

The Application of Automation Technology in Mechanical Design and Manufacturing

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Keywords: automation technology; mechanical design and manufacturing; application

Abstract: Today, human production and life have long been closely related to the machinery manufacturing industry. With the continuous development of computer information technology, engineering control technology, information data processing and other technologies, mechanical manufacturing has gradually become more automated. Mechanical design manufacturing is committed to improving the quality of mechanical design and manufacturing and liberating human productivity. Under the new situation, in order to further respond to the call of the technology era, the practical application of automation technology in mechanical design and manufacturing should be strengthened. Promote organic union of both, raise productivity, liberate productivity. This paper first introduces the concept and application advantages of automation technology, based on the application status of automation technology in the machinery manufacturing industry, targeted application analysis and research, hope to effectively promote the rapid development of China's mechanical design and manufacturing field.

1. Introduction

With the rapid development of China's socialist modernization, all walks of life in China have made great progress. Under the influence of the background of this era, technology to promote development and technology to drive the economy has gradually become the focus of attention of all walks of life. Especially in recent years, the rapid development of Internet and computer technology. The use of information technology and automation technology to achieve the transformation of the original domestic traditional industries will become the key to the improvement of productivity in these industries. As a company mainly engaged in the design and manufacture of mechanical equipment, it should also be compatible with the background of the times and the needs of consumers, and implant new technologies in old-fashioned, traditional and other types of mechanical equipment. This will make the use of these mechanical devices easier, more convenient, and more efficient and labor-intensive. Therefore, in combination with the above-mentioned background of the times, it has become necessary and crucial to continuously strengthen the research on automation technology in contemporary mechanical design and manufacturing, which will have an important impact on the future prospects of this industry^[1].

2. Automation concept and application advantages

Automation technology is a modern technology that integrates many modern science and technology. It can effectively realize continuous and automatic production in machinery manufacturing, engineering and other industries. At the same time, it can optimize the production system, effectively manage it, and free manpower from many production and manufacturing processes. This plays an irreplaceable role in improving the engineering transformation and flow rate of mechanical manufacturing.

Mechanical automation technology combines a variety of modern high-tech, with considerable engineering advantages. According to its actual application in the mechanical manufacturing industry, it can be mainly reflected from the following aspects: first, mechanical automation can effectively carry out production operations according to the set procedure, which greatly improves the quality of mechanical manufacturing products, and greatly shortens the production cycle and

greatly improves production efficiency. Second, mechanical automation has made outstanding contributions to the liberation of productive forces, liberating human beings from many harsh production environments, reducing the labor intensity of workers and reducing the dependence of the machinery manufacturing industry on manpower. Third, the production cost is reduced, and mechanical automation can guarantee productivity, reduce the probability of producing defective products, achieve low production cost, and high production quality. Fourth, the application of mechanical automation production lines provides a large space for the innovation and development of enterprise manufacturing processes. It is conducive to the improvement of the entire production process, the timely introduction of advanced manufacturing technology, and the injection of new power into the mechanical automation production system. In summary, automation technology has great advantages in the field of mechanical design and manufacturing, and it is worthy of our innovation and development^[2].

3. Application analysis of automation technology in mechanical design and manufacturing

The application of automation technology in mechanical design and manufacturing is of great significance, which can improve production efficiency, improve resource utilization, improve product quality, and promote industry development in both directions. The main applications are shown in Table 1.

Table 1 Application of automation technology in mechanical design and manufacture

Application of automation technology in mechanical design and manufacture
● Highly integrated application
● Intelligent machine manufacturing applications
● Flexible automation application
● Virtualized application

3.1 Integrated application of automation technology in mechanical design and manufacturing

With the rapid development of the Internet and computer technology, mobile communication terminals have gradually become household names, and the demand for these electronic mechanical devices has rapidly increased in people's lives and work. And as a way to make people use these products more conveniently in life and work. Integration is playing an important role in meeting this need. For new electronic products such as mobile phones, tablets, and sports watches, the use of more traditional manual production techniques has become impossible. The use of automation technology in the production process of the above-mentioned electromechanical equipment will enable the integration needs. By using the characteristics of automation technology to improve the accuracy of operations and increase the quality of production, it will be able to achieve more accurate production management of precision components, so that the final product has a higher technical content to meet the needs of the modern public^[3].

3.2 Intelligent application of automation technology in mechanical design and manufacturing

Automation technology plays an important role in intelligent production. The automation technology can realize artificially unachievable regional detection and regional monitoring by using more scientific detection instruments, monitoring equipment and monitoring means. For example, for underground mine roadway excavation, traditional technical means will be difficult to accurately detect rock faults and rich areas, and mechanical equipment using automation technology will be able to use electronic computer technology in special areas to achieve artificial The effect achieved. In addition, the development of intelligent machinery has also been more widely affected in human-computer interaction. Integrating automation technology into modern electronic products in mechanical design, it better meets the needs of different needs. For example, for patients with color blindness, modern mobile phones can adjust the color primary colors to meet the needs of these customer groups^[4].

