

On the Modern Development Trend of Mechanical and Electronic Engineering Technology

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Abstract: As one of the core fields of modern science and technology, electronic engineering technology constantly promotes the development and progress of society. Mechanical and electronic engineering technology on the basis of electronic engineering, combined with the characteristics of mechanical engineering, has a wider range of applications. Through the overview of electronic engineering technology, this paper deeply discusses the modern development trend of mechanical and electronic engineering technology, including intelligence, network, modularization and green. Through the analysis of these trends, we can better understand the future development direction of mechatronics engineering technology, and provide references for the research and practice in related fields.

Keywords: Mechanical and Electronic Engineering Technology; Intelligent; Networking; Modularity; Greenization Introduction

With the continuous progress of science and technology, electronic engineering technology is playing an increasingly important role in all walks of life. In this field, mechatronic engineering technology, as a fusion of traditional mechanical engineering and electronic engineering, is rapidly emerging. The development of this intersecting field combines mechanical and electronic systems with each other, bringing a wider range of application possibilities to various industries. The emergence of mechatronic engineering technology not only promotes technological innovation, but also provides more advanced and efficient solutions for society. Its comprehensive nature enables it to fully consider the interaction and integration of mechanical and electronic systems in the design and development, which brings a new development prospect for future science and technology applications and engineering fields.

1. Overview of mechanical and electronic engineering technology

1.1 Comprehensive engineering disciplines

Mechanical and electronic engineering technology is a comprehensive engineering discipline that integrates the principles and methods of mechanical engineering and electronic engineering. This discipline is characterized by its organic integration of the principles of mechanical and electronic systems to form a completely new category of engineering. In the field of design and development, mechatronic engineering technology has a unique advantage in considering and dealing with the interaction and integration between mechanical and electronic systems. In mechanics, this discipline covers a variety of mechanical principles and basic concepts of engineering design, including mechanics, materials science, thermodynamics, etc.^[1]. At the same time, it also incorporates the core principles of electronic engineering, such as circuit design, electronic components and signal processing knowledge. This convergence has made the application field of mechatronic engineering technology very broad, covering all aspects from traditional mechanical equipment to advanced electronic systems. Through the organic integration of mechanical and electronic systems, mechanical and electronic engineering technology professionals can design innovative products and systems with higher comprehensive performance and intelligence levels. This not only promotes the development of engineering technology, but also brings more efficient, reliable and intelligent engineering solutions to society.

1.2 Core Objectives

The core goal of mechanical and electronic engineering technology is to combine mechanical systems with electronic systems in order to create more advanced, intelligent and feature-rich technical solutions. This goal reflects the pursuit of engineering products with better performance and a wider range of applications by integrating the strengths of mechanical and electronic engineering. In the process of achieving this goal, mechatronic engineering techniques focus on exploiting synergies between mechanical and electronic systems. By deeply under-

standing the intersection of mechanical and electronic principles, engineers are able to design systems that complement and enhance each other. ^[2] This not only means that the overall performance of the product is improved, but also that it has a higher level of intelligence to meet the evolving needs of technology. The key is to make full use of the potential advantages of the two major fields of machinery and electronics to solve practical engineering problems in innovative ways. Through the introduction of electronic components, sensors, and control systems, mechatronic engineering technology gives traditional mechanical systems more flexibility and control. Such a comprehensive approach not only improves the performance level of the product, but also expands its application field, makes it more adaptable to diverse needs, and promotes the application of science and technology more deeply and widely into all walks of life.

2. The modern development trend of mechanical and electronic engineering technology

2.1 Intelligent development trend

With the rapid development of artificial intelligence, intelligence has become a significant development trend in the field of mechanical and electronic engineering technology. Intelligent system with perception, analysis and learning as the core, with the ability of independent decision-making and task execution, has brought revolutionary changes to mechanical and electronic systems. In mechanical and electronic engineering, intelligent applications have been widely promoted, covering intelligent manufacturing, intelligent transportation, intelligent home and other fields. The introduction of intelligent systems gives mechanical and electronic systems a higher level of intelligence. By perceiving the environment, analyzing data, and constantly learning, these systems can quickly adapt to complex and changing work scenarios for more efficient task execution. In intelligent manufacturing, the mechanical and electronic system realizes the optimization and adaptive control of the production process through artificial intelligence technology, which improves the production efficiency and product quality ^[3]. In the field of intelligent transportation, mechanical and electronic engineering technology realizes the intelligent management of traffic systems by introducing intelligent perception, automatic navigation and collaborative control technologies, and improves traffic fluency and safety. In terms of smart home, mechanical and electronic systems combined with artificial intelligence algorithms can achieve intelligent control of home equipment, energy saving management and intelligent security functions, providing residents with a more convenient, safe and comfortable living environment.

