

# Research on the Application of Intelligent Robots in the Field of Mechatronic Engineering

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**Abstract:** *In the social context of the common development of economy and science and technology, the promotion of intelligence is increasing, and intelligent robots have achieved a certain degree of application expansion in various fields. In the field of mechatronic engineering, the application effect of robots is very significant, and the application of robots has contributed to the improvement of mechatronic engineering production efficiency and production quality to a large extent. Therefore, in order to promote the development of mechatronic engineering in the new era, it is imperative to conduct in-depth research on the practical application of robots. In view of this, this paper analyzes the basic concepts of robotics and mechatronic engineering, analyzes the specific robot technology on the basis of clarifying the importance of robot application, clarifies the direction of robot application in the field of mechatronic engineering, and makes predictions and prospects for the future application and development of robot technology.*

**Keywords:** *robots; mechatronics; Engineering applications*

## 1. Introduction

In the process of industrial intelligent development, intelligent robots have a very significant importance in the manufacturing industry, and the application of intelligent robots in the field of mechanical and electronic engineering will help promote the automation and intelligent development in the field of mechanical and electronic engineering. Because the application effect of robots in mechatronic engineering is good, which can promote the improvement of production efficiency of mechatronic engineering and help improve the coordination of the whole engineering construction, it is a crucial task to conduct in-depth research on the practical application scheme of robots. At this stage, the application experience of robots in the field of mechatronic engineering is relatively small, so it is easy to have problems during the application practice, therefore, it is necessary to study the practical application countermeasures of robot technology in depth and put forward effective application optimization schemes.

## 2. Conceptual analysis of robotics and mechatronic engineering

### 2.1. Types of intelligent robots

Intelligent robots are core and critical technologies in the field of artificial intelligence. According to the degree of intelligence of the robot, intelligent robots can be divided into sensor type, interactive type, and autonomous type. Among them, sensor-type intelligent robots are also called externally controlled robots. The robot structure only has an execution structure and a sensing mechanism, and there is no intelligent unit. During the application process, it can process visual, auditory, ultrasound and other information. In the application In the process, it can promote the improvement of mechanical and electronic control operation capabilities. Interactive intelligent robots mainly operate based on human-machine dialogue between computer systems and programmers. In practical applications, interactive robots have a strong functional role in problem processing and decision-making, but they are usually subject to external There is a lack of work due to factor constraints. Autonomous robots mean that after the design and production are completed, the robot itself has a high degree of autonomy and can automatically complete anthropomorphic tasks in different environments without human intervention. Autonomous robots have relatively strong task execution independence and autonomy, and their functional modules are also relatively complete.

## ***2.2. The development history of mechatronic engineering***

Generally speaking, the whole development process of mechatronic engineering can be divided into three different periods, the first period is the stage of manual domination, in which the mechanical equipment is more dependent on manual intervention, and during the actual operation of mechanical equipment, the amount of tasks that the mechanical equipment is responsible for is relatively small, and the overall need to adopt manual control for mechatronic engineering production <sup>[1]</sup>. The second development period is the assembly line stage, in which a complete production and processing line needs to be built during the production of mechanical and electronic engineering, and then the equipment is controlled by the computer, so as to complete the production task and improve the production efficiency. In the actual operation process, mechanical and electronic technology and information technology can achieve a good organic combination effect, and all kinds of technical means can be combined with the production of mechanical and electronic engineering under the concentrated role of the digital control center.

## ***2.3. The intrinsic relationship between intelligent robots and mechatronic engineering***

In the actual robot application process, the use of intelligent robot technology to assist the application of robots in mechanical and electronic engineering can obtain twice the application effect with half the effort, under the application of intelligent robots, the loopholes in the traditional mechanical manufacturing mode can be made up in time, and the overall production quality and efficiency of mechanical and electronic engineering will be significantly improved. It can be seen that the rational application of robots in the development process of mechatronic engineering is helpful to improve the intelligent level of the production process, strengthen the control in mechatronic engineering, and then promote the overall improvement of the production effect of mechatronic engineering. At the same time, the production optimization of mechatronic engineering will also promote the further development and upgrading of intelligent robots. It can be seen that the application of intelligent robots can promote the development of informatization, automation and even intelligence in the field of mechatronic engineering, while mechatronic engineering can help the R&D and production upgrading of intelligent robots.

