Analysis of Control Technology for Motor Drive System of New Energy Vehicle Based on Computer

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Abstract. The market prospect of new energy vehicles is broad and popular in the early stage of development, because it meets the requirements of convenient travel mode and reduces the great pressure caused by the development of science and technology and industry to the environment. In addition to the great potential in application, the new energy vehicle also has great potential in the control technology of motor drive system. Although it has been developed greatly under the attention of the whole society, it is of great value in the long run. In this paper, the above technology is analyzed under the condition of computer technology.

Keywords: Computer, New Energy Vehicle, Motor

1. Introduction

Since the birth of automobile more than 100 years ago, the automobile industry has entered a stage of continuous development and improvement. In the years of change, the automobile has achieved many improvements in safety, convenience, comfort, speed and so on. But these improvements are all consumer-centered changes, and the emergence of new energy vehicles takes into account the factors of resource and environmental protection, which marks a further step in human civilization. However, the emergence of any new thing is faced with many difficulties, technical difficulties, inadequate infrastructure defects, but as long as it meets the requirements of the times, it will have tenacious vitality [1]. The development of new energy vehicle is restricted by technology. As the key technology of new energy locomotive development, the control technology of new energy vehicle motor drive system is not mature, so it still needs to be explored and optimized. The new energy automobile motor drive system is its core system, and its system control technology combines the excellent essence of automobile industry for more than a hundred years with the key technology of modern computer technology and high technology. When the concept of new energy vehicle appeared, it became the field of competition for new energy vehicle. This study is related to the future of new energy vehicles. Only by perfecting the system and improving the motor drive control technology can the new energy vehicles meet the needs of people's travel and the requirements of environment and resource protection in the future [2].
2. Brief description of new energy vehicles

2.1. Concept
New energy vehicle is not a specific reference to a certain kind of vehicle. It is defined from the source of driving force and energy efficiency. At present, there are two kinds of new energy vehicles: oil-electric hybrid vehicle and pure electric vehicle, among which oil-electric hybrid vehicle is the most available in the future, but the technical threshold is high and the realization is difficult. The oil-electric mixing here refers to the conversion of a part of the fuel that cannot be fully utilized in the engine operation into electric energy for secondary use, thus achieving the purpose of energy saving. Instead of installing cars with rechargeable lithium batteries and fuel tanks as independent drivers. The threshold of pure electric vehicles is relatively low, but in order to realize the original intention of people to invent new energy vehicles, a lot of subsequent exploration is needed [3]. Of course, the new energy vehicle is an open concept, its potential is endless. As long as the natural renewable resources can be used as the driving force of the car will be the direction of the development of new energy vehicles.

2.2. Advantages
Under the current realistic conditions, new energy vehicles are faced with many difficulties that all technologies will face at the beginning, but the future of new energy vehicles is predictable. Because in theory, it has many advantages that traditional cars do not have. First of all, the new energy vehicle in the control of more aspects, the operation surface is more concise, for the integration of computer intelligence technology to provide a very suitable space. Second, new energy vehicles in the driving process more stable, more safe. Thirdly, the natural renewable resources used by new energy vehicles are all clean energy, and the fuel such as oil, diesel, natural gas and other fuels will not produce harmful substances, impurities and other damage to the. Finally, the biggest advantage of new energy vehicles is that they are friendly to resources and environment and have the support of all countries. Our government also specially subsidizes consumers who buy new energy vehicles. These advantages will promote the rapid development of new energy vehicles.

3. Basis of motor selection in motor drive system of new energy automobile

3.1. Compliance of performance indicators
For the traditional automobile, the engine system is its core component, and for the electric drive new energy vehicle, the motor drive system is one of the three core components. Therefore, the choice of motor should be considered from many aspects, and the weight, volume and other factors should be considered under the condition of ensuring the use effect.

3.2. Wide coverage of power curves
In the course of driving, the new energy vehicle is the same as the road surface faced by the traditional vehicle. There are ditches and ridges, uphill and downhill, and the power of the motor is naturally different on different roads. This requires the motor to cover a wide range of power in the selection, so that the car on any road can let the user experience the best performance. In order to meet the requirements of automobile power, the maximum power is also an important index of motor selection.

3.3. Low radiation or equipped with radiation protection devices
Low radiation motor is beneficial and harmless to both the user and the environment. In today's increasingly popular promotion of healthy life, the choice of the motor cannot ignore its radiation capacity. It can even add devices that weaken or block radiation on the motor.
3.4. Reasonable cost
In the final analysis, the new energy vehicles should be provided to the consumers in the form of commodities, and then they can get the appropriate profits to be put into reproduction and technical research. In the era of unprecedented competition in the market economy, the cost is every manufacturer must be careful. In the motor selection link, the cost pressure still exist, this is to ensure the best effect, the lowest cost, that is, the so-called high cost ratio.

4. Control technology of motor drive system of new energy vehicle under computer technology
Since the Industrial Revolution, the driving principle of all motors has been the same, the difference lies in the form and combination of application, the efficiency and the material of rotor, stator and coil [4]. In the new energy vehicle, it is still widely used that the motor drive controller is wound with three sinusoidal currents with an angle of 120 degrees on the three-phase winding resistance of the permanent magnet synchronous motor through the permanent magnet synchronous motor speed control system. The synchronous rotating shafting should be in the same position as the rotor rotating shafting.

5. Hardware technology of motor drive control for new energy automobile under computer technology

5.1. Unit system design
Unit system is a microprocessor in computer. It has the advantages of strong function, strong expansibility, stable performance, fast processing speed and strong anti-interference ability. One of the products used in new energy vehicle is motor controller. It not only has powerful digital signal processing function, but also integrates a large number of peripherals for control and use, and has the function of microcontroller, as well as the code accuracy and execution speed of processor. It has been widely used in the field of high performance motor control [5].

5.2. Motor position speed detection circuit
The position and speed of permanent magnet synchronous motor (PMSM) are detected by rotating transformer decoding chip which can be applied to automobile level. The digital converter of rotary transformer with 12 bit resolution can convert the input information of its sine and cosine input to the digital quantity corresponding to angle and speed [6]. The angular position information and angular velocity information in two 12-bit registers are read and saved by three-wire serial interface, so as to obtain the position and speed information of the motor.

6. Software technology for motor drive control of new energy automobile under computer technology

6.1. Main procedures
The main program mainly completes the initialization of the system initialization, peripheral modules, etc., and then waits for the arrival of the interrupt in the main program, and its flow chart is shown in figure 1. Initialization includes initialization of all variable definitions, initialization of register parameters, initialization of interrupt vector table, GPIO initialization, timer setting, event manager initialization, etc.
6.2. Fault Protection Interrupt Program

The fault protection interrupt program is that when any protection action in the motor drive system occurs in under-voltage protection, overcurrent protection, overheating protection and short circuit protection, after the computer host receives the fault signal, the pulse output is cut off by logical judgment, and the system is stopped to ensure the driving safety\cite{7}. The fault protection interrupt program flow chart is shown in figure 2.

![Figure 2. Fault protection interrupt program flow chart.](image)
7. Conclusion
Synthesizing above, the driving characteristic of motor determines the main performance index of automobile driving. It is an important executive component of electric vehicle. We need to call on relevant organizations and individuals in the industry to carry out in-depth analysis and research. Develop potential capabilities for new energy vehicles, improve efficiency and protect the environment. In this way, the emergence of new energy vehicles will certainly bring us a bright change in life.

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