

Construction Method of Instrument Application System Based on Automatic Control

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Abstract

In order to overcome the shortcomings of traditional instruments and improve the accuracy of instruments, this paper puts forward a new construction method of application system based on automatic control technology. The construction method integrates a variety of science and technology, such as sensing technology, system integration technology, intelligent control technology. The research results show that the method can overcome the disadvantages of traditional instruments, improve the application efficiency of automatic control technology, and improve the accuracy of instruments.

Keywords

Instrumentation; Automatic control; Application system; Intelligent control; Construction method.

1. Introduction

At present, a large number of scholars and experts began to conduct in-depth research and exploration of intelligent technology, at the same time, they are also committed to introducing these intelligent technologies into various industries. The application and development of these technologies in different industries have laid a solid foundation for the improvement and development of automation level and information level in these industries. In human production activities, these intelligent technologies play an important role, which can not only reduce the workload of staff, but also fundamentally promote the development of intelligent technology and major industries. At the same time, with the continuous development of the industrial field, intelligent technology has also begun to enter the major fine production activities. For example, at present, intelligent science and technology are also introduced and widely used in the instrument industry.

At the same time, people's demand for a variety of environmental protection energy materials, such as wind energy, water energy, tidal energy, etc. Therefore, in order to meet the needs of industrial production activities, relevant instruments and equipment also need to be modified and optimized. According to the current application and development status of automatic control in instruments and meters, this paper puts forward a new construction method of automatic control and application system of instruments and meters. The construction method combines a variety of intelligent technologies and skillfully combines the instrument and instrument equipment with automatic control technology, which has strong feasibility and intelligence.

2. Theoretical Basis

2.1 Instruments

Instrument is one of the commonly used equipment or apparatus in the industrial field, which can accurately measure and calculate various physical quantities and material components. In the field of production, the common instruments and equipment are industrial automation instruments. This is

also the focus of this paper. Generally speaking, industrial automation instruments can scientifically and accurately transmit data over a long distance, and can fundamentally improve the efficiency of industrial production. At present, in the industrial field, industrial automation can be divided into three categories, namely detection, display and regulation. Among them, the main function of the detection instrument is to detect the changes of all the data in the industrial production link, such as temperature, pressure, etc. The display instrument is to display and analyze all the data in the industrial production process, so that the staff can quickly see the real-time data in the production process. The adjustment instrument is to adjust and optimize the initial data in production activities to help staff reduce production pressure and improve production efficiency.

In addition, instruments, like artificial intelligence technology, can extend and strengthen human sensory organs. For example, microscopes, telescopes, acidometers, pyrometers, etc., can make the staff's senses more sensitive, and then help the staff to optimize and adjust the production process accurately. In addition, there are some instruments that can expand human sensory organs, and even help people feel physical quantities that cannot be felt by human physiological functions, such as magnetometers, ray counters, etc.

In general, machinery and technology are very important in the field of science and technology. Instruments can help people to understand and explore the world, and it is also an important tool for human beings to carry out cognitive activities. In addition, instruments can be used not only in human production activities, but also in scientific research, and even in the military field. Therefore, in the current social background, instruments can not only promote the progress of science and technology, but also can improve the level of national economy.

