Application of Computer Technology on Mechanical Design-manufacture and Automation

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Abstract. Mechanical design-manufacture and automation play an irreplaceable important role in our national economy. It supports the development of all walks of life, and it is the foundation of national economic development. In Mechanical design-manufacture and automation, computer technology can effectively improve the efficiency of Mechanical design-manufacture and automation, which will reduce production costs. This paper mainly analyses the connotation, application status and future development trend of Mechanical design-manufacture and automation. Finally, this paper analyses the application of computer technology in the field of mechanical design and manufacture and automation.

Keywords: Computer Technology, Mechanical Design-manufacture and Automation, Intelligent Technology

1. Introduction
With the continuous innovation of computer technology, information technology, new materials and microelectronics technology, computer technology has been applied more and more widely in various fields. In the field of mechanical design and manufacture and automation, the popularity of computer technology has gradually deepened. Computer technology has made a qualitative leap and development in Mechanical design-manufacture and automation. Computer technology improves the efficiency of design and manufacturing, and saves production time and cost, which accelerates the automation process of mechanical design and manufacturing1. At the same time, it also makes our country's mechanical design and manufacturing have a strong advantage in the fierce market competition. The integration of mechanical and electrical products and micro-electromechanical systems are typical achievements. Machinery design, manufacture and automation is a subject that studies the design, manufacture, operation and control of various industrial machinery, equipment and mechanical and electrical products. It is mainly based on mechanical design and manufacturing. At the same time, it integrates computer technology, automatic control technology and information technology. Computer technology can better solve the more complex
technical problems in the field of modern engineering, which promotes the development of mechanical intelligence and automation.

2. Present situation of machinery design, manufacturing and automation technology
The manufacture and production of machinery and equipment in China started earlier, but automation technology started late in the manufacture of machinery and equipment\[^2\]. Compared with the advanced mechanical automation production technology in the world, there are inherent shortcomings. There are some deficiencies in manufacturing theory in our country, which leads to its not widely used. Nowadays, most of the machinery and equipment in our country are controlled and managed manually. This phenomenon is especially widespread in small and medium-sized enterprises.

In many large state-owned enterprises, automated machinery and equipment still need manual operation, so it can only be called semi-automated production. The development of automation technology naturally depends on the cultivation of talents. If there is no solid theoretical basis and rich experience, then China's machinery manufacturing industry will stop innovation and stagnate. At this stage, China still does not have its own precision instruments. Therefore, mechanical manufacturing enterprises need to strengthen the research of automation technology, only in this way can enterprises win higher profits and efficiency.

3. Development trend of computer technology in mechanical field

3.1. Miniaturization of mechanical design and manufacturing
With the introduction of computer technology into the field of Mechanical design-manufacture and automation, mechanical design and manufacturing will tend to be miniaturized. Miniaturization is the trend of the times\[^3\]. Both computers and mobile phones are developing towards miniaturization. Mechanical design and manufacturing will also adapt to the development of the times, and it will gradually move towards a new direction of miniaturization. Fast-paced life will make the field of mechanical design and manufacturing become fast-paced and efficient, which means that computer technology will be widely used. It is computer technology that brings high efficiency and fast rhythm development prospects for Mechanical design-manufacture and automation.

3.2. Networking of machinery design and manufacturing
Computer technology has been widely recognized. With the popularity of the Internet, Mechanical design-manufacture and automation will become networked. The mechanical field will adapt to the development of the times and integrate perfectly with the Internet\[^4\]. Later propaganda and promotion of Mechanical design-manufacture and automation will be applied to computer technology and the Internet.

3.3. Intelligent machinery design and manufacturing
Nowadays, Internet technology and computer are widely used. More and more intelligent technology has replaced manual operation. Machinery design, manufacturing and automation industries will also become intelligent. Machinery design, manufacture and automation involve a wide range of areas, so the industry requires higher accuracy of operation steps and drawings. There is a certain probability error in manual operation, which also reduces the confidentiality of the design scheme\[^5\]. With the continuous development of science and technology, intelligent products continue to pour into the market. Robot is one of the main
products. The combination of computer technology and machinery will be more conducive to the development of machinery industry, especially the breakthroughs in language recognition and information perception.

4. Application of computer technology

4.1. Computer aided technology

Computer aided technology is widely used in the field of mechanical design and manufacture and automation. There are mainly computer visualization technology, computer simulation technology and so on. Computer visualization technology is to visualize, concretize and visualize Abstract mechanical information and data. By transforming it into more comprehensible information and data, we can analyze, calculate and master the characteristics and performance of mechanical products. Computer simulation technology is based on computer and software, which gathers theoretical knowledge and technical principles of many disciplines. The application of simulation technology can effectively solve the complex problems in mechanical manufacturing[6]. In mechanical design and manufacturing, product processing is the basic link for enterprises to produce products. Through computer simulation virtual technology, we can provide theoretical and technical support for product processing. For example, in the grinding of mechanical products, through simulation technology, we can predict and simulate the grinding behavior and grinding quality. On this basis, the grinding process is optimized. In the stage of mechanical design, computer graphics technology, such as CAD and CAM, is widely used. Through computer graphics technology, on the one hand, it can reduce the error rate of drawing; on the other hand, it can shorten the drawing cycle and provide more time for new product development. Computer aided technology promotes the process of automation. The computer aided technology (CAT) is shown in Figure 1.

![Figure 1. Computer Aided Technology](image1)

![Figure 2. The CNC machine tool](image2)

4.2. CNC machine tool

The main advantages of CNC machine tools are as follows. It can realize the automation of product production. There are two main ways to program CNC machine tools based on computer and software, namely software automatic programming and software manual programming. The NC machine tool software based on automatic programming is mainly used in the production of more complex parts. The application program is written in the standard NC software language on the computer platform. Then the operation program of NC machine tool is formed by processing. In recent years, with the rapid updating and
development of NC technology, the conversion between computer language and NC programming program is more easily realized, which meets the needs of NC machine programming. The CNC machine tool is shown in Figure 2.

4.3. Computer three-dimensional technology
Three-dimensional technology is an important part of modern computer technology. It uses more advanced theories and methods to make magical three-dimensional. It provides a more scientific design method for product production, such as force analysis, simulation analysis and product structure. The application of CAD three-dimensional technology is not only reflected in the simulation and analysis of product size, shape, characteristics and product location. In addition, a series of physical characteristics information can be given to the product, such as product color, product quality, product volume, product pressure, etc. The analysis of physical feature information can further guarantee the quality of product design. The quality of product design can be guaranteed by the model function of three-dimensional technology, which greatly saves the cost of product design. The computer three-dimensional software technology is shown in Figure 3.

![Figure 3. Computer three-dimensional software technology](image)

5. Conclusion
Then, we will continuously improve and optimize the dynamic production process of mechanical products. Computer visualization technology plays an important role in the field of mechanical design and production. On the one hand, computer visualization technology can play a basic role in aided design, which is conducive to reducing manual errors and improving the accuracy of product design. On the other hand, it can greatly improve work efficiency, which saves a lot of manpower and time. Computer aided technology promotes the process of automation.

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