Discussion on the characteristics and development trend of intelligent mechanical design and manufacturing automation

Fu Bo

Luzhou Vocational & Technical College, Luzhou, Sichuan, China

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Abstract: With the advent of modern intelligent manufacturing era, advanced technology provides strong support for China's economic and social development. In order to maintain and improve China's international status and form a stronger comprehensive national strength, it is necessary to better modernize industrial technology. As a component with key value in this field, intelligent mechanical design and manufacturing automation has attracted more attention. It includes information technology, automation technology and mechanical circuit design. These advanced technologies represent the level of China's industrial modernization to a certain extent and play an extremely important role in the future industrial development. Firstly, this paper studies the development status of intellectualization and automation of mechanical design and manufacturing, finds out the main existing problems, and analyzes its development trend in the future, so as to provide help for the development of the industry.

1. Introduction

The intelligent automation of mechanical design and manufacturing can meet people's basic demands for contemporary diversified production and life, realize the successful transformation of information energy, intercept the required information process, complete the organic integration of technology and product design objectives, and build a complete automation work system. Starting from the design function of mechanical equipment, establish the organic relationship between various internal components, give full play to the advantages of mechanical design and manufacturing automation, and improve the core competitiveness of enterprises occupying market share ^[1].

In today's society, people have formed higher requirements for all aspects of production and life. Improving the level of mechanical design and manufacturing and realizing its intelligent and automatic development can better meet the new needs of modern society. It can effectively convert information energy, obtain a large amount of useful information, better achieve the design and manufacturing objectives through advanced technology, and make the automation system in the industrial field more perfect. Based on improving the functions of machinery and equipment, make different components form closer ties with each other, give full play to the value of automatic design and manufacturing technology, and help enterprises occupy more shares in the market competition.

2. Characteristics of intelligent mechanical design, manufacture and automation

In the process of mechanical manufacturing, mechanical manufacturing and automation technology play an extremely important role in the field of industrial manufacturing. The practical application of mechanical planning and its automation mainly have two different levels. Firstly, the design and manufacture of intelligent machinery can meet the actual needs of current mechanical production equipment and traditional mechanical production and mechanical planning. The combination of modern industrial skills, modern industrial intelligence and automation technology can comprehensively improve the automation and intelligent efficiency of intelligent mechanical design. So that mechanical equipment can become safer and have higher productivity. With the

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continuous progress of science and technology in China, people can meet the actual needs, automation and related functions of their own machinery planning and production process to a certain extent. Improve product quality and production capacity, and make more development of mechanical planning and automation. On the other hand, with the continuous combination of advanced technology and related theories, the automation development of intelligent mechanical design is inseparable from the support of modern skills. In order to fully meet the work of mechanical planning and automation, we must rely on various types of technologies. Take advanced technology and equipment as support, such as CNC machine tools. Mechanical planning, production and automation skills, as well as internal combustion engines and other energy equipment are closely related. It provides more power support for machinery planning and production. After all, mechanical planning, production automation skills and information skills are inseparable from each other. Through the use of information skills, we can fully complete the transmission and interaction of information, materials and other aspects in the production process, so as to improve the information processing ability and quality.



Figure 1 Intelligent mechanical automation

The characteristics of intelligent mechanical design automation also have high efficiency. The efficiency of intelligent mechanical design and manufacturing automation is its most important feature and advantage, and the staff invested in production is relatively small. The process is relatively more organized and orderly, and will not cause work slowness due to man-made reasons. In the traditional mechanical design and manufacturing work, professionals must understand the operation details of mechanical production in advance, and abide by relevant rules and regulations, which takes a lot of time. Manufacturing progress will also be affected. Manufacturing automation of intelligent mechanical design can make up for this defect and complete related tasks more efficiently and quickly. It can not only reduce the cost of time and labor, but also make the operation more standardized and greatly improve the efficiency. Intelligent mechanical design, manufacturing and automation features also include safety. In the process of traditional intelligent machinery design and manufacturing, most of them use manual operation mode. Once any error occurs, there is likely to be more serious safety accidents. The automation of intelligent mechanical design can prevent this situation. The staff do not need to complete the operation task manually. As long as they can complete the program of remote control of machinery through computer program. In this way, the production of intelligent mechanical design and manufacturing automation can be comprehensively improved. In the process of intelligent mechanical design and manufacturing and automatic production, there are likely to be some accidents. However, the specified procedures can detect the potential safety hazards in time. For example, in case of an accident, remedial measures can be taken. The probability that the staff can contact the mechanical manufacturing equipment is relatively small, and the safety of the staff in the production process can also be guaranteed.

3. Intelligent mechanical design and manufacturing automation

3.1 Slow development

Judging from the current development of domestic mechanical equipment, its types have been relatively complete. Some fields have begun to explore the application of mechanical automation technology in design and manufacturing, and are exploring to replace the traditional mode with advanced production mode. After continuous development, the scope involved has become wider and wider. According to the current situation, Advanced technology and modernization model will form an increasingly large coverage in the future. However, from the objective situation, the development of domestic manufacturing industry is still in the key stage of transformation and upgrading. Compared with the development of automation and intelligence, the industry has a short history, and the scope of the industry is still narrow. How much energy and effectiveness can the technical model related to intelligent mechanical design and manufacturing automation produce, It is a problem not fully recognized by many regions and industries. Especially in some areas with relatively backward production level, the understanding and acceptance ability of advanced production mode are more limited, and many difficulties will be encountered in popularizing it. Because the running in time is still very short, there are still many imperfections, there is a lack of professionals, and the development speed is seriously limited. In addition, it takes time to complete the inclination of resources and policies and the establishment of a complete system.

