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Application of Intelligent Control in Mechatronics System

Xu Chen

HXC (Beijing) Certification Center Co., Ltd., Beijing, China.

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***Corresponding author:** Xu Chen, HXC (Beijing) Certification Center Co., Ltd., Beijing, China.

Abstract

At present, the market has higher and higher technical requirements for mechatronics. In order to promote the development of mechatronic integration to a new stage, we must make good use of information technology, intelligent control applied to the process of industrial production, through the equipment to control the progress and quality of production, reduce the cost of human and material resources, to provide greater economic benefits for mechatronic integration. With the continuous increase of the added value of industrial products, the product precision requirements are higher and higher, accelerating the complexity of the industrial production process, and put forward higher requirements for the function of electromechanical integration system. Based on this, this time we will focus on the characteristics of intelligent control and its application in mechatronics.

Keywords

Intelligent control, Mechatronics integration, application

Introduction

Mechatronics has been integrated into various industries in China, among which the most widely used is machinery manufacturing industry, which can bring more advantages to the machinery manufacturing industry. Accordingly, with the continuous development, the electromechanical integration technology has also been in the continuous development, which has greatly improved the manufacturing industry in our country. At the same time, with the birth of microelectronics technology, the application of intelligent control system in electromechanical integration system is more and more harmonious. With the development of microelectronic technology, the application of intelligent control system in electromechanical integration system is more and more extensive.

1. The necessity of intelligent control application in mechatronics

With the further development of mechanical engineering and electronic equipment, some large devices can be better developed. Only by combining mechanical design theory with electronic equipment science more effectively, can we give full play to the advantages of mechanical engineering and power electronics, thus promoting the development of mechatronics. In order to further improve the quality of mechanical engineering design, environmental conditions must be fully considered in the process manufacturing and mechanical operation design, and the complex and changeable background requirements must be analyzed in detail. Only in this way can reasonably accurate modelling of environmental conditions be developed to best promote the development of the industry. Although the design of mechanical and electronic products has a good nonlinear analysis method, but in the complex and changeable living environment requirements, the natural environmental conditions can not make reasonable modeling and good data analysis, which has become the main reason to hinder the rapid development of mechatronics. With the development of computer science, microelectronics technology has also made great progress. One of the characteristics of intelligent control technology is that it can make more accurate data analysis of various factors, complex environment and nonlinear conditions, so as to realize automatic correction and give compensation countermeasures. Therefore, if the intelligent control technology is applied to mechatronics, it can not only improve the technical development level of microelectronics

more efficiently, but also overcome the difficulties of mechatronics, so as to promote the greater development of mechatronics [1].

2. Features of intelligent control

2.1 Automation

Intelligent control in the application of electromechanical integration has the characteristics of automation, can greatly improve the efficiency of industrial production, speed up the process of scientific production, and achieve good results. Compared with the traditional control mode, the intelligent control can reduce the control of the system, make the system run automatically by the prepared process, realize the effective control of complex work, reduce the impact of environmental factors on the system [2].

2.2 Intelligence

It is the most prominent feature of intelligent system. In the face of industrial production for multi-objective, diversified equipment control needs, intelligent control technology introduces advanced theory and information technology, optimize the mechanical and electrical integration system, so that the equipment in the case of unmanned operation can intelligent correction and operation, can flexibly deal with sudden problems, improve the stability of the equipment.

2.3 High efficiency

Intelligent control technology is the product of multidisciplinary communication and integration, which can promote the application of the system in mechatronics and develop to a scientific and efficient direction. Because the development speed of today's era is getting faster and faster, the scale of enterprises is constantly expanding, and the requirements for production efficiency are also getting higher and higher, so it is necessary to use intelligent control technology to process the production data and improve the production process.

