Application and Differences of Robotic Arms, Traditional Machines, and Manual Work in Production

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Abstract

This article aims to explore the differences between robotic arms and traditional machines and humans. Firstly, robotic arms are a kind of automated equipment with high flexibility and accuracy, which can perform a variety of complex tasks. In contrast, traditional machines lack flexibility and accuracy, while humans have problems such as low work efficiency and high error rates. Secondly, the emergence of robotic arms can solve many problems in traditional machines and humans, and improve production efficiency and quality. Finally, there is no contradiction between robotic arms, traditional machines and humans, but they can complement each other. By using robotic arms and humans reasonably, we can give full play to their respective advantages and improve the overall production efficiency and economic benefits.

Keywords: robotic arm, traditional machine, human, production efficiency, economic benefit

1. Introduction

Robotic arms are a kind of automated equipment with high flexibility and accuracy, which can perform a variety of complex tasks. In contrast, traditional machines lack flexibility and accuracy, while humans have problems such as low work efficiency and high error rates.

The emergence of robotic arms can solve many problems in traditional machines and humans, and improve production efficiency and quality.

There is no contradiction between robotic arms, traditional machines and humans, but they can complement each other. By using robotic arms and humans reasonably, we can give full play to their respective advantages and improve the overall production efficiency and economic benefits.

The rest of this article is organized as follows. The second section introduces the appearance differences between robotic arms and traditional machines. In the third part, the application of robotic arms in manufacturing can solve many problems. In the fourth part, robotic arms and human labor can complement each other. At the same time, robotic arms also need human supervision and management to ensure their normal operation and production safety. In the future, with the continuous advancement and development of technology, robotic arms will be applied and developed in more fields.

The picture of the robotic arm board is shown in Fig. 1.

Fig. 1 The picture of the robotic arm

2. The Different Appearances

Machine arms and traditional machines have distinct differences in appearance.

2.1. Traditional machines

Traditional machines often have a rigid mechanical structure, consisting of various metal and plastic components and parts. Their shape and size are relatively fixed, and they can only be produced and processed on a large scale in factories.

The picture of the traditional machines is shown in Fig. 2.

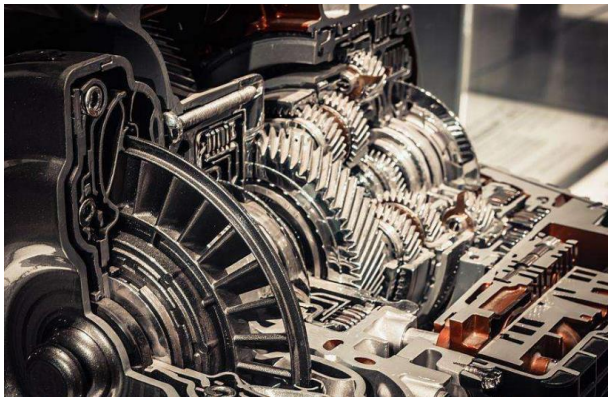

Fig. 2 The picture of the traditional machines

2.2. Robotic arms

The design of robotic arms typically adopt a more flexible mechanical structure, with multiple movable joints and arms, as well as various sensors and actuators at the end. These joints and arms can move independently, allowing the machine arm to adapt to various work environments and tasks. In addition, machine arms are usually equipped with various sensors, such as visual sensors, tactile sensors, and force sensors, to perceive the surrounding environment and perform precise operations.

The picture of the is robotic arms shown in Fig. 3.

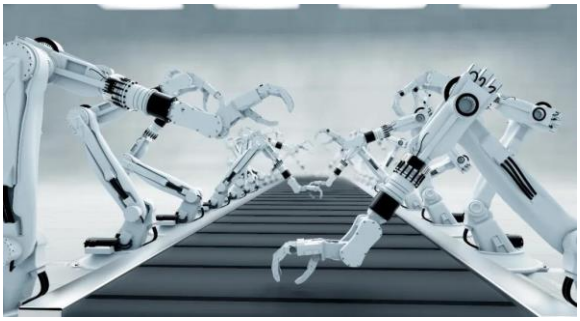

Fig. 3 The picture of the robotic arms

Traditional human production has been unable to keep up with basic standards, which can easily lead to a decline in economic efficiency [1]. Therefore, in appearance, machine arms are more flexible, complex, and intelligent compared to traditional machines

3. The Application of Robotic Arms

The application of robotic arms in manufacturing does provide solutions to many problems. Here is a detailed explanation of some specific applications and advantages of robotic arms in manufacturing.

