Study on the Application of Intelligent Robot NC Technology in Machinery Manufacturing

Jianbo Yuan1,*

1Shandong University of Science and Technology, Tai’an City, Shandong Province, China, 271000

*Corresponding author e-mail: yuanjianbo@sdust.edu.cn

Abstract. Intelligent robot numerical control technology is more and more widely used in mechanical manufacturing, and its role in mechanical manufacturing is becoming more and more important. In mechanical manufacturing, the application of intelligent robot numerical control technology has greatly improved the efficiency of mechanical manufacturing, and also better guaranteed the quality of mechanical manufacturing. Based on this, this paper expounds the basic concept and advantages of intelligent robot numerical control technology, and then makes a simple analysis of the application of intelligent robot numerical control technology in mechanical manufacturing, such as macro-program, off-line operation of programming, laser detection technology, planning trajectory.

Keywords: Intelligent Robot, Nc Technology, Machinery Manufacturing

1. Introduction
With the rapid development of the times, traditional machinery manufacturing has been unable to adapt to the current society. Machinery manufacturing industry is one of the most important industry types in China. The development level of machinery manufacturing industry will directly affect the overall strength of the country [1-3]. In the future, the mechanical manufacturing industry will inevitably move towards a smaller scale, a variety of types, personalized customization, section production cycle, and high production accuracy. In many production links, the precision of operation is very strict. If the mode of artificial operation is adopted, certain errors will inevitably occur, which will affect the quality and efficiency of mechanical manufacturing [4-6]. Therefore, there is an urgent need to find more reliable, accurate and efficient methods through the application of intelligent robot numerical control technology, so as to improve the level of mechanical manufacturing. With the emergence of intelligent robot numerical control operation technology, it provides the machine manufacturing industry with the possibility of mechanical intellectualization, automation and mechanical equipment compounding. Therefore, the application of intelligent robot numerical control technology in machine manufacturing will be the development trend of machine manufacturing in the future.
2. Characteristics of NC technology
With the emergence of intelligent robot numerical control operation technology, the mechanical manufacturing industry has made great progress. NC technology has the characteristics of high production accuracy and high production efficiency, as shown in figure 1.

![High production accuracy and efficiency](image)

**Figure 1.** NC technology characteristics.

2.1. High precision of production
The application of numerical control technology can greatly improve the production accuracy of mechanical manufacturing. Firstly, the application of numerical control technology in mechanical manufacturing process can make the original complex production process become programmed and standardized, avoid the errors and errors caused by manual operation, and significantly improve production efficiency and quality. NC technology can achieve fine manufacturing of mechanical parts by setting processing parameters, and improve the manufacturing accuracy to micron and nanometre levels, thus meeting the application requirements of precision parts.

2.2. High production efficiency
The application of numerical control technology can greatly improve the efficiency of mechanical manufacturing. The application of NC technology in mechanical manufacturing process can realize batch production by setting the parameters of one kind of product, synchronous processing of different specifications of parts by setting the parameters of different products, and directly produce another kind of parts without stopping work by changing the parameters of NC technology, which greatly shorten the application time of mechanical manufacturing and greatly improve the production efficiency.

3. Advantages of intelligent robot NC technology

3.1. NC technology of intelligent robot
In many fields of modern technology, NC technology could be well applied, among which mechanical manufacturing is one of the main application directions. The emergence of intelligent robots can solve many difficulties in people's lives, greatly save human resources, and improve people's living convenience and comfort. Intelligent robotic numerical control technology is mainly used in mechanical manufacturing. Procedures are set according to the requirements and specific operation process is controlled by computer. In practical application, the basic idea is that technicians are responsible for the inspection and measurement of related products and the acquisition of data, drawings and other related information. Using computer programming software, according to the needs of programming, get the relevant data into the application program. Through computer control program and intelligent robot numerical control technology, the staff can carry out specific operations, and then realize the application of intelligent robot numerical control technology in mechanical manufacturing, so that the efficiency of mechanical manufacturing can be effectively improved. At the
same time, through system control, the reliability and safety can be ensured, and the accuracy of mechanical processing can be guaranteed to meet the requirements.

