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# Application of Mechanical Automation Technology in Manufacturing

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**Absrtact:** With the continuous emergence and development of high-tech industry, more and more fields began to try automation technology, and under the promotion of automation technology has made extensive achievements. In this paper, the concept and components of mechanical automation technology are analyzed through the practical application of automation technology in the field of mechanical manufacturing. This paper discusses the main application fields of automation technology in mechanical design and manufacturing industry, such as the contribution of computer, virtualization, intellectualization and so on, as well as the improvement of enterprise competitiveness and product quality, in order to promote people's understanding of automation technology.

## 1. Introduction

Mechanical automation technology refers to the integration of automation technology into production in the process of mechanical manufacturing, in order to gradually improve the efficiency and quality of mechanical manufacturing. With the continuous progress of automation technology, the automation technology at this stage has been able to make the whole process of mechanical manufacturing to maintain sustainability and safety, on the basis of reducing the cost of input, so that mechanical manufacturing can meet production needs and practical needs. With the application of mechanical automation technology more and more widely, it is necessary to further improve the mechanical automation technology and process, combining with the existing technical characteristics, to provide continuous power for the modern mechanical manufacturing industry.

## 2. The Component Unit of Mechanical Automation Technology

The main components of mechanical automation technology are program unit, control unit, sensor unit, formulation and related action unit. These are composed of a variety of structural units with integrity and systematicness, and have complete management performance for the overall working system. Among them, the program unit can centralize the management of the whole working system, which is an important component of the whole mechanical automation system. The control unit plays the role of management and regulation in the process of the system playing a role, and becomes the regulation guarantee part in the whole automation system. Sensor unit can effectively adjust the work content of automation system under the condition of ensuring its own work efficiency. So that the corresponding signal command can be accepted. Finally, the unit of action plays an external role. This unit can be



positioned effectively according to the needs of the system and help to improve the functional value of mechanical automation technology<sup>[1]</sup>.

### 3. Specific Application of Mechanical Automation Technology

#### 3.1. Application of Integrated Control System

As far as the current technology is concerned, the most widely used control system still belongs to the computer aspect. Before the development of this control system, the relevant technicians have adaptively matched other production aided processes according to the operation cycle of the computer [1]. The role of these auxiliary links in various aspects was evaluated, and the production quality and efficiency driven by mechanical automation technology were comprehensively evaluated. Before the formation of Automatic Integrated Control System (AICS), many assistant technologies operated independently in a small scale<sup>[2]</sup>. And there is a specific set of procedures, as shown in Figure 1.

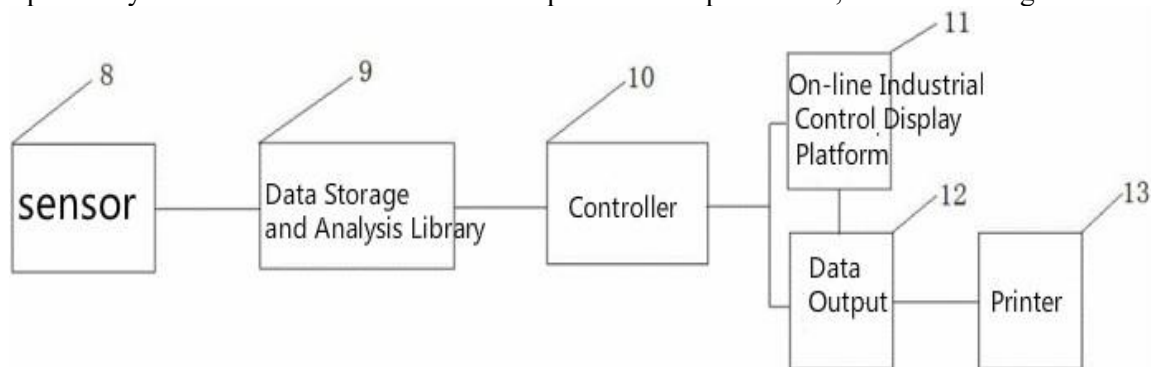


Figure 1 - Running procedures for assistive technology

Although production time can be reduced to a certain extent, there is still a lack of necessary means for cost reduction. The computer integrated manufacturing system (CIMS) combines each technology well in different degrees, which makes the information platform and data types combine with each other, so as to ensure the stability of assistant technology. From a macro point of view, computers can also effectively improve efficiency through the mutual adjustment of manufacturing systems to ensure sustainable development of enterprises. The computer integrated control system can also be analyzed from the aspects of electronic information and modernization. These include electronic information, modern management, advanced material realization, mainly including computers, new automatic sensors and other components, as shown in Figure 2.