2.2 Network development trend

With the rapid evolution of Internet technology, mechanical and electronic engineering technology is actively responding to the development trend of network. This trend is mainly manifested in the integration of advanced network technology into mechanical and electronic systems to achieve efficient information sharing and collaborative work between devices. Networked mechatronic systems not only improve the flexibility and scalability of the overall system, but also create entirely new possibilities for remote monitoring and control. In the networked mechanical and electronic system, real-time data transmission between devices can be achieved through the Internet, so as to achieve instant information exchange. This provides a more efficient platform for collaboration between different components and subsystems, contributing to overall performance optimization. The network connection also gives the mechatronic system a more flexible working mode, enabling it to adapt to the needs of different application scenarios and working environments. In the industrial sector, networked mechatronic systems facilitate intelligent manufacturing and factory automation. Through the network connection, the production units achieve real-time monitoring and collaborative work, improving efficiency and product quality. Remote monitoring technology allows engineers and operations personnel to remotely access equipment for immediate fault diagnosis and maintenance, effectively reducing downtime and maintenance costs. This networked intelligent manufacturing has promoted the advanced nature and efficiency of industrial production, and laid a solid foundation for the manufacturing industry to move towards an intelligent future.

2.3 Green development trend

Green development trend occupies an increasingly important position in mechanical and electronic engineering technology, through

the use of sustainable design and environmental protection technology, efforts to reduce the energy consumption of the system, reduce the impact on the environment, so as to achieve the protection of the ecological environment and sustainable development. In terms of material selection, green electromechanical systems tend to use recyclable materials, low-energy materials, and environmentally sound manufacturing processes. For example, the use of eco-friendly materials, such as biodegradable plastics, not only effectively reduces the demand for traditional plastic resources by using biodegradable raw materials, but also reduces the negative impact on the environment during the end-life cycle of the material. This degradable plastic gradually breaks down during use, reducing the problem of plastic pollution. This approach is a positive response to sustainability and environmental concerns and offers practical solutions for reducing the carbon footprint of production processes and reducing pressure on ecosystems. In addition, green technology also focuses on reducing system energy consumption, such as by optimizing circuit design, adopting efficient energy management systems, etc., to improve energy efficiency. In the field of electric vehicles, green mechanical and electronic engineering technology has been widely used. Using high-efficiency battery technology, lightweight design and intelligent energy management systems, electric vehicles can not only reduce their dependence on traditional fuel, but also reduce exhaust emissions, thereby improving air quality^[4]. In addition, the field of renewable energy is also a hot spot for the development of green mechanical and electronic engineering technology. Through intelligent control systems and efficient electronic converters, renewable energy equipment such as solar and wind power generation systems can convert and use natural energy more efficiently, reduce dependence on traditional energy sources, and promote the sustainable development of clean energy.

Concluding remarks:

Mechanical and electronic engineering technology is moving towards modernization at a remarkable speed, and the development trend of intelligence, networking, modularization and green has injected new vitality into it. The convergence of these trends is driving continuous innovation in technology and bringing more exciting applications to society. In the future, with the rapid development of science and technology, mechanical and electronic engineering technology will continue to play a key role in various fields, shaping a more intelligent, efficient and environmentally friendly living and working environment. An in-depth study of these trends not only helps to better understand the direction of technological evolution, but also provides useful guidance for research and practice in related fields, leading us to a more advanced and sustainable future. The modernization of mechanical and electronic engineering technology is the joint promotion of scientific and technological innovation and social needs to create a better foundation for the future. The development of this field will provide the society with more advanced, intelligent and efficient solutions, and inject new vitality into scientific and technological progress and social development.

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