

Analysis of the Value of the Application of Intelligent Control in Mechatronic Systems

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Abstract

The development of science and technology has also promoted the acceleration of the urban construction process, many industries have strengthened the application of electronic technology, and achieved certain results, effectively promoting the development of China's mechatronics technology. Mechatronics system is the main carrier of enterprise production and operation, in the development of the times, it also needs to be transformed, innovation, in order to meet the needs of all aspects. People need to apply intelligent control technology and methods, and analyze the specific value of intelligent control in mechatronic systems in theory and practice, so as to help enterprises improve productivity and technology, and thus point the direction for the development of mechatronic systems. In this regard, this paper mainly discusses the application value of intelligent control in mechatronic systems, specifically elaborates the overview of intelligent control, the relationship between intelligent control and mechatronic systems, as a result of which specific applications are proposed, followed by an analysis of the specific application value.

Keywords

Intelligent control; Mechatronic system; Application value.

1. Introduction

In the social and economic stimulation, various industries have higher and higher requirements for mechatronic products. Under the development of intelligent technology and information technology, intelligent control technology is widely used in mechatronic systems, which can improve the operation efficiency and quality of mechatronic systems through optimal operation, help enterprises optimize their organizational forms, innovate production and operation modes, reduce production costs and ensure the quality of integrated production. In this regard, enterprises need to pay more attention to the flexible application of intelligent control technology and methods to simplify the industrial production process and effectively meet the production needs of high value-added industrial products. In short, the application of intelligent control technology to mechatronic systems can effectively play its value and role in improving the production efficiency of enterprises.

2. Overview of Intelligent Control

Intelligent control is a product of the development of the new era, the development of new technology, which is also developed on the basis of traditional control technology, intelligent control is a new control system, its internal components have the characteristics of openness, coordination, in the specific application can effectively play the advantages of information technology processing. Intelligent control is a multidisciplinary, multi-project, multi-professional intertwined technology, intelligent control theory mainly covers information disciplines, artificial intelligence technology, big data, etc., compared to the traditional control theory can include multiple feedback control theory. And intelligent control can also create

complex, three-dimensional mathematical models, effectively play their own value and role, can be applied in multiple tasks, to the individual range, under the intelligent control system can automatically obtain the monitoring object data information. No manual operation is required, the system is advanced and functional, and has been applied in several fields with better results, which can effectively deal with the details and provide guidance for people's operating experience.

3. The Relationship Between Intelligent Control and Mechatronic Systems

Mechatronics is a technology that combines various mechanical and electronic products with a wide range of design and application levels, such as computer technology and mechanical technology, etc. It also has strict requirements for practical operation and application, which are highly professional, intensive and dangerous. However, the technology also has great advantages when applied. Through the analysis of the operation and operation of mechatronics system, it is found that it can effectively reduce the human cost and manpower consumption, and can effectively prevent the occurrence of various risks at the operation site and reduce the emergence of safety problems. Compared with traditional technology, mechatronics system can complete the task with high efficiency and can explore deeper areas. Intelligent control technology is a new technology, which has been applied by several enterprises, and through intelligent control technology can effectively monitor the state and advantages of mechatronics system, which can ensure that enterprises can effectively achieve the expected goals in production operation and improve production efficiency and quality. In essence, intelligent control technology by imitating the function of the human brain to analyze and study multiple data information, can automatically to monitor and detect the operation of the system, equipment operation, its application in the mechatronics system can effectively complex electronic system control, and finally effectively achieve the desired goals [1].

4. Application of Intelligent Control in Mechatronic Systems

4.1. Mechanical System

Intelligent control technology can clarify the direction of mechatronics development, grasp its trend, can effectively improve the control effect, better meet the needs of enterprise industrial production, better for the people to provide high-precision, high-quality industrial products, in the application of intelligent control technology in the process people can simulate expert intelligent control activities through intelligent control instructions, human brain thinking activities, etc.. In the late development of science and technology, the machine manufacturing system can be updated through intelligent control technology, in this process people coursework using neural network systems and big data technology to supervise and control the mechanical system application process, so as to effectively create dynamic, three-dimensional, visualization of the environment construction model, and ultimately improve system operation and operational efficiency. In the specific application people need to install sensor devices within the system to facilitate the technology to record data information and understand the dynamic characteristics, in addition, intelligent control technology can also optimize the neural network technology to jointly process a variety of hidden and incomplete data information, and ultimately promote the development of mechatronic systems [2].

4.2. AC Servo System

At present, people do not have a complete and clear knowledge of the AC servo system. The servo system is installed with drive equipment, which is a kind of equipment that can transform data technology, and can convert the electric signal in the system into mechanical energy in the

process of specific application, effectively controlling the size of the electric power, and finally ensuring that the servo system can better serve the mechatronics system application.

4.3. Robotic System

With the development of information technology, science and technology in China, many fields have strengthened the research, production and design of robot products, for which intelligent control technology is also the main research object, requiring researchers to pay more attention to, for example, in the design of robot walking, it can detect its walking mode and movement trajectory, direction, etc. through intelligent control technology. But in the new era of development, the technology has been unable to meet the new needs of people for industrial products, which requires the enterprise producers to strengthen the analysis, develop more functional and more advanced robots, so as to highlight the level of industrial technology in China and promote the development of social economy. In the intelligent control and up and down, it is possible to simulate human movements and thoughts through the neural network system, which can effectively improve the robot's movement, coordination, flexibility, etc. In this regard people need to scientifically use intelligent control technology to enhance the development, production, design, etc. of robots, such as the design of fuzzy systems, expert systems, etc.[3].

