Application of artificial intelligence in mechanical design, manufacturing and automation

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Abstract:

Artificial intelligence technology has gradually entered our lives and has had a profound impact, and the production of these smart devices is inseparable from the combination of artificial intelligence and mechanical design and manufacturing automation. At present, intelligent mechanical equipment is still in the development stage. In the future, mechanical design and manufacturing will continue to be integrated with intelligence. Intelligent equipment will also have human-like thinking and independent logical reasoning and decision-making capabilities, adding new capabilities to my country's mechanical processing and production industry. power.

Keywords:

Artificial intelligence; mechanical design and manufacturing; automation; application

1. Application advantages of artificial intelligence in mechanical manufacturing and automation

1.1 Improving the level of production safety Machinery manufacturing companies will involve a lot of equipment. At this time, the use of equipment for safe production has become the focus, and we must attach great importance to it. Safety issues will not only cause serious economic losses, but also threaten the lives of personnel. Mechanical technical problems, coupled with the lack of safety awareness during operation, failure to protect self-protection, improper operation, etc., can easily cause safety problems. The integration of automation technology in mechanical manufacturing enables unmanned operation and reduces the risk of human operating errors. At the same time, the mechanical automation system is relatively comprehensive and complete, and can dynamically monitor operation conditions, detect control faults in time, and improve production safety. Machinery manufacturing companies have always put safety first as their core work in carrying out production activities. Automation can realize remote control without human operation, which improves safety and reduces the chance of accidents.

1.2 Improving production speed For machinery manufacturing companies, the production process involves many complex systems and operating processes, which requires close cooperation among every staff member. Irregular operating behavior can easily affect production efficiency. The application of automation technology simplifies the production process, improves production efficiency, and reduces accidents caused by human factors. The mechanical manufacturing and automation design are reasonable, the production system is optimized, the product quality is consistent with the standards, and the economic value is increased. The ultimate goal of enterprise development is to maximize benefits, which is closely related to production efficiency. If production efficiency is improved, output will be increased and benefits will be improved. For example, the Double Eleven Shopping Festival requires improving logistics efficiency, and automatic sorting of parcels can be achieved in a short time, ensuring efficiency while improving accuracy. Mechanical automation will replace human labor and reflect its advantages in production efficiency.

1.3 Improving maintenance effects As society develops rapidly, customer needs are diversified and personalized, which puts higher and higher requirements on the production system. Mechanical manufacturing and automation optimize equipment according to customer needs to ensure that products more closely meet customer needs. In particular, it has achieved outstanding results in product testing, being able to quickly detect quality problems and take effective measures to ensure quality. For

enterprises, quality is the magic weapon to win. If the quality is not up to standard, customers will be lost, and the economic losses will be immeasurable. Mechanical manufacturing and its automation functions are complete and can meet the production needs of a variety of products and improve customer satisfaction, thereby seizing opportunities and seizing the market. If there is a fault in the system, automatic protection will be carried out to stop the faulty equipment to minimize losses and avoid casualties. Automation can monitor comprehensively in real time, quickly find fault locations, find causes and methods during the analysis process, reduce losses, and ensure production can be resumed in a shorter time.