## **3. The importance of the application of robots in the field of mechatronic engineering**

### ***3.1. Helps to improve production efficiency***

From a global perspective, the labor cost in the field of traditional mechanical and electronic engineering is relatively large, and the cost of R&D, purchase and use of intelligent robots is more economical than that of traditional machinery manufacturing. At the same time, because the robot is not susceptible to external factors such as emotions in the work process, and has higher work efficiency, the rational use of robots can effectively improve the maneuverability and reliability of mechanical and electronic engineering production. The safety, high precision and difficult quality of some high-risk work in the field of mechanical and electronic engineering can also be guaranteed under the role of robot application. In general, with the assistance of robotics, when carrying out mechatronic engineering, all work is no longer limited by human production capacity, and the overall production quality will be improved.

### ***3.2. It is beneficial to strengthen production supervision***

With the gradual penetration and integration of robots in the field of mechatronic engineering, the relevant supervision and management effects can be further optimized and strengthened when supervision is carried out in the production process of mechatronic engineering. Specifically, in the traditional supervision mode, the supervision work based on manual work is more likely to be affected by human subjective factors and is not accurate, and with the gradual application and implementation of robots in the production supervision of mechanical and electronic engineering, relevant departments can effectively use automated and intelligent supervision methods to replace manual supervision, so as to improve the accuracy of supervision and management, so that the robot can independently complete the production supervision task in the process of operating the system, and effectively improve the quality of supervision of the whole production process <sup>[2]</sup>.

### ***3.3. Helps enhance coordination***

There are a large number of disciplines involved in the development process of mechatronics engineering. Electronics, mechanics, computer technology and other disciplines are all reflected in the field of mechatronics engineering. Therefore, in the actual production process, the work performed by different disciplines There are obvious differences in properties. In order to ensure the overall quality of mechanical and electronic engineering production, it is necessary to give full play to the active role of different disciplines. On this basis, the application of robotics technology in mechanical and electronic engineering can improve the coordination of the overall work. With the application of intelligent means such as artificial intelligence algorithms and environmental perception systems, faults in mechanical and electronic engineering will be dealt with promptly and effectively, and various disciplines can achieve coordination and cooperation with the support of robot applications.

## **4. Available robotics in the field of mechatronic engineering**

### ***4.1. Network Control Technology***

Network control technology is a key technical means during the application of robots, which can affect the overall application effect in the actual application operation of robots. Specifically, during the production of mechanical and electronic engineering, giving full play to the application of network control technology can effectively improve the system parameters and process adjustment efficiency in the production process, and help to enhance the actual operation quality of integrated control equipment. In the process of system operation, network control technology can provide effective support for the application of robots, and at the same time can replace some manual operation tasks, so that the production efficiency of mechanical and electronic engineering can be comprehensively improved. It can be seen that in order to ensure the application effect of robots in the field of mechanical and electronic engineering, it is necessary to do a good job in the application planning of network control technology and effectively improve the application efficiency of this technology.

### ***4.2. Quick diagnostic technology***

As the name suggests, rapid diagnosis technology refers to the rapid diagnosis of various possible errors when applying robot technology in mechanical and electronic engineering, so as to eliminate the failure problems in the operation of mechanical and electrical products, so as to ensure that the entire operating system is in a stable working state. The scientific application of rapid diagnosis technology in the application process of robots can improve the speed of tracking equipment fault points, and can timely find fault problems in the operation of equipment, so that maintenance personnel can take effective technical means to deal with faults in time<sup>[3]</sup>. From the perspective of practical application effect, the application of rapid diagnosis technology can reduce the errors in manual diagnosis work, and can greatly reduce the level of equipment maintenance investment during the production of mechanical and electronic engineering. In the actual process of technology application, the staff should promote the implementation of rapid diagnosis technology from the perspective of system parameter information fault analysis and judgment.

### ***4.3. Embedded System Technology***

Under the background of the rapid development of computer technology, when recommending the application optimization of robots in the field of mechanical and electronic engineering, the practical application feasibility of embedded system technology should be fully considered, and the embedded system should be reasonably constructed according to the actual application of robots, so as to effectively provide special computer systems for the actual work of robots, so as to ensure the accuracy of robot operation and timeliness of response. Because the embedded system technology is relatively small in size and very professional, when the robot is remotely controlled, the production safety of the robot can be guaranteed by applying the embedded system technology, and the specific operation of the robot in the mechanical and electronic engineering production can be effectively controlled, so as to improve the production efficiency.