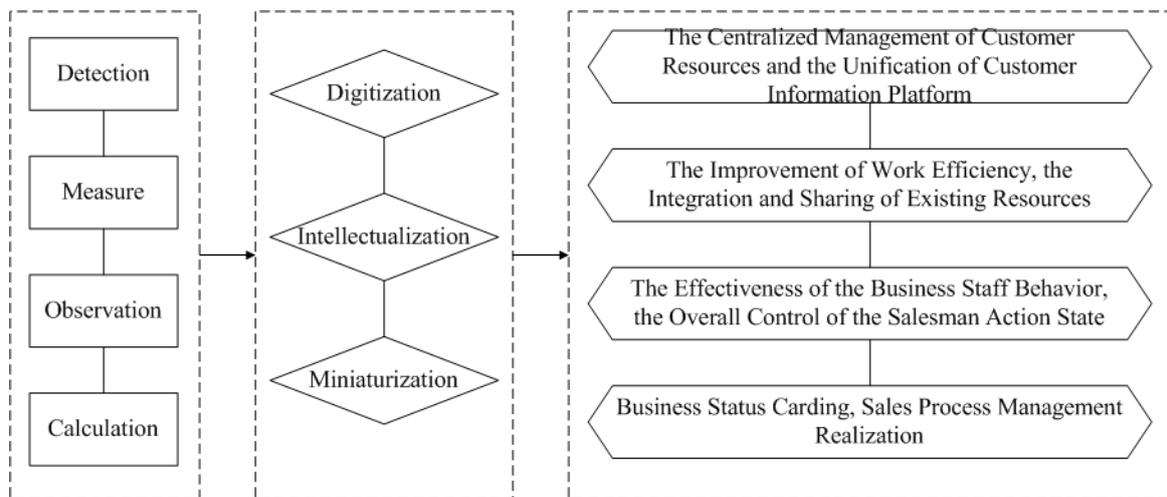


Fig. 1 Instruments

2.2 Automatic Control

In essence, automation control is an integrated control technology, which involves many fields and disciplines, such as industry, agriculture, manufacturing, mechanics, electricity, etc. Automatic control is divided into two categories, one is fully automatic control, the other is semi-automatic control. Fully automatic control equipment can carry out scientific and efficient automatic production according to the requirements and purposes of production activities. In other words, only the operator needs to input the requirements and procedures of production activities, and then turn on the equipment, and the equipment will run according to the program. Therefore, the use of fully automated control equipment, staff do not need to directly participate in production activities. Using semi-automatic control equipment, staff need to directly participate in the production activities, but compared with the traditional equipment, semi-automatic control equipment has reduced the workload of a large number of staff.

At present, automatic control technology is widely used in various fields. At the same time, in life activities, the choice of automatic control equipment can help staff reduce work pressure. In the face of the heavy need to pay a lot of energy of physical labor work, automation control equipment can basically take the place of work. In addition, automatic control equipment can also help staff to carry out part of the mental work. Moreover, in the production activities, some working environment is full of danger, or the working environment and working conditions are very bad. In such cases, the automatic control equipment can liberate the staff from the bad working conditions and help the staff to complete a series of high risk work. Therefore, the production of automatic control equipment, fundamentally improve the labor productivity, improve the economic benefits of enterprises.



Fig. 2 Automatic control

At present, in China's industrial field, automation technology has not yet achieved the state of full intelligence. Therefore, in China's production activities, technical personnel are still needed to control and research automation technology. In China's current conditions, automation control equipment still needs the direct participation of staff, which also leads to a certain degree of waste of human resources.



Fig. 3 Application conditions of automatic control technology

3. Development Status and Characteristics of Automatic Instruments

3.1 Development Status of Automatic Instruments

There are more and more kinds of automatic instruments, and more advanced and high-end industrial system has been produced gradually. At present, with the rapid development of automation industry, many enterprises have begun to produce all kinds of automation instruments, which not only brings higher economic benefits to enterprises, but also promotes the development of automation instrument industry. However, it is worth noting that there is still a long way to go for the combination of automation instrument and automation control technology from the perspective of current industrial development level in China. Compared with foreign developed countries, there are still many problems in the development of automatic control instruments in our country, and in the process of development, only a few enterprises' industrial technology can meet the international standards.



Fig. 4 Development trend of instrument

3.2 Characteristics of Automatic Instruments

Compared with traditional industrial instruments, automatic instruments have significant advantages. In essence, the production technology of automatic instrument is higher, and it has more accurate instrument analysis ability. Therefore, the automatic instrument can process and analyze the data accurately and efficiently. Moreover, with the continuous development of Internet technology, the advantages of automatic instruments also appear. Automatic instruments can store massive data information, and can upload the collected data and analyzed data directly to the Internet platform.

Therefore, the staff only need to use mobile phones or computers to understand the specific data and information in the current production activities in real time, which undoubtedly fundamentally improves the application rate of data information.

