

## Present situation and development trend of welding robot

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**Abstract:** in recent years, the research and application of welding robot technology has made many outstanding achievements in seam tracking, off-line programming, path planning, intelligent control and so on. With the continuous development of computer technology, intelligent control technology and artificial intelligence theory and industrial production systems, robotics and many waiting for us to study the problem of welding, especially of the path planning technology of intelligent welding robot (such as neural network algorithm, genetic algorithm, ant colony algorithm, etc.) will be the main direction of future research. In view of this, this paper analyzes the current situation and development trend of welding robot technology, for reference only.

### 1 Introduction

The rapid development of science and technology in our country has greatly stimulated the development of manufacturing industry. Welding robot as an important symbol of the upgrading of the manufacturing industry has been highly valued by the state, the government to increase policy and funding support for the rapid development of welding robot.

### 2 the status and advantages of welding robot in welding

Robot welding is a breakthrough in the welding industry. It is a new method of flexible automation compared with the traditional rigid welding automation. This flexibility is mainly manifested in the desire to make the welding robot to complete a welding task, only the welder to give it a demonstration, it can imitate the human each step. If you want a robot to do another task, do not need to change the hardware, it can be a demonstration of it. This performance of the robot, so that small quantities of different products of automatic welding possible. The rigid automatic welding equipment is generally dedicated, can only complete a welding task, usually used in medium and large quantities of automatic welding products.

### 3 research status of welding robot technology

#### 3.1 coordinated control technology of welding robot and peripheral equipment

Positioner and control cabinet, etc. the original workstation needs welding machine process, rather than an independent unit can work, so as to enhance the efficiency of welding, must each original coordinate together to enhance its efficiency. In the process of welding transverse welding welding position for welding quality overall have a crucial influence on the welding quality of riding a positive effect for the

overall quality of the robot, from which can be seen only by adjusting the position of the robot and posture so as to achieve the corresponding position of welding is very difficult, will also increase the construction process the inconvenience, however the welding points are determined in the same plane method can reduce the difficulty of the operation in a certain extent, the same level of the welding point combined with the coordinated motion of other components, also for quality guarantee.

### **3.2 Study on arc welding power supply for welding robot**

In the research of welding robot, the research of arc welding power supply must not be ignored. As a kind of electric appliance, the welding robot can see how much power it can play. The excellent performance of the special arc welding power supply has a great influence on the performance of the welding robot. The special arc welding power source with good electrical performance can reflect the high quality and high efficiency of the welding robot. In recent years, arc welding power supply technology matures, the majority through the single-chip microcomputer to control the transistor arc welding inverter as robot arc welding inverter, excellent dynamic characteristics are capable of welding, ensure the welding quality and efficiency. There is a power supply welding power control fuzzy control with fuzzy control method, this method has strong adaptability, can satisfy the workpiece surface roughness, and the welding has great deformation conditions, and consistency of the weld width and weld penetration, weld forming, less defect. Arc welding power source is toward digital direction, the welding process will be more stable, the impact will be further reduced, more welding quality can be guaranteed, the digital welding power source will become a development direction.

### **3.3 neural network path planning algorithm**

Neural network path planning algorithm is a kind of intelligent path planning algorithm. The neural network algorithm has good adaptability and robustness, and it can deal with the control problems of complex welding process, such as time-varying, multi factor, nonlinear and so on. The neural network has good adaptive and self-learning ability, and good fault tolerance, large amount of information storage, can realize the parallel associative search solution space and adaptive reasoning, improve the intelligence level, knowledge processing ability and robustness. Therefore, it is a very efficient method to use neural network to plan the path, which plays an important role in the path planning of robot welding. As shown in the schematic diagram of the 1 neural network.

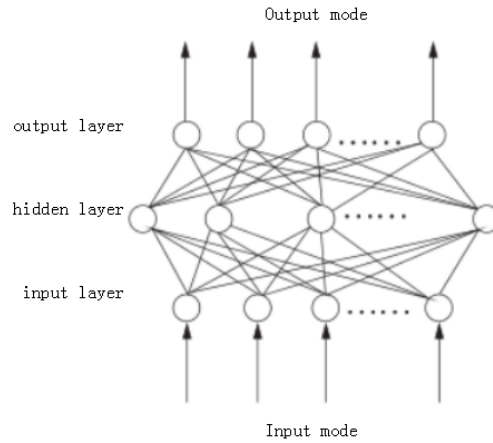


Fig.1 Neural network schematic

### 3.4 seam tracking technology

In the welding process, often accompanied by strong arc radiation, high temperature, smoke, splash and other phenomena. The welding parts will also be due to processing errors, thermal deformation and other factors lead to welding error, or even the entire welding process failure. In order to solve this difficult problem, we often use a welding method called weld tracking technology in the actual welding process. The technology is to detect the changes in the welding conditions, real-time adjustment of the parameters and the welding trajectory, so that the quality of the weldment is guaranteed. In the seam tracking technology, one of the core technology is the sensor technology. The sensor used in this system includes two kinds of sensors: arc sensor and optical sensor.

## 4 development trend of welding robot technology

### 4.1 virtual reality

The technology can be applied to the reality, which is applied to the robot, the robot for the surrounding environment. And can be applied to the production process of robot welding technology, so as to realize the digital welding technology for the welding technology, through the electronic control, in order to further regulate the welding technology. The use of this technology can make the application of the technology people foresaw after welding in welding, so as to timely for unreasonable changes, and compared for various schemes, find out the reasonable scheme to be used.

### 4.2 multi sensor information fusion technology

The reliability of the sensor has become the basis and prerequisite for the development of intelligent robots. In this case, the technology of multi-sensor intelligent information fusion appeared. Multi sensor intelligent information fusion technology for the comprehensive collection for all kinds of information, and processed through the analysis for the collected information, thus the situation around the sensor for general understanding, then, is conducive to the robot according to the instructions to make some corresponding responses in the nearby environment permits.

It can be seen that the multi-sensor information not only plays an important role in the identification of the surrounding information, but also plays an important role in the rationality of the robot action and action. The development of sensor technology is also a big leap for robots.

## **5 Conclusion**

Welding technology plays a very important role in the development process, all walks of life cannot do without the welding technology, in the course of production robot, welding technology plays an irreplaceable role, plays a very important role in the manufacturing process of robot. Moreover, the welding technology not only plays a very important role in the current robot manufacturing, but also in the future manufacturing process.

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