to solve electrical fault diagnosis. With the help of expert technique, it can not only provide powerful technical support for the operation of all kinds of electrical equipments, but also can quickly locate and accurately analyze the fault of electrical equipment with the help of neural network control, which provides great convenience for the operators whose duty is fault diagnosis. Generally speaking, in electrical system, the fault of electrical equipment is mainly concentrated in engine, generator, transformer and other equipments, so in the process of fault diagnosis, these equipments are also detected first, which provides an effective guarantee for the efficiency of fault diagnosis and maintenance (the flow chart of fault diagnosis is shown in Chart 1). If we only rely on manual fault detection, on the one hand, it wastes a lot of time to find the problem, which will delay the normal operation of the electrical system; on the other hand, it is difficult to ensure the accuracy of fault diagnosis, which is easy to lead to the emergence of secondary faults. However, fault diagnosis with the help of artificial intelligence technology can effectively avoid these problems, because the fault diagnosis operation by virtue of artificial intelligence technology is simple, the accuracy rate of fault diagnosis is very high, and the fault location can be find out at the first time, and the causes of the fault can be analyzed systematically and comprehensively, so that the staff can carry out rapid and accurate equipment maintenance and ensure that the equipment can be put into work quickly, and then, to reduce the economic losses of enterprises to largest extent. Therefore, the application of artificial intelligence technology is of great significance to the sustainable development of electrical enterprises and electrical industry.

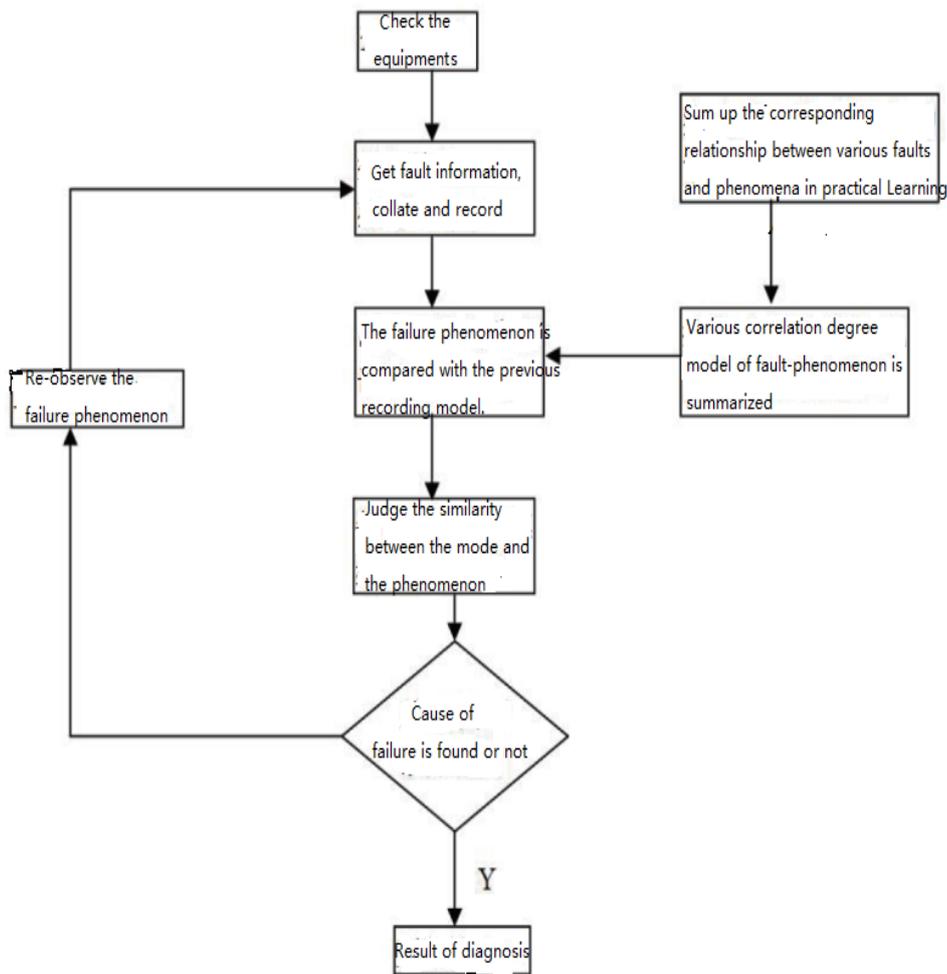


Fig.1. Flow chart of fault diagnosis

### 3.5 Application Analysis on Artificial Intelligence Technology in Electrical Automation

In recent years, artificial intelligence technology is more and more widely used in electrical automation, and the central control of industrial production and manufacturing is realized by artificial intelligence. Compared with the traditional management mode of production automation, with the help of artificial intelligence technology, the transmission equipment and mechanical equipment can achieve more coordinated work, so as to ensure the production quality and improve the efficiency of production, and to improve the economic benefits of the enterprises.

### 4. Conclusion

In general, the advantage of artificial intelligence in the electrical automatic control is to save the human resources of the electrical enterprises and improve the safety and stability of the electrical system. With the rapid development of the social development, the development of all walks of life and the daily life of people have higher requirements for the electrical automatic control system, and the traditional methods of management and control have not been able to meet the development demand of economic and social development of China in the future. Therefore, the relevant enterprises must fully realize the necessity to apply artificial intelligence technology to the electrical automatic control, strengthen the research and application of the artificial intelligence technology, and try to improve the application level of the artificial intelligence technology in the electrical system. Starting from the aspects of fault diagnosis, design, management and operation of electrical equipment, the time cost and human resource cost of the electric enterprise can be saved by the application of artificial intelligence technology, and the safety and stability of the operation

of the electrical system can be guaranteed. Only by such way, the development level of the electric industry can be improved fundamentally, and the economic and social development needs of China can be met.

## References

- [1] Li Fei, Liu Lingxi, Teng Qianlin; Wang Can. Exploration and Analysis on Application of Artificial Intelligence to Electrical Automatic Control[J]. Southern Agricultural Machinery, 2019,50(14):161.
- [2] Tang Zhenning. Train of Thought on Analyzing the Application of Artificial Intelligence Technology in Electrical Automatic Control[J]. Shandong Industrial Technology, 2019(17):138.
- [3] Lu Sha. Analysis on Application of Artificial Intelligence Technology to the Electrical Automatic Control[J]. Electronics World, 2019(12):144-145.
- [4] Zheng Quanju. Discussion on Problems and the Countermeasures of Artificial Intelligence Technology Applied to the Electrical Automatic Control in Mine[J]. World Nonferrous Metal, 2019(05):18+20.
- [5] Luo Haiying. Analysis on the Application of Artificial Intelligence Technology in Electrical Automatic Control[J]. Information Recording Material, 2019, 20(05):68-69.