Application of Robot Technology in Electrical Automation Area

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Abstract: With the continuous development of the social economy, people's demand for electricity is increasing, and automation control is an important part of electrical engineering. In the process of electrical engineering automation control, robot technology plays a very important role. Robot technology can promote the automation control ability of electrical engineering to a great extent, which provides a good help for the development of electrical engineering. It is urgent to automate the reform and management of it, to achieve automatic control in the power system, to ensure the stability and reliability of the power system, and to ensure the safe and sustainable development of the power system. The paper mainly describes the intelligent technology in electrical automation control, focusing on the application of intelligent technology in electrical engineering automation.

1. Introduction

Robotics is an innovation in the field of technology that has enabled all industries to achieve full development. The application of industrial robot technology in electrical control can make the system operation of electrical equipment more simple and intelligent, and can optimize the system. At the same time, the application of robot technology also provides technical guarantee and safety guarantee for electrical automation control, reduces the damage caused by the operation of various electrical equipment, and improves the work quality on the basis of saving manpower and material resources. In the development of the electrical industry, automation must use robotics.

2. Industrial robot construction and characteristics

Industrial robots consist of three basic parts: the main body, the drive system and the control system. The main body is the base and the actuator, including the arm, the wrist and the hand, and some robots and walking mechanisms. Most industrial robots have 3 to 6 degrees of freedom of movement, of which the wrist usually has 1 to 3 degrees of freedom of motion; the drive system includes a power unit and a transmission mechanism to cause the actuator to act accordingly; the control system is input according to the input The program signals and controls the drive system and the actuator.

According to the movement form of the arm, the industrial robot can be divided into a rectangular coordinate type. The arm can be moved along three orthogonal coordinates; the cylindrical coordinate type can be used for lifting, turning and telescopic movement; the spherical coordinate type can be rotated. , pitch and telescopic type; articulated arm has multiple rotating joints. According to the control function of the actuator movement, it can be divided into a point type and a continuous track type.

(1) Advanced industrial robots integrate advanced manufacturing technologies such as precision, flexibility, intelligence, software application development, etc., through the detection, control, optimization, scheduling, management and decision-making of the process, to increase production and improve quality. Reducing costs, reducing resource consumption and environmental pollution are the highest manifestations of industrial automation.

(2) Technology upgrade Industrial robots and automation equipments have the technical characteristics of fine manufacturing, fine processing and flexible production. It is a new generation of production tools that extend the physical strength and intelligence of human beings after power machinery and computers. An important means of digitization, automation, networking and

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intelligence.

3. Defects or deficiencies in traditional electrical automation

Traditional electrical automation control lacking intelligent technology has many shortcomings, and there is no security as a guarantee in management. In the early development of electrical automation, there is no effective control over the security of data. However, lack of technical support, when communicating with other companies for internal data and information, there will be difficulties in data transmission due to differences in product performance. Electrical automation is very difficult and costly to manage and operate. Electrical automation was first in the industrial field, and now it is gradually becoming more commercialized. Once a security loophole occurs in management, it will have a great impact on production.

At the same time, in the absence of intelligent technical support, the electrical automation control is also very simple in the maintenance and maintenance of the equipment. It is not possible to quickly find and solve the problem in the event of a failure. This will affect the production rate of the enterprise, increase the operation and maintenance cost of the enterprise, and reduce the final efficiency of the enterprise. The traditional electrical automation technology control is very simple in development. There is no effective network platform as a support to ensure the development of electrical automation control. The development of electrical engineering automation must rely on the network platform as a carrier to achieve effective control. There is no platform. Support, enterprise data information will be greatly affected in the processing.

4. Electrical automation control measures for core intelligent technology

Computer vision refers to the recognition of objects and activities from the image of a computer. Computer vision technology can use image processing operations for analysis. In electrical automation control, data images are analyzed according to electrical monitoring, and images are decomposed into convenient Managed small tasks. As a discipline, machine vision can be used visually in industrial automation, especially in factory operations, where the environment is limited, computer technology can be applied, and individual parts of electrical equipment can be identified and controlled relatively simply.

The machine learning computer system does not need to follow the instructions of the program, but relies on the data to improve its performance. Machine learning autonomously discovers the current working mode from the data. Once the working mode of the machine can be found, it can effectively predict the future machine work and control the entire electrical equipment. The electrical automation control process generates a large amount of data, and machine learning can improve the performance of these electrical devices based on the data in the work. It can effectively identify suitable forms of activities, and can also predict and manage future control development.