3.3 Flexible application of automation technology in mechanical design and manufacturing

The traditional mechanical design and manufacturing industry lacks the ability to respond to business requirements, mainly without the support of automation, intelligence and other technologies. Under the new situation, with the continuous development of human society, customers' demands for machinery manufacturing are constantly diverse and changeable. This has brought a big test to the mechanical design and manufacturing industry, and it also promotes the development of flexible applications of automation technology. The flexible application of automation technology is mainly achieved by strengthening the effective combination of automation technology and mechanical manufacturing technology. Construct a scientific and intelligent modern production system to meet customer requirements for manufacturing capacity. The combination of artificial, automated and intelligent can improve the flexible application level of automation technology in the manufacturing industry. The whole process of mechanical design and manufacturing is connected in series to form a chain reaction, which is beneficial to the upgrade and improvement of the entire automation system. Under the new situation, the social and economic development is changing with each passing day. If you want mechanical design and manufacturing enterprises to achieve long-term development, you must seize the footsteps of the technological era. We must attach importance to innovation, development and improvement, and actively introduce advanced automation technology and production equipment. At the same time, efforts should be made to promote the flexible application of automation technology in the mechanical design manufacturing industry, and ultimately protect the development of China's machinery manufacturing industry^[5].

3.4 CNC and virtualized applications of automation technology in mechanical design and manufacturing

The application in numerical control and virtualization is an important achievement of the great development of modern automation technology in the field of mechanical design and manufacturing. For some things and areas that are not suitable for human survival and not suitable for human observation, the mechanical equipment produced by automation technology will achieve the goal of observation and production using numerical control technology. For example, for areas with extremely harsh environments, it is impossible to reach people, and through numerical control devices, efficient production and detection can be achieved to meet the needs. For another example: for the analysis of large databases, the use of automation technology to design and produce mechanical equipment, on the basis of human programming and logic control, to achieve rapid processing of large data. In addition, the use of automation technology can also simulate the simulation of certain scenarios to achieve the desired goals. For example, automation technology can be used to design mechanical equipment to simulate the space environment, to achieve the purpose of training space astronauts, and to verify the results of an important technical test.

3.5 Application of automation technology in mechanical design and manufacturing

Automatic detection technology is an important part of automation technology, which is based on the use of traditional instruments and sensors. In the process of mechanical manufacturing, automatic detection technology can be carried out without excessive manual intervention, which is an effective way to reduce product failure rate and improve product quality. The composition of the automatic detection system is shown in Figure 1. Each part contains advanced information processing systems such as microcomputers to improve the reliability of detection.

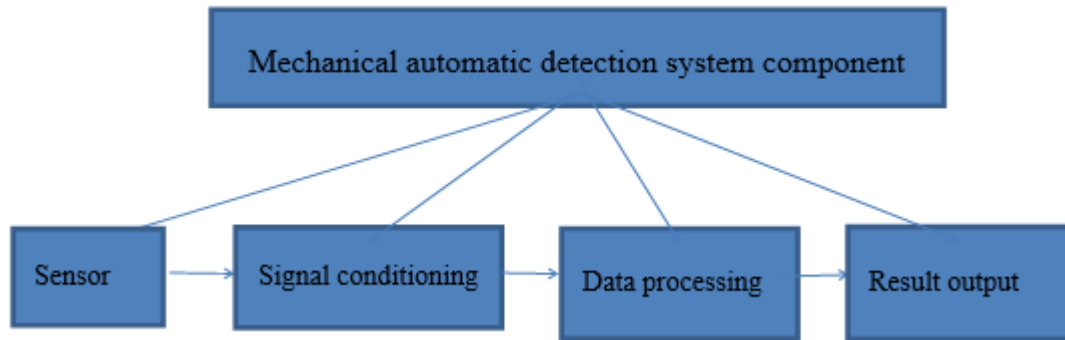


Figure 1 Mechanical automatic detection system schematic

4. Conclusions

The development level of the machinery manufacturing industry is an important criterion for measuring the production capacity of a country, and it can guarantee China's stable rank among the world's industrial powers. In addition, the mechanical design and manufacturing industry is closely related to people's production and life. To this end, we should spare no effort to develop mechanical automation technology and strengthen the application of automation technology in the field of mechanical design and manufacturing. In this way, we can realize the modernization of China's machinery manufacturing and promote the rapid development of China's industry. In order to adapt to the changes and development of society, automation technology should be developed in the direction of sustainability, scale, and green.

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