2. The application of artificial intelligence in mechanical design, manufacturing and automation

Intelligent machinery design and manufacturing and automation are one of the important trends in the current development of the machinery industry. Incorporating artificial intelligence technology, the further development of the machinery manufacturing industry has played a role in promoting the overall development of the industry. The machinery manufacturing industry requires basic machinery knowledge and skills, and also requires effective application of multi -disciplines, that is, it is necessary to carry out work under the support of computer technology, electronic information technology, simulation technology and other technologies and theoretical knowledge. Therefore, under the current background of rapid development, mechanical design, manufacturing and automation require more use of artificial intelligence technology. Constantly improving its own technical level can improve the corresponding working ability, so as to provide people with more convenient and high -quality living conditions. At present, my country's machinery design and manufacturing are at the stage of rapid development of the industry. The degree of application of intelligent technology has been continuously improved. Under the promotion of market economy development and demand, the number of enterprises in the machinery manufacturing industry has shown a rapid growth trend. Intelligent technology has continued to improve in the design of mechanical design and manufacturing and its automation, and its scope has been further expanded. The improvement of the application of intelligent technology in mechanical design and manufacturing has continued to improve, making the era of manual control and development in the past has become the past. Application is more intelligent and more effective to control the development of mechanical production and manufacturing technology. The application of artificial intelligence technology in mechanical design and manufacturing and its automation is one of the important ways to improve its production accuracy, progress and effectiveness. Especially for some mechanical design and manufacturing and automation parts with risks, high pollution, and underground operations, the application of artificial intelligence technology has greatly improved the safety and quality of operations. On the basis of many aspects such as economic level, equipment quality, and cost, the overall development and application of the current artificial intelligence technology is still concentrated in the field of industrial production and its application. It is also at a relatively limited level. The development presents imbalances Essence Artificial intelligence technology has a high degree of application in large cities and large production areas, and the level of general mechanical design and manufacturing and its automation intelligence is still low, the management system and corresponding supporting facilities are not comprehensive. Therefore, the production and development are still affected.

3 Intelligent technology is used in the practice of mechanical manufacturing and automation.

3.1 Intelligent analysis of computer assisted design. The application of intelligent CAD is an application example of artificial intelligence in mechanical manufacturing. In the traditional mechanical manufacturing industry, the application of CAD technology is one of the important ways for design products and parameter design. Design of products. The application of intelligent CAD technology combines data collection and promotion of expert systems and neural network algorithms, analyzes the process of problems arising from the production process, and writes them as computer language. If problems occur during production, you can use computer assistance to solve and propose high -quality solutions. The neural network algorithm uses the special nature of artificial neurons to perform non -linear association data in the process of product design and manufacturing, which greatly increases the ability of mechanical and automatic combinations. The current application of intelligent CAD technology has integrated and effectively develop a number of technologies, which guarantees the improvement of mechanical design and manufacturing and its automation.

3.2 Application analysis of mechanical manufacturing programs. In the development of large -scale machinery heavy industry, artificial intelligence technology is one of the important ways to promote the upgrading and transformation of the machinery manufacturing industry, and it also provides it with more development opportunities. However, in the industry's extensive technological development, it still faces deficiencies. For example, most companies and institutions are unclear about the development trend of the mechanical manufacturing industry. They still stay in the application of traditional technology technology. The low level of new methods has caused the development of mechanical design, manufacturing and its automation industry. The flexibility of the new theory and technology is not high, and only the form of copying the copy has caused the information process of the machinery industry to be affected. Therefore, in terms of mechanical manufacturing, it is necessary to combine the current development of the industry to make scientific structural updates and technical applications to achieve scientific application of artificial intelligence technology.

3.3 Analysis of the application of mechanical automation technology. Based on the analysis of fault diagnosis of hot die forging pressure machinery in a certain section, the application of artificial intelligence in machinery manufacturing often causes failures during the work process. The effective application of artificial intelligence technology can effectively analyze and match the data and parameters in the fault diagnosis system. Perform real-time parameter comparison and analysis during the normal use of the equipment, so that if a failure occurs, the cause of the problem can be found in time.The artificial intelligence system can achieve effective control in the analysis of the preset problems and the corresponding operations. The automatic diagnosis of hot mold forging pressure mechanical failure under artificial operation and visibility can enable the equipment to achieve better work performance and improve work efficiency and quality.

Conclusion

The scientific application of artificial intelligence technology in mechanical design, manufacturing and automation, that is, the application in mechanical design, machinery manufacturing, information processing, fault diagnosis, etc., can not only significantly improve work efficiency and level, but also promote the development of various fields. The development of intelligence. In addition, from other perspectives, mechanical design, manufacturing and its automation also provide a practical platform for artificial intelligence technology to a large extent, and the two promote each other.

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