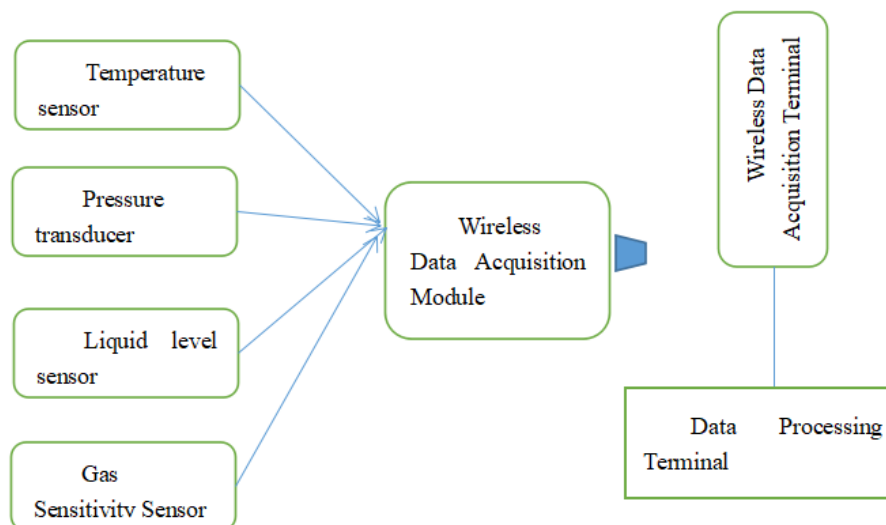


Figure 2 - Analysis of Computer Integrated Control System

These components regulate each other, promote the improvement of labor efficiency, and form a stable and reliable system. Starting from the integrity, the product cycle type planning can further shorten the development and manufacturing cycle, so that the work efficiency can be effectively improved and unnecessary waste of resources can be avoided<sup>[3]</sup>.

### 3.2. Flexible Automation Production Technology

The concept of flexibility was first proposed by the United Kingdom, and it is also a concept of automation. In this concept, the most basic production information as the basic part, through the storage system and matching production and processing equipment to optimize the centralized processing of different objects, to achieve centralized control of each object, as shown in Figure 3.

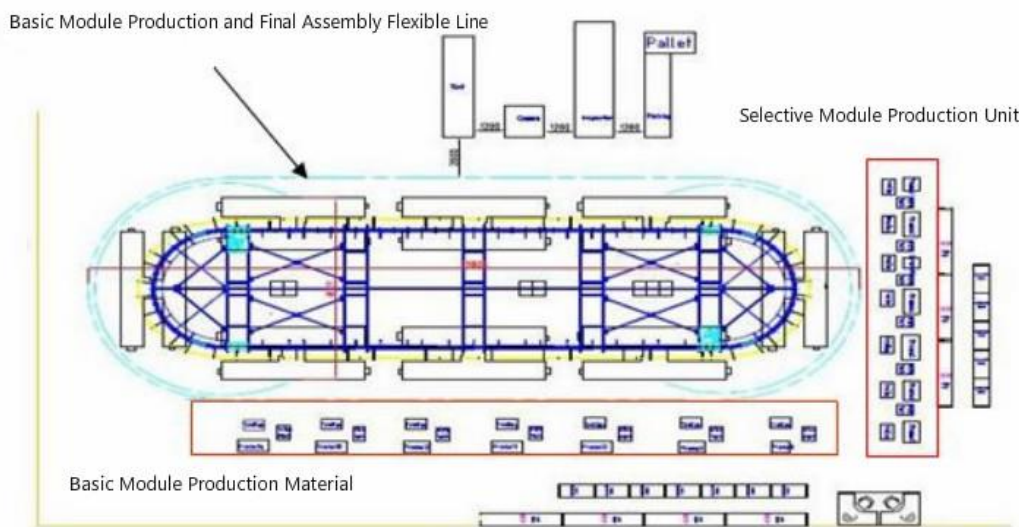


Figure 3 - Flexible Automated Production Diagram

The flexible automation technology can be integrated into the actual production process of each object according to the processing needs. At the same time, it is also convenient for all technicians to choose suitable processing equipment for unified management and allocation, and it can also make such processing equipment technology adjust according to market needs. The core of information control technology of flexible automation technology is information. Through the detection of information, the overall allocation of data information can be effectively realized, and the production plan can be adjusted freely. In addition, the computer responsible for the control of the ethnic group can also report the corresponding computer situation at the bottom, and adjust the process according to the instructions of the upper level, complete the improvement of the whole production process, thereby improving the efficiency and quality of automation. In the use of Flexible Automation Production, Baowo Group is in a leading position. Among the groups, the automated spraying process is more advanced, which can adapt to gasoline, hybrid power and other flexible production process, and ensure that the flexible production process can meet the individual needs of customers and adapt to changes in the environment. In the process of production, nearly 500 robots control the spraying of automobiles, ensure the implementation of intelligent production system and the integrated use of the Internet of Things, and finally digitalize the supply chain of enterprises to ensure efficient production and meet the corresponding customer needs<sup>[4]</sup>.

