

Analysis on Design and Optimization Measures of Automobile Electronic and Electrical Architecture

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Abstract: With the development of society and economy, automobile has become an indispensable means of transportation for people's daily life and work. It has become the key development goal of automobile industry to improve the performance of automobiles and providing people with a safe and comfortable riding environment. This paper takes the electronic and electrical structure and optimization measures of automobile as the research object, and provides reference for automobile development by studying the electronic and electrical structure and optimization process.

Keywords: Automotive Electronic and Electrical; Architecture Design; Optimization Measures

1. Introduction

In recent years, with the rapid development of our country, the total number of cars in China is constantly increasing, which makes cars become a very convenient means of transportation chosen by people and brings the most convenient travel for people. In China's current automobile manufacturing industry, the design of automobile electrical and electronic architecture is one of the most critical factors affecting automobile design. In the process of automobile development, automobile has more and more functions, and a large number of communication lines are used in automobiles, thus building a complex electronic and electrical control system. In order to make the electronic and electrical control system run normally, on the one hand, the design content of electronic and electrical architecture is simplified. On the other hand, effective optimization measures are implemented according to the service performance of automobiles.

2. Analysis of main optimization tools for automotive electronic and

electrical architecture design

2.1 Database

The optimization of database is divided into three aspects: First, in the design of electronic and electrical architecture system, the database should be optimized comprehensively to meet the design standards. Under the background of global economic integration, in the production process, automobile enterprises will constantly optimize the models and structures according to the industry trends and drivers' needs, and establish a perfect database in the optimization, so as to provide reference for subsequent production; Second, designers should adjust the database in real time, analyze the development trend of the automobile market from the perspective of development, and formulate a scientific and reasonable design scheme of the electronic and electrical architecture system through the database, which is conducive to improving the operation level of the electronic architecture system; In the optimization of automotive electronic and electrical architecture design, it is very important for us to optimize the architecture database, which plays an important role in automotive electronic

and electrical architecture design. If the architecture database cannot be done well, the automotive electronic and electrical architecture design will become meaningless, because the authenticity of data is very important in the process of optimizing database design.

2.2 Tool for optimizing the design of electronic and electrical architecture

Optimizing the design of electronic and electrical architecture can better assist people to carry out related work. For the current development, tools are playing a more and more important role. As the development of the automobile industry is becoming more and more complicated, we should introduce information technology and improve the design work, so as to improve the overall design effect, accurately grasp the design accuracy, and better promote the related work. Automobile manufacturers need to constantly improve relevant work and use relevant tools reasonably. Based on the concept of electronic and electrical architecture design, we can effectively combine various elements with relevant tools, which can improve the design quality. We can also define electronic and electrical components. According to different situations and the positions of different components in automobiles, we can establish different development modules, play the role of different modules, and strengthen the links between modules, so that better results can be achieved, thus further improving the design of automobile electronic and electrical architecture and ensuring the quality of automobile production.

In the process of automobile electronic and electrical architecture design, only by using appropriate design optimization tools for electronic and electrical systems can ensure the effective implementation of various electronic and electrical architecture optimization and management, and then scientific configuration settings be realized. Therefore, in the process of electronic and electrical architecture design, designers should give priority to some advanced and representative electronic and electrical design optimization tools with relatively mature technology, such as vision and PREE. The advantages of the above-mentioned tools are that they generally have database support systems and graphical user interfaces, and the relevant design results can be reused in the tools,

and they also have the functions of relearning and modifying electronic and electrical construction^[1].

3. Analyze and optimize the process of designing automotive electronic and electrical architecture

3.1 Positioning of market models

Optimizing the design process of automotive electronic and electrical architecture is very important and plays an important role in our next development. First of all, we should do a good job in positioning market models, so as to determine the development direction. When planning the market, automobile enterprises need to know the current market development in detail and monitor the specific market dynamics in real time, so that we can grasp the latest development trends and make reasonable evaluation, so that we can carry out related work from different aspects. The design appearance, market pre-sales situation and other aspects of work need to be positioned reasonably. We can optimize and do a good job in research, so that we can better overcome the problems, help the automobile industry to do a good job in future planning, adjust and design the plan through relevant information, achieve better development, master the latest development process, and play a guiding role in the development of the automobile industry, which can reduce the occurrence of problems and achieve better results.

In the process of vehicle positioning, the strategic department of the enterprise should go deep into the market for investigation, and cooperate with the market planning department to launch brand-new vehicles, so as to conform to the market development trend on the one hand and meet the needs of drivers on the other hand. In the process of market model positioning, based on the changes of the future market, the market should be comprehensively analyzed and evaluated, so as to accurately position the model, make the model more reasonable and occupy a dominant position in the market. Once the model is determined, the design of electronic and electrical architecture system can be started.