## **5. Practical application of robots in the field of mechatronic engineering**

### **5.1. Part processing**

The application of robot technology in the process of parts processing in the field of mechanical and electronic engineering can effectively improve work efficiency, and the relevant personnel can take macro program control means to control the robot in the practical operation process, so that the robot can play an effective role in the process of parts processing and production, and solve the processing tasks with high complexity. In the process of parts processing, the operator should input relevant instructions in the system, so that the robot participates in the production process, and the robot is controlled, the actual working situation in the production process is collected by using the sensor, and the appropriate production parameters are set before the robot is operated, and the manufacturing equipment is sent accurate instructions, so as to clearly control the processing and production process of mechanical and electronic engineering parts, and help improve the processing quality.

### **5.2. Off-line Programming**

With the application of robots, the practical advantages of offline programming during mechatronic engineering production will be further expanded, and offline programming can effectively meet production needs and assist in the successful completion of production activities<sup>[4]</sup>. Specifically, during the execution of the production work of mechatronic engineering, the complexity of the various manufacturing processes is relatively high, and the technical requirements for the operation are relatively strict. Due to the strong precision of parts and products during production, it is very feasible to reasonably use the robot for offline programming to flexibly and timely adjust the production parameters and ensure the precision of parts. In short, in the offline programming of mechatronic engineering, the rational application of intelligent robots can improve the implementation quality of the manufacturing process, and can fully meet the product manufacturing needs in the production process of parts.

### **5.3. Track design**

The application of robot-assisted track design optimization in mechanical and electronic engineering is indispensable, work tasks, in the actual track design and operation process, the staff should fully promote the innovation of work forms, use interactive configuration to replace the manual operation mode under computer control, and effectively give full play to the advantages of single-machine interactive robot application in different production conditions to reasonably adjust control measures, flexible and reasonable track planning, and avoid work errors due to human interference in track design. And then improve the production accuracy of mechatronic engineering from the root. It can be seen that in the process of track design, interactive robots can be used to improve the production effect, effectively play the functional role of interactive robots, and comprehensively optimize the decision-making and information processing in the track design process.

### **5.4. Laser gauge**

Under the background of the continuous development of science and technology and the increasing requirements of industrial production, the precision level should be guaranteed and the product accuracy should be improved to meet the needs of users when carrying out machinery manufacturing. Based on this, when applying robots in the field of mechatronic engineering, it is necessary to promote the integration of robot applications from the perspective of laser measurement. For example, in the process of laser measurement technology operation, combined with the design of measurement programs, robot technology can be introduced to identify various software, give full play to the application advantages of interactive robots, improve the collection efficiency of parts processing data information, improve the production effect of parts with the help of the neural network function of the robot, and use sensors to efficiently transmit data, so that the size error in the production process of parts can be effectively controlled. In the final analysis, in the laser measurement work, the flexible use of various robots can improve the accuracy of part size recognition, can effectively ensure the efficiency of data acquisition and delivery during laser measurement, in the interaction, under the joint action of robots and sensors, the production accuracy of parts can be effectively controlled, and the resolution and repeatability of part dimensions can be limited to a reasonable range.

## 6. Prospects for the development trend of robots in the field of mechatronic engineering

The application value of intelligent robots in mechatronic engineering is high, which plays a good role in promoting the development of mechatronic engineering. When applying intelligent robots, its working principle is to simulate the structure of the human brain and other nervous systems, use different systems to distinguish information types, simplify the calculation process, and avoid errors and failures. By playing the role of intelligent robots, electronic devices can exhibit higher stability, enabling mechatronic engineering to continue to develop in a better direction<sup>[5]</sup>. The artificial intelligence system can automatically identify the signal, organize the data, complete the data processing and data storage, and improve the efficiency and accuracy of production. Mechatronics, highly intelligent is the inevitable trend of enterprise development, the use of intelligent robots can add a control center in the system, control the accuracy of production, ensure the stability of the system, can adjust the module function of mechanical and electronic engineering, strengthen the performance of the system. With the continuous development of intelligent robots, the defects of mechatronic engineering have been improved, making production more convenient and efficient.

## 7. Conclusion

According to the above, in the context of the development of the intelligent era, it is an indispensable task to promote the application of robots in the field of mechatronic engineering and effectively improve the depth of integration of robots in the construction of mechatronic engineering. In the new industry development period, practitioners should fully study the internal relationship between robot technology and mechatronic engineering, and clarify the application advantages of robots, and then analyze the types of intelligent robot technology available in the field of mechatronic engineering, and then start from the aspects of parts processing, offline programming, track design and laser measurement to carry out robot application research. On this basis, researchers should analyze the application and development trends of robots based on the current industry and even the overall development of society, improve the efficiency of robot application practice in the field of mechanical and electronic engineering, and truly contribute to the long-term development of the field of mechanical and electronic engineering and even the overall development of society. Intelligent advancement adds luster.

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