3.2 Large technical differences

There is a premise for the application of automation technology in design and manufacturing, that is, to comprehensively master the current specific process of design and manufacturing. Through observation and analysis for a certain period of time, find out which links and processes will play a key role in improving efficiency, and constantly try to achieve the development goal of automation. When the intellectualization and automation in the field of mechanical design and manufacturing are realized, the production efficiency will be significantly improved, and the internal management mode of the enterprise will be more in line with the needs of modern society and form stronger competitiveness. However, there are great differences in mechanical application among enterprises in different industries, and the comprehensive strength of enterprises is also very different. Therefore, this advanced technology model is still difficult to form standards applicable to all industries at present.

3.3 There are few relevant professional and technical talents

In order to realize the modernization transformation in the field of mechanical design and manufacturing and improve its automation and intelligent technical content, it must be implemented by professional technicians. These personnel should have profound theoretical foundation, master skilled operation technology, have strong executive ability, and have an in-depth understanding of the development of technology and mode modernization in this field. At the current stage, there is no perfect talent training mechanism in this field in China, and the cooperation between schools and enterprises is still in the exploration stage. At present, the investment intensity and coverage are very limited, the trained professionals are difficult to accurately match, and the content of education and training lags behind, so they do not keep pace with the times. In addition, enterprises do not pay enough attention to the cultivation of professional talents. The trained talents can not match the enterprise management mode well, and are prone to brain drain, which is very unfavorable to the transformation and upgrading of enterprise production automation.

4. Development trend of intelligent mechanical design and manufacturing automation

4.1 Virtualization

The automation of intelligent mechanical design and manufacturing is likely to develop in the direction of virtualization in the future. The traditional mechanical design and manufacturing can not meet the requirements of virtualization, and most of the design drawings are drawn manually.

Once there is any problem with the scheme, the designer must spend more resources. Make repeated modifications to the drawings, so the work efficiency may be reduced. Virtual intelligent mechanical design drawings are one of the development directions of design and manufacturing automation, and the overall production process and samples of products can be fully displayed through Internet technology. What are the problems? The data can be modified on the computer until the design work is completely completed. In the manufacturing automation of intelligent mechanical design, the use of virtual design can reduce the production cost, prevent repeated work in the process of production design, and comprehensively improve the production efficiency and production efficiency of enterprises.

4.2 Intellectualization

The design and manufacture of intelligent machinery in China can fully meet the requirements of intelligence and automation to a great extent. With the continuous development of science and technology, the development trend has become more obvious. The manufacturing automation application of intelligent mechanical design mainly includes electronic computers and a variety of different science and technology. Computer technology can play a greater value in building a comprehensive production and manufacturing system and improving the efficiency of mechanical design can control the production error in time, ensure the production quality of the machine, avoid the waste of materials and reduce the material cost as much as possible. In the process of intelligent mechanical design and manufacturing automation, artificial intelligence technology, including the functional technology of machine vision repair, can be used to solve complex problems in the production process. The vulnerability can be repaired without manual method, so as to reduce the labor cost and improve the production accuracy

4.3 Realization of Mechatronics

In the current intelligent mechanical design and manufacturing and automation market, the most widely used is the mechatronics system. This system can be applied in relatively complex working environment, and can play a very important role in improving production efficiency, product design and verification integration. The renewal of mechanical technology and information technology will make the intelligent mechanical design and manufacturing and automation technology develop continuously in the direction of mechatronics.

4.4 Application of digital technology

The technology of fully converting the images and sounds required for production into digital information is digital technology. Using in mechanical automation can help the system complete relevant data analysis and processing. The manufacturing of products can be simulated in real time. As people pay more attention to digital technology and its wide application, product design will become more accurate, and the process of product production will become extremely concise

4.5 Product design virtualization

Designers design and confirm drawings, and assist design through relevant software is a specific process of traditional product design. The development trend of mechanical automation is likely to make product design more virtual. The time of product design will be shortened, and the design efficiency and the overall accuracy of product design will be further improved.

4.6 Scientific and Technological Development

At present, the development of mechanical automation in China has realized the systematization of production process, operation and scientific and technological development, but it still needs to be improved. The outstanding performance is remote control technology. According to the current situation, the development level of technical monitoring and remote sensing technology in mechanical automation in China still needs to be improved. The future development is of great significance to the solution of specific problems in production links.

5. Conclusion

The work of intelligent machinery design and manufacturing automation in China is gradually developing towards a more advantageous direction, which can make up for the defects existing in the traditional intelligent machinery design and manufacturing work, reduce the production cost invested by enterprises, improve the production efficiency, and reduce the waste of resources, Intelligent mechanical design and manufacturing automation is a typical modern science and technology. Its development prospect is very considerable. It can play a great value in the development of China's manufacturing industry.

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