Application of Artificial Intelligence Technology in Automotive Electrical Automation

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Abstract: Technological innovation is a powerful driver of social development. In recent years, China has continuously increased investment in scientific research and achieved remarkable results, especially in the rapid optimization and upgrading of artificial intelligence technology. Currently, artificial intelligence is increasingly applied in automotive electrical engineering, helping to improve the quality and effectiveness of automation control, optimize control systems, and promote further industry development. This paper briefly introduces AI and electrical automation technologies, then comprehensively analyzes their practical applications in automotive manufacturing from multiple perspectives, providing valuable references for industry professionals.

Keywords: artificial intelligence; automotive electrical automation; intelligent control; automotive manufacturing; application research

INTRODUCTION

In recent years, with the continuous development of the social economy, automobiles have gradually become an indispensable means of transportation in people's lives, and the automotive industry has further developed. To further improve the intelligence level of automobiles and meet people's various needs, electrical automation systems have been widely applied in the automotive manufacturing field. With the continuous development of electrical automation technology, its application in automobile manufacturing has been further deepened.

1 Overview of Artificial Intelligence Technology and Electrical Automation

1.1 Artificial Intelligence Technology

With the rapid development of the social economy, information technology has also made great progress, leading to the application of AI in electrical automation. A comprehensive and in-depth analysis of AI technology reveals that its operation is similar to that of the human brain.

Through a series of information processing and technical operations, it can highly simulate the working mode of the human brain. The advantages of AI technology are reflected in its ability to process large amounts of data accurately and efficiently, as well as to manage and control certain equipment in a timely and effective manner.

1.2 Electrical Automation Technology

Electrical automation technology essentially uses computers to monitor the operating status of the entire system or corresponding equipment, ensuring their normal operation. With the continuous development of modern information technology, current electrical automation technology has achieved a high degree of integration and intelligence. It can combine corresponding computer hardware systems to analyze, process, and integrate data information, and can also realize information transmission and sharing, which helps to further improve the intelligence and automation level of the system.

At the same time, electrical automation systems have a certain degree of openness, enabling system settings, monitoring, and interaction with the outside world through corresponding interfaces, making the equipment more open and controllable to meet different functional requirements of products. Under the support of monitoring functions, it can further ensure the security and accuracy of data transmission, forming a good transmission network system to better realize system functions.

Finally, the scientific application of electrical automation technology and systems can not only meet the diverse needs of users but also improve product quality and production efficiency. At present, electrical automation technology has matured, and its application in the automotive manufacturing field has explored new directions, which is of great significance for promoting the development and progress of China's automotive manufacturing industry.

2 Advantages of Artificial Intelligence Technology

2.1 Strong Consistency of AI Controllers

AI controllers can process large amounts of data within the same time period. Even if the data is not originally in the database, the system can perform accurate calculations through relevant functions to serve electrical engineering automation control. Differences in control objects lead to differences in control effects. Therefore, during electrical automation control, staff must strictly follow design principles and concepts, conduct data analysis based on the characteristics of the control object, verify the results through repeated practice, and finally determine an effective plan.

2.2 Easy Adjustment and Control of Electrical Systems

Traditional electrical engineering automation control systems have lagged behind the needs of the times, while the use of AI controllers caters to the trend of the times. By using AI controllers to adjust and optimize equipment, staff no longer need to go to the site in person. Even from a distance, they can adjust parameters in the control room to timely regulate and control the electrical system. This facilitates the adjustment and control of the electrical system and ensures the safety of staff. In addition, AI control helps improve the accuracy and effectiveness of controllers, reduces the number of staff required in the production workshop, lowers production costs, and makes automation control more convenient and efficient.

2.3 Reducing Design Difficulty

Before traditional controllers start working, professionals need to conduct comprehensive and detailed research. When applied to specific scenarios, manual adjustment is required based on equipment parameters and related variable data, which increases the difficulty of operation and may cause various problems due to improper operation. All this has

changed with the introduction of AI technology. With AI, calculation and setting can be carried out more quickly and accurately, effectively reducing design difficulty. This process requires no human participation, improving the accuracy of control design, enhancing work efficiency, and ensuring the safety and stability of equipment operation.

2.4 Improving Product Quality

Traditional electrical automation control requires a lot of human cooperation. In product design and manufacturing, a large number of personnel are involved, which increases the factors affecting product quality. Improper operation by technical personnel may result in many 不合格 products. This process consumes a lot of manpower and material resources, but production efficiency remains low, and product quality cannot be guaranteed. Applying AI technology to electrical control can effectively reduce the probability of work errors, ensure product quality, and significantly improve economic efficiency in manufacturing.

3 Application of AI Technology in Automotive Electrical Automation

3.1 Application in Automotive Rearview Mirror Systems

The automotive rearview mirror system consists of a position servo system and a mirror adjustment system. This system mainly uses a networked chip to detect the driver's position. During vehicle operation, the driver can automatically control and adjust the position of the rearview mirror, enabling timely adjustment according to needs. Traditional rearview mirror adjustment systems mainly use manual adjustment, which is time-consuming and inaccurate. By adopting AI technology, the optimal position of the rearview mirror can be calculated, and even the driver's preferences for mirror positions in various environments can be recorded, bringing the following advantages:

The mirror adjustment system can adjust to better meet the driver's personalized needs according to different driving environments.

It improves the efficiency of adjusting the rearview mirror, ensuring that it can be set to a reasonable position in one operation.

3.2 Application in In-Vehicle Air Quality Detection

The in-vehicle air quality control system mainly uses air molecule sensors to filter the air inside the car to meet standard requirements. Traditional systems only include air conditioning and ventilation systems, resulting in poor air quality control effects, no real air filtering, and high energy consumption. By using AI technology, a control chip can detect the in-vehicle air quality and feed it back to the driver. The driver can then take measures such as ventilating, replacing the air filter, or other operations to ensure good air quality inside the vehicle.

3.3 Application in Vehicle Systems

In recent years, with the development of AI technology, it has become possible to remotely control a car through a mobile phone app. Previously, in northern China's cold winters, a car needed to be warmed up for a long time after starting before it could run normally. With AI technology, people can start the car remotely without going downstairs, providing great convenience to car owners. In addition, AI technology can realize functions such as remote car search, positioning navigation, remote locking and unlocking, and automatic trunk opening, which greatly facilitate consumers and are highly favored by them.

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