### 3.3. Intelligent Automated Production Technology

With the rapid development of science and technology, more and more intelligent technology has begun to integrate into the basic research of mechanical automation technology. This laid an important foundation for the innovation and development of machinery manufacturing industry. For example, in the implementation of man-machine integration technology, intelligent technology is needed to play a role in ensuring the safety and convenience of man-machine interaction [4]. In the process of

conceiving mechanical manufacturing process, logical reasoning and analysis judgment are also needed to be carried out effectively. Under the condition of convenient communication mode, the efficiency of mechanical manufacturing work can be improved, so that the mechanical manufacturing work can be transformed to the direction of intellectualization. In addition, intelligent technology also has the characteristics of integrating mechanical manufacturing, automation technology and artificial intelligence technology, which can effectively enhance the ability of technical analysis and environmental judgment. In the actual process of studying mechanical automation technology, it is also necessary to integrate relevant intelligent systems, through the process analysis and actual of mechanical manufacturing. Environmental changes are dealt with. At the same time, it ensures the intelligent program running and testing, so as to directly carry out the decision-making process of mechanical automation, as shown in Figure 4<sup>[5]</sup>.

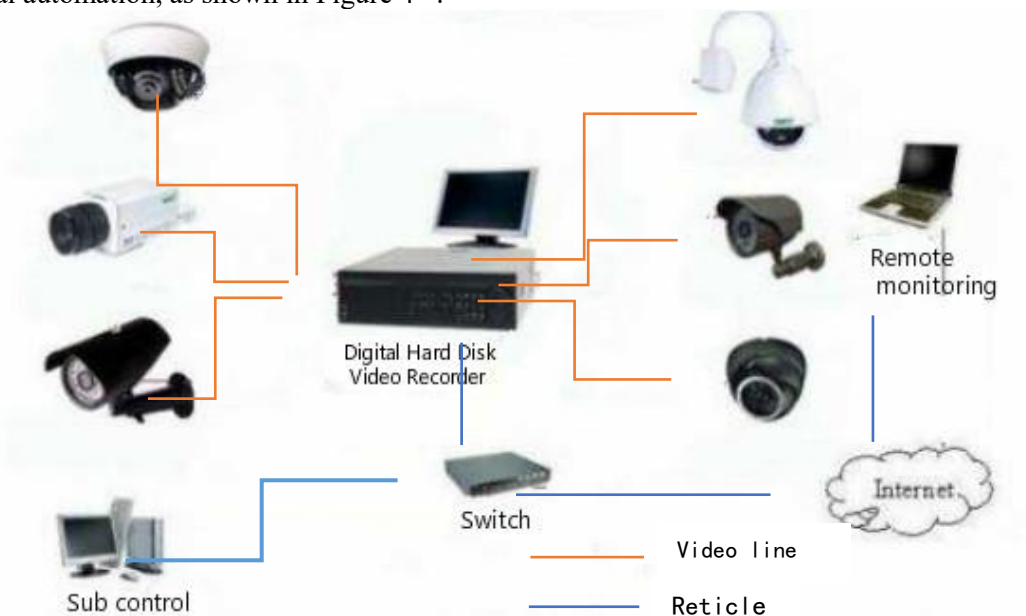


Figure 4 - Illustration of Intelligent Production Technology

In addition, the development of intelligent production technology has also emerged today as a branch of virtual manufacturing technology. Compared with intelligent production technology, virtual manufacturing technology has more comprehensive characteristics of virtuality and computer operation. It has advanced scientific and technological theory guidance in artificial intelligence. It can adapt to various scenarios in the form of simulation, and effectively avoid some bad problems. For example, in the process of assembly and manufacturing of mechanical devices, virtualization technology can be used to study and analyze possible problems and imitate the environmental conditions of the problems to be studied. This way can lay a good foundation for the manufacture of mechanical products, but also can reduce the cost of mechanical manufacturing.

#### 4. Summary

With the deepening trend of global economic integration, the use of automation technology in the machinery manufacturing industry will be more and more, and the scope of application will continue to increase. The use of mechanical automation technology in an enterprise will directly affect its comprehensive competitiveness. In addition, mechanical automation technology is also related to the production and sales of enterprises and related production quality, so it is necessary to enhance the importance of the application of mechanical automation technology in production. Let flexible, intelligent and other related advanced technology concepts into the production of machinery, through the use of mechanical automation technology to improve the market competitiveness of enterprises, to achieve the stable development of the machinery manufacturing industry.

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