

Analysis of the application of industrial robots in intelligent manufacturing

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Abstract: *In the context of the new era, industrial robots play an increasingly important role in the field of intelligent manufacturing, which not only boosts the high-quality development of China's economy, but also helps promote the optimization and upgrading of industrial structure and enhance the momentum of economic development. At present, industrial robots are widely used in intelligent manufacturing in welding operation, automobile manufacturing, automatic assembly and other aspects, and have formed a certain industrial scale and economic effect. Therefore, this article mainly from the industrial robot in the field of intelligent manufacturing development present situation, analyzes the industrial robot in the field of intelligent manufacturing applications, and put forward from the stick to establish and improve the personnel training mechanism, vigorously strengthen the technological innovation capability and upgrading product application performance and so on three aspects to explore the optimum path of industrial robots in the field of intelligent manufacturing, In order to promote the long-term development of industrial robots from the perspective of intelligent manufacturing in the future.*

Keywords: *Industrial robot; Intelligent manufacturing; Specific application; Optimal path*

1. Introduction

As an emerging industry, intelligent manufacturing is gradually being widely used and popularized in the market, through the combination of artificial intelligence machine and human thinking of the integration of human-machine intelligence system, from the beginning of the advent, covering analysis, judgment, reasoning and decision-making and a series of activities. Since its birth, industrial robots have provided a steady stream of power for the high-quality development of China's economy and society, and laid a solid foundation for the development of modern manufacturing industry. By constantly promoting the optimization and upgrading of industrial robot industrial structure, it is conducive to the sustainable development of China's social economy and to provide new economic growth momentum.

2. Development status of industrial robots in intelligent manufacturing

Nowadays, artificial production gradually replaced by robot manufacturing, has become the important trend of the manufacturing sector, it is not only to the development of intelligent manufacturing is the foundation, but also the future application of science and technology step by step towards the important symbol of the automatic, digital and intelligent, and as an important product of industrialization of industrial robots will play an important core status in the field of intelligent manufacturing.^[1] With the high-quality development of China's economy, big data technology and the Internet are constantly promoted and applied, and begin to move towards the direction of systematization and intelligence. In the long run, the application field and scope of industrial robots are also expanding, no matter in education, or in the medical field, embodies an important role. Therefore, industrial robots have fully improved the current level of industrial production and efficiency, while ensuring the stability of their own functional applications, they can cope with various unexpected environments, which is conducive to the high-quality development of China's intelligent manufacturing industry.

As we all know, the ultimate goal of enterprises is to pursue production efficiency and provide power for production innovation. Therefore, in the process of industrial production, industrial robots can not only replace manpower to complete the work with high difficulty coefficient, but also help to reduce labor costs. Day after day, at the same time, assembly line work, easy to cause the workers to produce the corresponding depression, is not conducive to stimulate working enthusiasm and working efficiency, and the wide application of industrial robots, to a certain extent to ensure the precision work task is complete, the product itself, to maximize the quality of help enterprises to better improve the efficiency

of the production and business operation. In addition, industrial robots in the practical application process, can be seamlessly connected with all kinds of CNC machine tools, for multi-category product production, ensure the construction of flexible production lines, provide a solid foundation. On the basis of no manual supervision and operation, high efficiency and high precision work can be guaranteed every day.

3. The application of industrial robot in intelligent manufacturing

The application of industrial robots in intelligent manufacturing is mainly analyzed from welding operation, automobile manufacturing and automatic assembly.

3.1. The welding operation

As an important technical application of industrial robot, welding operation mainly embodies its own important value in automobile and ship, and plays an important role in the manufacturing industry. Nowadays, the use of ships is large, and welding operation is conducive to give full play to the use value of industrial robots. In the process of welding operation, through a series of technologies such as systematic tracking and system optimization integration, to ensure that the relevant supporting facilities complete offline work tasks, improve the quality of welding operation. At the same time, the wide application of wireless communication technology also provides a wide range of technical terminal support for the deep development of welding operation. Therefore, in the workflow, the industrial robot is equipped with the corresponding welding tools at the same time, and intelligent sensors can permeate the application, complete the welding work with the ship or car body, on the basis of reducing the risk of manual welding, really improve the work efficiency and level.^[2]

3.2. The automobile manufacturing

In the field of automobile manufacturing, industrial robots are also widely used in the market. Through various effective scientific methods, it can provide sufficient technical support and intelligent terminal for automobile manufacturing industry. In addition, the market promotion of industrial robots is conducive to fully improving the productive technical functions of CNC machine tools and other basic equipment, laying a solid foundation for digital and intelligent manufacturing. In other aspects of automobile manufacturing, cleaning and assembly of parts and components are important embodying of hot working production operations. Therefore, at present, every basic link in the field of automobile manufacturing is inseparable from the participation and penetration of industrial robots. For example, brands such as Benz, Volkswagen, Toyota and Honda, which are widely known to us, have their own industrial robot suppliers and technical terminals to ensure the smooth progress of automobile production process.^[3]

3.3. The automatic assembly

The application of industrial robots in the field of automatic assembly is also very extensive, whether rectangular coordinate type, or rotary and plane joint type, all fully reflect the variety of industrial robots. For example, the industrial robot used in motorcycle engine assembly line, through the relevant process operation, the ability to finish all kinds of spare parts with high accuracy, high rigor of automated assembly, it can not only improve the work efficiency of the automated assembly operations can reduce the error probability in the parts assembly process more, on the basis of the normal operation of the machine, To prevent the slow down of service life of parts. In addition, dual-arm robots also play an important role in today's automated assembly operations. For example, the dual-arm robot developed by some large companies has the function of human-machine cooperation, and can imitate and learn human body movements.^[4] One of its most important outstanding advantages is its high safety and stability, which can prevent accidents. Therefore, in the production process of many enterprises, industrial robots have many incomparable advantages in automatic assembly. First of all, the industrial robot can measure the specific position of the bale, and on the basis of cutting, by compressing the proportion, leaving the usable and usable parts. Secondly, industrial robots in the process of automatic assembly, can be true and effective in the sample label remarks, complete a series of process work. At present, the unmanned vehicle widely known on the market can make full use of computer programming and big data technology, according to the most simple and efficient way, automatic parts assembly, data identification and information storage and other work, complete the scientific and convenient loading and unloading.