4.4. CNC System

In order to better understand the application of data machine tools and parts and components equipment, the need to introduce intelligent control technology and modernization concept, in order to improve the operational efficiency of basic equipment, work performance, accuracy, to ensure the realization of the expected goals of the practice operation, and in the intelligent control technology can also promote the development of CNC technology, prompting its development in the direction of intelligent, digital. In the specific application process, people can set up CPU control system, RISC chip, automatic monitoring of CNC machine tools, so as to ensure the stability and safety of CNC machine tool operation, improve its production efficiency and quality. In addition, in the intelligent control technology can also record its operating data, parameters change characteristics, to facilitate the timely discovery of abnormal phenomena, hidden faults, etc., so as to constantly adjust according to the work requirements, put forward a scientific treatment plan, and ultimately ensure the quality of CNC machine tool production. Intelligent control technology in the CNC machine tools in the specific applications are shown below.

First, the application of intelligent thermal barrier. Through the previous operation cases found that the process of machine tool processing will heat up, indoor temperature changes will affect product quality, resulting in errors, and ultimately affect production efficiency, which requires people to set up intelligent thermal barriers, can be found according to the specific location of the problem, automatic compensation, so as to reduce errors, improve production efficiency and quality. Second, set up intelligent voice control information system. In the intelligent control technology can be innovative CNC technology operation mode, through the introduction of intelligent voice information system to effectively replace the traditional manual operating system, people can ensure the normal operation link through voice settings, prompts, guidance, etc., so as to improve product quality, to ensure the safety and stability of CNC machine tool production. Third, set up an intelligent safety barrier. In the operation of machine tool production, parts will occur collision and wear, which requires intelligent control technology to set intelligent safety barrier to effectively solve this problem, to ensure the safety of CNC machine tools. Fourth, intelligent vibration control. Machine tools in the process of production and processing will be frequent vibration, affecting the accuracy of the product, which people need to set up intelligent vibration control system, effective detection of vibration frequency

and times, hazards, etc., to ensure that the product production, processing process does not appear abnormal problems, so as to improve the level of CNC machine tools.

5. Analysis of the Application Value of Intelligent Control in Mechatronic Systems

5.1. Optimize the Control Process

Various problems in the traditional mechatronics production process can be effectively solved under intelligent control technology, in which control programs need to be prepared according to the production requirements of processed products, and the product production process can be optimized through intelligent control technology, thereby improving production efficiency and quality and reducing costs and inputs. In this process, it is also possible to control the processing of multiple machine tools, reduce the workload, save manpower and material resources, and ultimately improve production efficiency [4].

5.2. Improve the Production Process

Intelligent control technology can improve the level of mechatronics technology, effective refinement of industrial products, under the intelligent control system can control the operation and state of the machine tool, so as to improve the machine tool processing accuracy and stability, safety, effective improvement of production processes and procedures, so as to produce high-quality products. Through the accuracy of the product to test the technical level of mechatronics system, and ultimately ensure the improvement of mechatronics production quality.

5.3. Promote A Closer and More Detailed Production Process

With intelligent control technology it is possible to scientifically design the production process, unify the production tasks, promote a closer and more detailed production process, adjust and control the product parameters through the actual production situation, and ensure that products with different parameters can be produced on the same machine tool[5].

5.4. Improve Security

The safety and stability of mechatronic systems can be improved with intelligent control technology, where people input commands to cause the system to operate under a fixed process.

6. Intelligent Control in the Design of Mechatronic Systems

6.1. Interface Standardized Design

For manufacturers of machinery and equipment connection interface types and characteristics are different, in order to allow each device before the effective connection, joint operation, the need to optimize the interface module design, to ensure that machinery and equipment can be operated in different environments, control system operation, through the standardized design of the interface to promote better communication between the supplier and the operator.

6.2. Application of Intelligent Design

Through intelligent control technology can be more timely, accurate and precise analysis of mechatronic system data information, so as to improve the system operation efficiency, operational stability, through the intelligent control design of the application module, to clarify the main development trend of mechatronic control system[6].

6.3. Market Expansion Network

In the information era, a variety of data and information constantly appear, spread, exchange, in the new technical support of new communication speed and efficiency have been improved,

which also need to constantly improve the optimization of mechatronics control system, so as to achieve the network of market expansion. In this process, network technology can be used to design network systems, promote the system, and ultimately promote the development of related industries.

7. Conclusion

In conclusion, mechatronics system is an important part of the production system in several industrial fields, and its reliable, safe and stable operation is directly related to the production progress, production efficiency, product quality, etc. In the new era of development, in order to effectively meet the demand for high value-added and high-precision industrial products, we need to pay attention to the significance and value of the application of intelligent control technology in mechatronics system. In this way, the scientific application of intelligent control technology can optimize the mechatronics system and clarify the development direction of mechatronics intelligent control system, so as to improve the production technology level and efficiency.

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