

# Based on the Application Analysis of Industrial Robots in Intelligent Manufacturing

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**Abstract:** The text briefly introduces the development status of industrial robots in our country, and analyzes the production benefits that they can bring after joining the manufacturing industry. On this basis, it discussed the applications of industrial robots in the current intelligent manufacturing field, and finally looked forward to the future development direction of robots serving the manufacturing industry.

## 1. Introduction

It is a vision that humans have existed for a long time to replace artificial production with robots. After entering the 21st century, the development of science and technology has turned this vision into reality. The field of industrial production is the first to apply robots in practice. The actual production results tell us that the addition of industrial robots will greatly promote the entire manufacturing industry, especially in the field of intelligent manufacturing, where the application of industrial robots has gained considerable development assistance.

## 2. The Current Development Stage of Industrial Robots in My Country

In recent years, China has invested a lot in high-tech research, especially in fields related to computers and information technology. The research and development of artificial intelligence has also achieved initial results. For example, major mobile phone operators have launched their own Artificial intelligence mascot. In addition, in the field of industrial manufacturing, artificial intelligence robots are gradually replacing operators into the manufacturing production line, hoping to help the manufacturing industry save the cost of product production. So far, some preliminary results have indeed been achieved. For example, some manufacturing environments are not suitable for humans to stay for a long time. After the use of industrial robots, there is no such problem, which avoids the physical damage caused by production. However, the domestic intelligent manufacturing industry started a little later after all, and there is still a certain gap with foreign advanced production fields. Moreover, the application of industrial robots in intelligent manufacturing still has certain limitations, so more research efforts are needed in the future.

## 3. Advantages of Industrial Robots in Manufacturing

The application of industrial robots in manufacturing production can bring great convenience to the entire production process: 1. In the industrial production process, some harmful dust, gas or even radiation will be generated. This is to restrict manufacturers from expanding an important factor in the scale of production [1]. After the use of industrial robots, manpower can be liberated from more hazardous production positions, reducing the harm caused by industrial production to the human body. 2. In the industrial production process, there are some links that need to be transported. Some items are too heavy and difficult to handle manually. Industrial robots do not have this problem. Even larger items can be transported smoothly. location. ③Industrial robots perform production operations in accordance with the set procedures. They are better than manual operations in terms of operating precision and accuracy, and their overall production efficiency will therefore

become higher. This will save industrial production costs and reduce the final product. The price is extremely beneficial to the public.

## **4. Several Applications of Industrial Robots in Intelligent Manufacturing**

### **4.1 Automatic Unbundling of Manufacturing Materials**

The process of automatic unbundling occurs in the initial stage of intelligent manufacturing. During the manufacturing process, certain raw materials are used. These raw materials are bundled together after they are purchased. To use materials for processing and production, they need to be disassembled first. For example, if you purchase the strip steel needed for production, these strips are bundled into steel coils. Industrial robots can be responsible for helping the production staff to cut the straps at this step. Because it can rotate 360 degrees without dead angles, it can choose the fastest path to cut the straps after identifying them, saving manpower and also Improve efficiency. It is even possible to collect the remaining strapping residues from cutting, compress the volume and throw it into the designated area as waste.

### **4.2 Automatic Sampling during the Manufacturing Process**

In industrial manufacturing, certain samples need to be collected to test the quality of the products from each production line, and to determine whether the production process is appropriate through some detected parameters. The sampling step can also be done by industrial robots. The industrial robot needs to go through two steps in the process of completing the sampling task, one is to obtain the sample, and the other is to mark the obtained sample. In addition to the robot itself, other cooperation such as sampling tools and push-out equipment are also needed. The robot completes the sampling and marks it, and then places it in a specific hopper [2]. Robot sampling can greatly avoid sample contamination, and the speed of marking sampling will be much faster than manual sampling.

### **4.3 Automatic Labeling of Production Products**

In the intelligent manufacturing process, industrial robots can also help with product labeling. In the production process, after the product production control system feedbacks the various parameters of the produced product, the industrial robot can directly receive the information, and then correspond the corresponding data to the various parameters on the designer label, and carry it by itself. The printing equipment of the company will print out the label, pick up the product and paste the label, which completes the entire process of product labeling. Compared with manual labeling, industrial robots have more precise control to ensure that the finished labeling surface is flat enough and firmly adhered to the product surface. In addition, the robot's recognition and matching of products and labels will be more accurate, which greatly reduces the chance of labeling errors.

### **4.4 No Manual Operation is Required for Driving during Production**

In the industrial manufacturing process, many semi-finished or finished products produced need to be transported to a fixed location or warehouse using transport vehicles. Before the introduction of industrial robots, this step was performed manually, and the traffic workers would transport the products. The vehicle is controlled, and the matching warehouse is selected to transport the product. In the intelligent manufacturing mode, the control of the transportation vehicle is realized by the unmanned driving function of the robot itself. The production plan designed according to the production process, the product transportation plan and other related information are input into the control system of the industrial robot. The robot can use its own computing system to simulate the best transportation plan and driving route. The completed driving operation can also intelligently

optimize the product transportation plan, reduce the transportation time, shorten the transportation route, and improve the efficiency of product transportation.

## **5. Looking Forward to the Future Development of Industrial Robots in Intelligent Manufacturing**

### **5.1 Human-Machine Collaboration is More Harmonious**

The intelligent manufacturing model led by industrial robots is to improve production efficiency, reduce production costs, and solve some dangerous production operations that cannot be completed by humans, but this does not mean that robots will completely replace the full role of humans in the production process. Judging from the development at this stage, industrial robots will still only be used as auxiliary facilities for manufacturing. Therefore, in the future, for the cooperation between industrial robots and humans in the intelligent manufacturing process, they will jointly contribute to the development of manufacturing industry. The research on machine collaboration still needs to continue to be strengthened, by adding more humanized functions to the design of robots to help the linkage between humans and machines be more harmonious, and give full play to the production utility of 1+1 greater than 2.

### **5.2 Further Expansion of the Coverage of Industrial Robots**

Judging from the current development trend, industrial robots have achieved initial results in the manufacturing industry, and intelligent manufacturing is gradually invading the market's competitive share. But from the perspective of the development potential of industrial robots, it can do far more than these, and there is still more room for development in intelligent manufacturing based on industrial robots [3]. At present, smart manufacturing covers more areas of industrial production, but in the future, it can gradually expand to industries such as food processing and pharmaceutical production, and even join high-tech fields such as military manufacturing and aerospace construction to make it more efficient. , Production safety and other advantages are more thoroughly played out, which promotes the development of all walks of life while also stimulating the construction process of the entire society.

### **5.3 Adapt to More Operating Environments**

In the known intelligent manufacturing, industrial robots mostly work on production lines, which still have certain requirements for the production environment in which they are located. But the essence of intelligent manufacturing is still to serve the entire production industry, and even to explore more production areas that cannot be touched by humans. This means that future industrial robots need to adapt to more kinds of working environments, such as harsh weather environments, or extreme manufacturing environments such as high temperature, high pressure, and vacuum. Therefore, the design and manufacturing process of industrial robots need to be further strengthened. When they can meet more types of production environments, the development of the intelligent manufacturing industry will become even further.

## **6. Concluding**

The application of industrial robots in intelligent manufacturing includes automatic unbundling of production materials, automatic sampling of production products, automatic labeling of products, and unmanned driving in the process of transporting products. The application of industrial robots in these links helps the efficiency of production and manufacturing become higher, and also reduces the harm suffered by humans in the production process. In the future, industrial robots will also have better development, helping to further expand the territory of intelligent manufacturing.

## References

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