3. Intelligent control status and deficiencies

With the continuous improvement of Chinese science and technology level, various high-tech products begin to be applied in human production and life practice, the wide use of these high-tech products can improve the quality of human life and the technical level. As one of the high-tech products, intelligent control system can realize unattended and intelligent operation. The reasonable realization of automatic control function can indeed improve the level of manufacturing technology and management, and promote the cross connection and mutual penetration of control and system engineering research. From the practical application process can be seen, mechanical and electrical integration management system contains many complex links and its influencing factors, so the actual application content is relatively complex, only excellent compound personnel can operate the entire mechanical and electrical integration management system on the basis of practical experience of various professional disciplines. Then the functionality and value of the various devices can be realized. In the process of system implementation, we must establish a good awareness of equipment protection, according to the actual situation of intelligent control application, the use of computer programming means to optimize the application, intelligent operation and all-round control of electromechanical integration equipment. Undeniably, the use of intelligent control can effectively manage the entire mechanical integrated management process, can replace the manual way to complete the relevant monitoring and management work, so as to reduce the negative impact of various manual errors, control the actual loss rate within a reasonable range, through this intelligent control means to minimize the human cost. As far as the current situation is concerned, in the development of mechatronics control, the influence of intelligent control can not be underestimated. Based on the actual situation of control system operation, this technology can carry out profound analysis and diagnosis of electrical accidents and mechanical faults. It has become a key part of intelligent control and plays an important role in the development of system technology, neural network and fuzzy theory by experts. Among them, the electromechanical integration project involves more links, easy to produce a variety of failures, the formation of these failures directly affect the company's operating efficiency and long-term development prospects. Therefore, before and after the operation of the control system, it is necessary to carry out a comprehensive test on all electromechanical integration equipment, grasp the data factors caused by the failure of intelligent control, prevent all kinds of possible problems, so as to overcome various problems in the actual operation of electromechanical integration equipment, to ensure the effective improvement of work efficiency [3].

4. Application of intelligent control in Mechatronics

4.1 Numerical control field

In the electromechanical integration system, the application of intelligent system can give full play to the advantages

of the integration of power collection, provide good technical support for the precision and quality of CNC machine tools, and promote the development of scientific and technological innovation in the field of CNC. Due to the high efficiency and high precision of numerical control technology, products can be processed by equipment to reduce unnecessary external interference. Thus, the reliability of NC machine tools in knowledge processing and independent decision-making can be realized, and the interaction and effect between man and machine can be strengthened.

For example, through the intelligent control technology, the fuzzy control can be carried out on each area of the CNC machine tool, constantly improve the interpolation calculation and adaptive ability, in order to adjust the parts processing and structural details of the CNC machine tool, so as to ensure that the CNC machine tool can achieve the desired effect. At the same time, in the process of designing CNC machine tools, we can strengthen the precision of products according to the requirements of product production, adjust and operate various types of group control interpretation, and ensure the quality and output of workpiece production through programming. Finally, using intelligent simulation, intelligent programming and environment awareness, improve the construction of system model, implant automatic adjustment system and fault diagnosis system, improve the stable operation of CNC machine tools [4].

4.2 The Field of Robotics

Nowadays, the popularization rate of intelligent control technology in construction engineering is getting higher and higher, which can make up for the defects of electromechanical integration system and expand its application scope and processing capacity. In the process of manufacturing and operating robot equipment, strong technical support is needed to control the operating parameters of the robot, enhance the flexibility of the robot, and ensure the innovation and development of the robot field.

For example, the robot walking, obstacle avoidance, positioning intelligent processing, the use of neural network technology to realize the robot to human imitation. Because the robot in order to improve the reaction ability and judgment ability, need to receive a variety of information, so the path, trajectory and motion form of the robot need to be unified into the mechatronics system, to provide effective data reference for robot production. Finally, sensor technology is used to collect and integrate the information needed for robot production to improve the sensitivity of the robot in sense and motion. At the same time, computer software technology can be combined with traditional robot design theory and technology to provide new ideas and methods for robot innovation and upgrading. Because the brain has certain defects in the field of robotics, intelligent control can reduce the difficulty of robot production and make the production process more scientific and reasonable. It has not been developed in this field yet, and provides an intelligent environment to ensure the overall performance of robot products.