Natural language processing refers to the ability of a computer to be used for text processing similar to humans. You can extract useful information from the text, and even interpret its deep inner meaning from complex descriptions. This technology is applied to electrical automation control, and it can consciously and actively identify the performance of internal work and the focus of work during the operation of electrical equipment. Natural language processing technology can combine various technologies to achieve the ultimate goal of intelligent control. A language model can be established to predict the production process, and the safety of the entire production process can be identified and managed. This technology can enhance the safety management of electrical automation, and can timely identify many hidden dangers of the electrical system. And deal with the fault for the first time, so as to minimize the impact and loss.

The new generation of robots integrates a series of cognitive technologies, such as machine vision and automatic planning, to design small hardware or sensors. Robots can work with humans and work in uncertain environments. Handle different tasks. For example, the current UAV can replace human beings to monitor and control the work of the entire equipment before the electrical equipment, share the human work, reduce the burden on human beings, and liberate the labor force.

Speech recognition is a technology that can accurately convert machine language into human language. It uses voice recognition technology to control electrical automation, supplemented by other technologies, and builds specific programs into acoustic models for voice control of computer systems. It records the operating status of the electrical system, and is updated and tracked at all times, facilitating the simplification of the control process, and even exiting the APP for speech recognition, helping us to control the electrical automation.

5. The function and application of robot technology in electrical control applications

(1) Realize data collection and processing. When applied in electrical control, some data in the device can be collected, and some data can be stored according to the continuous improvement of functions. (2) Monitor the operating system and issue an alarm in time. It can effectively monitor some problems that occur during the use of electrical equipment, and can also effectively simulate the electrical system, monitor the switch quantity of the equipment to prevent abnormal situations, and automatically start once an abnormal situation occurs. The alarm device can also cut off some electrical equipment, so that the electrical equipment is in a safe state. (3) Control the operation of electrical equipment. The operation of the electrical equipment can be made simpler, the control of the circuit breaker and the electric disconnector can be realized by the mouse and the keyboard, and the excitation current can be adjusted. Through the application of this technology, the workload of the staff can be greatly reduced and the labor intensity can be reduced.

(1) In the application of electrical equipment, the design of electrical equipment should meet the requirements of automation operation, and the application of robot technology should also be strengthened in the process of design. Because the system of electrical equipment is complex and contains many aspects of knowledge and skills, when designing, some algorithms can be set by computer to calculate some parameters in the design of electrical equipment system, thus facilitating the control system of electrical equipment. Design, greatly improving the working speed and quality of the equipment.

(2) In the application of electrical control work, in the electrical field, the control of electrical equipment is a very important part. The automation equipment is the main development direction of the current electrical industry. In the control of equipment, it is also necessary to gradually realize the intelligence. It can greatly enhance work efficiency, reduce capital costs, and reduce the labor intensity of practitioners.

(3) In the daily operation of electrical equipment, the electrical industry is closely related to the daily life and work of the people. Various power grids are very complicated, and there are many electrical equipments. The daily control work is also very cumbersome. The traditional daily operation is more complicated, and it also increases the control time of the electrical system and reduces the control efficiency.

(4) Application in the process of fault diagnosis. In the electrical operation process, whether it is objective factors or other subjective factors, it will cause electrical equipment failures and accidents. If these faults are not processed in time and the corresponding reasons are not found, it is likely to cause more serious harm. There will be a large economic loss. In the process of electrical automation, the diagnosis of the use performance and faults of the equipment should be gradually automated, and the application of industrial robot technology will make the fault diagnosis process easier.

(5) Application in simplifying the automatic control process. The automation control in the electrical field is a very complicated process. The requirements for each step are strict. Once a link occurs, it will cause serious consequences and cause large economic losses. The application of robot technology can analyze the use of various equipment, fault conditions, etc., and then design a reasonable fault handling method to ensure the quality of electrical self-control work as much as possible. And the application of this technology can also achieve remote maintenance and simplify the process.

6. Conclusion

The application of robot technology in the electrical control process includes many aspects, such as the operation of electrical equipment, the diagnosis of faults, the simplification of automatic control flow, etc., all of which can make the process simple and fast, and promote the electrical equipment by means of robot technology. The level of automation continues to increase.

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