4. Optimization path of industrial robot in intelligent manufacturing field

The optimization path of industrial robots in the field of intelligent manufacturing can be explored and practiced in three aspects: establishing and perfecting talent training mechanism, vigorously enhancing technological innovation ability and optimizing and upgrading product application performance.

4.1. To establish a sound talent training mechanism

A good policy environment to achieve the benign development of industrial robot industry foundation. Therefore, relevant government departments need to formulate industrial policies in accordance with the actual situation, improve the emphasis on excellent scientific research talents, and guide and guarantee the healthy development of relevant industries.^[5] As we all know, industrial robots are high-tech and professional talents are scarce. In order to guarantee the in-depth research and development of industrial robot technology, it is necessary to strengthen the talent reserve. The education department can further adjust and improve the robot and other related majors to increase the investment in education. At the same time, enterprises need to strengthen the training of technical backbone, regular organization of technical personnel to the industry leading enterprises and advanced enterprises to learn experience, master the key points of industrial robots, combined with the actual production, robot research and development.

4.2. To greatly enhance technological innovation capacity

China's industrial robot research and development has been in the forefront of the international level in terms of execution, but there is still a big gap in innovative application ability, system integration level and operation accuracy. Therefore, we should actively establish relevant organizations of industrial robot industry, so as to form a certain industrial scale. At the same time, we can put forward specific development plans of the industry with the help of the organization association, and further promote the development of industrial robot toward the direction of industrialization. In addition, one or two kinds of industrial robots can be set as the focus of research and development, to promote industrial robot technology can achieve new upgrades and breakthroughs, and then strengthen the upgrading and development of the entire industrial robot industry in a point-to-point way. In addition, it is necessary to strengthen the research and development of industrial robot technology, and continuously publicize and promote its various new technologies and practical application industries, so as to create a more high-end and cutting-edge development environment for it.

4.3. To optimize and upgrade product application performance

At present, China's industrial robots in modern manufacturing applications, mainly reflected in transportation, welding operations and other aspects, product application performance is relatively single. In order to further expand the application breadth and depth of industrial robots, the application performance of industrial robots must be constantly optimized and upgraded. By combining the development trend of intelligent manufacturing era, we can ensure the full coverage of industrial robots in the production line, and fully reflect the intelligent product performance. At the same time, with the high-quality development of the economy, the application and development of industrial robots has gradually moved from the field of modern industry to the field of people's livelihood. Therefore, the future industrial robots will continue to promote the development level of social productivity in the process of covering all kinds of civil industries. First, the application performance of industrial robots will have a more systematic and complete intelligent standard, to ensure that industrial robots have depth of perception and application ability, in the process of task operation, accurate identification and screening of all kinds of effective information. Second, the development of industrial robots is moving towards standardization. At present, a series of foreign experts are actively studying the combined industrial robot, that is, to ensure the completion of the assembly of industrial robots through the combination of systems. Therefore, relevant industries are constantly strengthening the product performance optimization and upgrading of industrial robots.^[6] At the same time, in the intelligent manufacturing perspective, industrial robots will also show the development trend of multi-machine coordination, through the scientific cooperation of different categories of industrial robots, fully ensure the implementation efficiency of production operations, improve the quality and level of work.

5. Conclusions

The application of industrial robot in intelligent manufacturing not only helps to improve the production efficiency of products, build flexible production lines, but also provides a solid foundation for the intelligent and high-quality development of product manufacturing. In order to enhance the application of industrial robots in intelligent manufacturing, it is necessary to increase the breadth and depth of the application of industrial robots in intelligent manufacturing and promote the further development of intelligent manufacturing. Although the promotion of intelligent manufacturing is a complex and huge system engineering, is also a new thing, but through the courage to practice and continuous exploration, will be to achieve the established goal, to achieve the maximum social and economic benefits.

References

- [1] Liu Yuan.(2022). *Research on the Application prospect of Industrial Robot in Intelligent Manufacturing Era. Computer Knowledge and Technology* (14),61-63.
- [2] Tan Weimei, Lu Zhuyang.(2021). *Application analysis of Industrial Robot in welding Technology. Science and Technology Innovation and Application* (15),153-155.
- [3] Chen Feng.(2022). *Application of Industrial Robot Technology in Intelligent Manufacturing of Automobile. Internal Combustion Engine and Accessories* (12),94-96.
- [4] Chen Guoli.(2022). *Research on Automatic Assembly Line Based on Industrial Robot. Science and Technology Information* (09),37-39.
- [5] Jiang Bingxiang.(2018). *Application Status analysis and Suggestions of Industrial Robot in Intelligent Manufacturing in China. China Equipment Engineering* (18),95-96.
- [6] Sun Hongying.(2020). *Application research of Industrial Robot in Intelligent Manufacturing. Electronic Testing* (12),129-130.