4.3 Machinery manufacturing field

The manufacturing field is an important part of the market, which can bring huge economic benefits to the industrial development. Therefore, it is necessary to actively integrate intelligent control technology into the electromechanical three-dimensional system, carry out intelligent design of mechanization operations, reasonably predict the possible problems in the data and work out direction solutions, and use the connection of network lines and controllers to ensure the safe and stable operation of each link of mechanical manufacturing, reduce labor costs and improve the core competitiveness of enterprises.

For example, combined with the development of the market to strengthen the application of intelligent control technology in the field of machinery manufacturing, according to the actual situation combined with modern technology, improve the precision and efficiency of machinery manufacturing, make it possible to save unnecessary labor and material costs, through the application of electromechanical integration system to improve the value and efficiency of intelligent control technology of machinery manufacturing, Thus to provide a new direction for the development of machinery manufacturing. At the same time, the environment of mechanical manufacturing can be optimized through computer networking, and special personnel can be arranged to collect and observe the application data of intelligent control technology in the field of mechanical manufacturing, so as to strengthen the application of technology in AC servo system, deal with the uncertain factors of system operation, and ensure that the process of mechanical manufacturing is more reasonable and scientific. Under the application of intelligent system. The automatic monitoring system of travel dynamic is realized in the field of machinery manufacturing. Finally, strengthen the cooperation and learning with excellent enterprises, advanced enterprises on the application of intelligent control technology experience and research and development experience, strengthen the intelligent control technology in the development of electromechanical integration system features and innovation.

4.4 Application of expert system

The application of intelligent control technology in the expert system is mainly manifested in the use of advanced computer system, effective combination of relevant data analysis, according to the information data in the expert data-

base and relevant experience, control and solve the sudden problems in the production process. The expert system can obtain the optimal treatment measures. In the current automatic control system, the expert system can be used to complete the overall control of the electromechanical system, especially when dealing with the fault, to ensure the safety and stability of the machinery has a vital significance. In the actual application process of expert control system, the control system will give full play to the function of fault emergency procedures, and adopt the way of fault warning to deal with the mechanical equipment with problems. Therefore, the processing and analysis of equipment faults show the characteristics of intelligence. Because of the application of expert system, the mechanical and electrical failure will be completed in the first time the corresponding treatment [5].

4.5 Application of intelligent control technology in construction industry

As an important part of the socialist market economy system, the scientific and technological construction has important meaning and practical value for promoting the improvement of the national comprehensive industrial capacity and the urbanization process. At present, in order to achieve the stable business objectives and long-term development of enterprises, various industries have begun to use a variety of intelligent control, forming a complete electromechanical integration system. As far as the current situation is concerned, we should first manage the operation of the lighting system according to the various working stages of the enterprise, and master the specific timing of the lighting system and lighting. Secondly, enterprises directly implement the intelligent control management of the central air conditioning system in winter. This stage of management is mainly based on the intelligent control system of the central air conditioning system of the enterprise as the foothold and core, to ensure that the indoor environment temperature is appropriate, and the power consumption is limited in the minimum range. The interaction between theory and practice can be realized by strengthening the connection with various professional disciplines.

Closing Remarks

In short, intelligent control can combine theory and technology to form a variety of efficient control methods, to achieve effective management of the system and equipment, so that mechatronic integration system in numerical control, machinery manufacturing, robotics and other fields to play a more active role, so as to ensure the accuracy and efficiency of production and management, reduce the cost of human and material resources, Provide strong support for industrial production. In contemporary family life and industrial production, family life technology has been widely used. The in-depth exploration and comprehensive development of intelligent control technology can make People's Daily production and life more convenient and efficient. There is still a lot of room for development of intelligent control in machinery manufacturing, which needs relevant personnel to study, so as to constantly improve the level of science and technology in our country.

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