3.2. Advantages of intelligent robot NC technology
Intelligent robot numerical control technology is very helpful to improve product quality and product accuracy. In mechanical manufacturing, the application of numerical control technology can improve the quality and accuracy of mechanical manufacturing, and also improve the efficiency of mechanical manufacturing. In the application of mechanical manufacturing, intelligent robot numerical control technology can be flexibly adjusted to process workpieces with multiple complex surfaces. The application of intelligent robot numerical control technology realizes modular operation, which improves the efficiency obviously. In addition, the application of intelligent robot numerical control technology also provides a basis for the application of electronic technology, and computer aided manufacturing and automatic control technology.

4. Application of intelligent robot NC technology in machinery manufacturing

4.1. Sensor-based intelligent robot macro program
Sensing intelligent robot is also called externally controlled robot, which could process information and control production by controlling external computer. In the mechanical manufacturing work of industrial production, mechanical equipment is one of the basic links. Because the production environment of some manufacturing products is relatively difficult, it is difficult to use manual operation to meet the needs of production. Therefore, it is necessary to use intelligent robot numerical control technology to help carry out production and manufacturing work, through automation and intelligent production mode, better carry out mechanical manufacturing work. Sensor-based intelligent robots are common in intelligent robots, which are also called externally controlled robots. These robots are controlled by external computers, which can realize the processing of sensing information and the real control and operation of instructions.

4.2. Interactive intelligent robot planning trajectory
Polishing is an important link for mechanical manufacturing and processing. In the traditional mechanical manufacturing process, polishing process is very easy to cause damage to polished parts due to human errors, which seriously affects the quality and efficiency of mechanical manufacturing. The emergence and application of intelligent robot numerical control technology greatly reduces the loss rate of polishing process, reduces the probability of parts damaged by polishing, and more in line with the intelligent and automated development of mechanical manufacturing industry. In the specific process of mechanical parts processing, the generation of motion trajectory can rely on interactive intelligent robots, which can have a certain impact on the shape and accuracy of parts.

4.3. Laser detection of autonomous intelligent robot
Autonomous intelligent robot is a kind of robot that can independently identify the working environment and automatically complete various anthropomorphic tasks without the intervention of designers and operators, which is more intelligent and automated than sensor-based and interactive intelligent robots. Autonomous intelligent robots have autonomous and interactive performance. Using sensor data processing, image recognition, driver control and other functional modules to achieve autonomous mechanical manufacturing is of great significance to the intelligent and automated development of mechanical manufacturing industry, and is an important tool to promote industrial unmanned.

4.4. Program off-line operation of autonomous intelligent robot
Programming of off-line operation is needed in mechanical manufacturing, and autonomous intelligent robot can realize this function. Autonomous intelligent robot has the greatest advantage of autonomy
and adaptability. Autonomy means that the robot cannot be affected and controlled by the external environment, and can autonomously control the development of work tasks. Adaptability refers to recognizing the surrounding environment independently, adjusting its own parameters according to the changes of the surrounding environment, dealing with and responding to emergencies. In the process of production and manufacturing, autonomous intelligent robots can fully consider the reality to identify autonomy and adaptability, and select the most appropriate scheme to carry out follow-up processing.

5. Conclusion
With the development of science and technology, artificial intelligence will have a significant impact on the development of mechanical manufacturing industry. More and more advanced technologies are applied to mechanical manufacturing, which greatly improves the level of mechanical manufacturing. Among them, the application of intelligent robot numerical control technology in mechanical manufacturing can greatly improve the level of intelligence and automation of mechanical manufacturing, improve the efficiency and quality of parts processing, and meet the requirements of high precision and high standards. The application of intelligent robots in mechanical manufacturing industry can raise the efficiency of mechanical manufacturing to a new level. Through the analysis of intelligent robot NC technology in parts manufacturing, polishing and off-line programming, the great role of intelligent robot NC technology in mechanical manufacturing industry is embodied.

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