3.1. Substitution for dangerous and heavy work

In the manufacturing industry, there are many dangerous, heavy, and repetitive tasks that can have negative effects on workers' physical and mental health. Robotic arms can take on these tasks, avoiding direct contact with hazardous environments while reducing their workloads. For example, in the automotive manufacturing process, robotic arms can be used for heavy lifting, welding, and painting, which are more dangerous tasks, thus protecting workers from work-related injuries.

3.2. Improving production quality

The precise control and repeatability of robotic arms enables them to perform production tasks more accurately than humans. Through pre-set programs or precise sensor technology, robotic arms can ensure consistency and product quality during the production process. On assembly lines, robotic arms can precisely assemble and tighten components, ensuring that each product meets specifications and quality requirements.

3.3. 24-hour uninterrupted work

Robotic arms can work continuously without needing to rest or sleep. They can work for 24 hours straight, which improves production efficiency and production cycles. In contrast, humans need to rest and recover and cannot work continuously for long periods of time. Therefore, robotic arms are very useful in situations where high production volume and rapid production are required.

In short, the application of robotic arms in manufacturing can solve many problems, including the replacement of dangerous work, improving production quality, 24-hour uninterrupted work, and increasing production efficiency and economic efficiency. With the

continuous progress and development of technology, the application of robotic arms will become more and more extensive, bringing more innovation and value to the manufacturing industry.

4. The collaboration

4.1. Collaboration between robotic arms and traditional machines

Robots are highly automated and precise machines that can perform a series of repetitive physical tasks. Traditional machines are more versatile machines that can perform a wider range of tasks. By combining robots with traditional machines, we can create a more efficient and flexible production line.

For example, in the manufacturing industry, traditional machines can complete a series of complex processing tasks, while robotic arms can be responsible for repetitive tasks such as handling, assembly, and inspection. This collaborative approach allows traditional machines and robotic arms to each leverage their strengths, thereby improving overall production efficiency. At the same time, this collaboration can also reduce production costs, as robotic arms can replace humans in performing dangerous or high-intensity tasks, reducing the reliance on human labor.

4.2. Cooperation between robotic arm and human

The collaboration between robotic arms and human beings can be divided into two aspects: one is human-computer interaction, and the other is machine-assisted human.

Human-robot interaction refers to the execution of tasks by a robot arm under the guidance of a human. In this mode, humans can control the actions of the robot arm by entering commands or operating it. This collaborative approach is often used for dangerous or high-intensity work, such as deep-sea operations or space exploration. Through human-robot interaction, humans can fully utilize their creativity and flexibility while avoiding some dangerous tasks.

Machine-assisted human labor refers to the use of robotic arms as an assistive tool to help humans complete complex tasks. For example, in the medical field, robotic arms can assist doctors in surgical operations, thereby improving the accuracy and efficiency of the procedure. This collaborative approach can free humans from tedious or high-intensity work, thereby improving work efficiency and quality.

The picture of the cooperation between robotic arm and human is shown in Fig. 4.

Fig. 4 The picture of the cooperation between robotic arm and human

In general, there is no contradiction between robotic arms, traditional machines, and human labor, but rather a collaborative relationship. By using robotic arms and human labor in a reasonable manner, we can fully leverage their respective strengths and improve overall production efficiency and economic benefits. In the future, as technology continues to advance and innovate, this collaborative approach will become increasingly common and important.

5. Conclusion

Through in-depth research, it is found that there is no contradiction between robotic arms, traditional machines, and human labor, but rather they can collaborate with each other to improve overall production efficiency and economic benefits.

In summary, robotic arms, traditional machines, and human labor each have their own advantages and disadvantages, and are suitable for different production scenarios. In the future, with the continuous advancement and innovation of technology, we can fully leverage their respective strengths to improve overall production efficiency and economic benefits. At the same time, we also need to focus on how to better achieve human-machine collaboration, improve production safety, and product quality.

The picture of the human-machine collaboration is shown in Fig. 5.

Fig. 5 The picture of the human-machine collaboration

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