3.3 Automatic Control Technology in Instruments

In the future, the instrument will have higher resolution and its accuracy will be further improved. According to the current research and demand of automatic instrument, in the future, the instrument can not only meet the needs of staff measurement, but also accurately identify and analyze the characteristics of the whole system. In addition, with the continuous development of automatic control technology, it can also collect, process and analyze massive data information scientifically and effectively. Therefore, with the development of intelligent science and technology, automation control technology will be more effective application and development.

3.3.1 Sensing Technology

With the application and development of sensing technology, people begin to realize the importance of sensing technology. In the industrial field, sensor technology is an important tool to improve the level of modern monitoring. In addition, in the process of system detection, sensor technology is also essential, which can provide various data information for various systems and equipment accurately and efficiently. Therefore, as an important means of production system detection, sensor technology can also promote the improvement of enterprise automation level.

3.3.2 System Integration Technology

If we want to measure the performance of the instrument, we need to use the system integration technology, which can directly have a greater impact on the automatic control system. At present, system integration technology is mainly divided into three categories, namely requirements analysis, configuration module communication and application. In addition, the system integration technology can control the operation process of the instrument. In essence, system integration technology is an important tool in the process of industrial application, especially in electrical automation, which can monitor the industrial production process in real time. In addition, system integration technology is mostly used in the production process of large-scale enterprises, which can quickly improve the level of industrial production of enterprises in a short time, and then reduce the input cost of enterprise production, so as to bring higher economic benefits to enterprises.



Fig. 5 Automatic control technology in instruments

3.3.3 Intelligent Control Technology

Intelligent control technology can supervise and test various measurement and control systems, which can ensure that the equipment and production are in the current best operation state, and then achieve the expected goal of production. At present, intelligent control technology is also widely used in the field of electrical automation, which improves the automation level of industrial production, but also achieves a high level of system effect. However, it is worth noting that in the process of application, the automation control technology should be selected reasonably and scientifically according to the actual situation.

4. Construction Method of Instrument Application System Based on Automatic Control

4.1 Improvement of Performance and Structure of the Instrument

Automatic control technology can accurately evaluate the operation ability of the instrument. In addition, through the automatic control technology, it can also effectively realize the organic

combination of the hardware and software of the instrument, and then produce the intelligent components of the instrument with strong performance. Moreover, using automatic control technology, the calculation ability and measurement ability of the instrument will be further improved, such as the accuracy of data processing, the operating speed of the instrument, data processing ability, etc.

At present, some automatic instruments are equipped with microprocessors. Through the microprocessors, these automatic instruments can accurately identify various micro control units in the instrument according to the relevant content of fuzzy control algorithm.

4.2 Design Virtual Instrument

At present, in the process of instrument development, it is necessary to use the design method of virtual instrument to display and interpret the information in the instrument in the way of source code. When consumers purchase the instrument, manufacturers need to provide the source code of the instrument to consumers, so that consumers can drive the virtual instrument according to the feedback of the source code, and then meet their own needs. At the same time, virtual instrument can meet the needs of consumers and has strong adaptability. Some manufacturers have proposed new standards for driving software management.

4.3 Application of Instrument Networking

At present, a large number of researchers are improving and optimizing the automatic instruments. Among them, some enterprises began to use network technology to break through the traditional production mode, that is, from the original single data acquisition mode to the distributed data acquisition mode. This transformation can enable the staff to operate these instruments remotely, so as to meet the real-time monitoring and acquisition of data. Compared with the traditional technology, the instrument based on the automatic control technology can complete all kinds of work according to the program of the system. This improvement can not only achieve real-time monitoring of all aspects of production activities, but also accurately identify and analyze massive data.

5. Conclusion

With the continuous improvement of science and technology, the requirements and standards for production in the industrial field are also constantly improving. At present, the utilization rate of intelligent automation instruments is increasing, which also plays an important role in the process of industrial production, especially data monitoring and data analysis. In addition, the automatic control technology has important application value in the field of instruments. It can not only strengthen the operation ability of the instrument, but also better meet the production requirements of the current society, which is worthy of wide promotion and application.

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