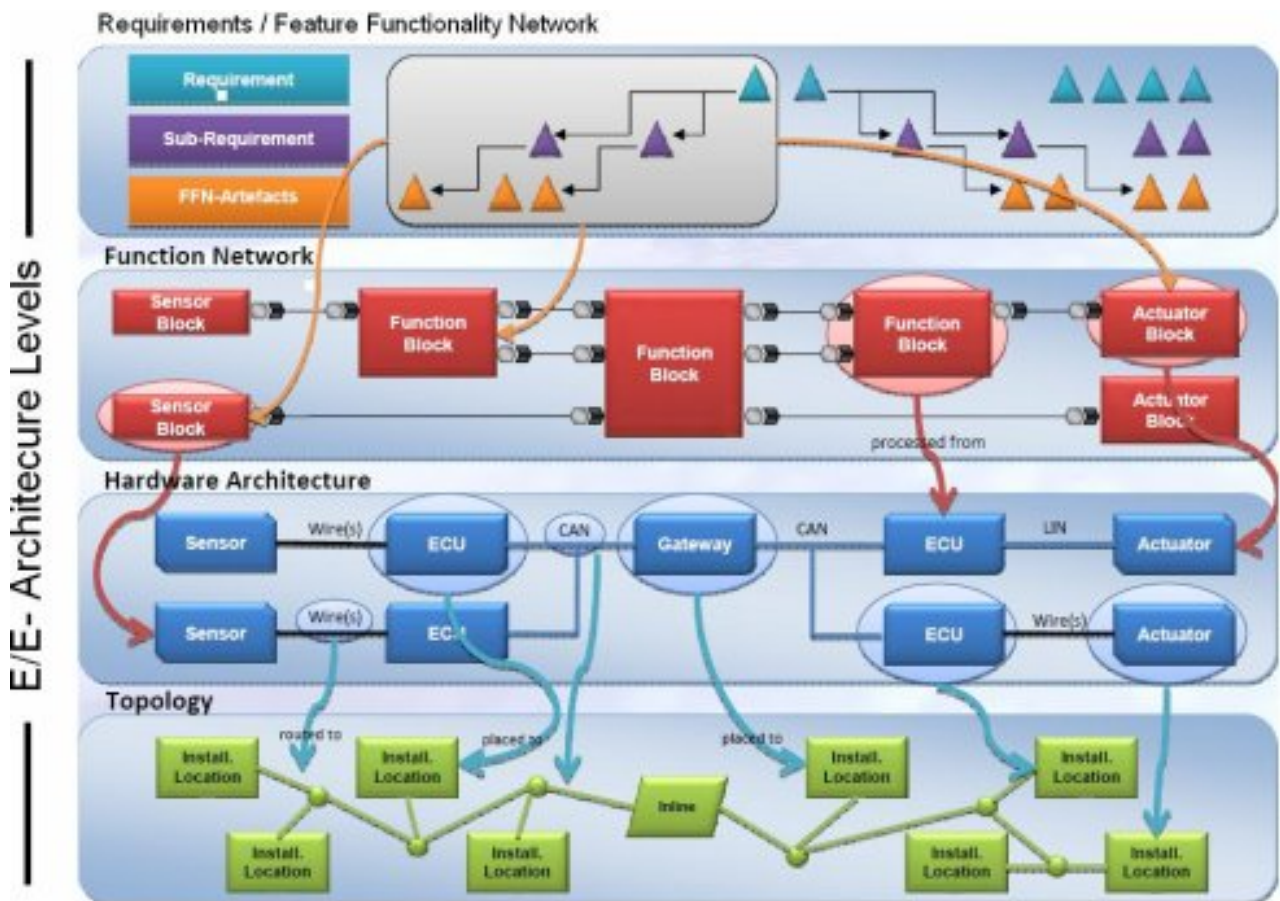


Figure 1. E/E — Architecture Levels.

3.2 Correct analysis of benchmark models

It is also a very critical step to analyze the benchmark models accurately, which plays an important role in the whole vehicle design, and plays a role in benchmarking management. We can optimize the related work of automobile electronic and electrical architecture design by understanding the need of benchmarking management in detail and then considering it comprehensively. On the basis of comprehensive consideration, we can innovate the power supply system, topology and other related work, so as to create better models, meet our current development needs and achieve better results. When analyzing the relevant benchmark models, we need to make a comprehensive analysis, not only to see its advantages, but also to find its shortcomings, so that we can better grasp the key to development. Effectively solve these problems, and accurately apply the benchmark models, so that we can continue to innovate and grasp the key of design according to our own development. By integrating various elements, we can achieve better results, improve the design of automotive

electronic and electrical architecture, improve its performance, promote related work, and master the latest development contents, thus further realizing the development of modernization. In the future development, we can achieve breakthroughs and get inspiration from benchmark models, which is a major breakthrough for the development of China's automobile industry. We must master more information from them and break through traditional construction from different aspects, so as to adapt to the development of the times and achieve higher development goals^[2].

3.3 Design the vehicle type according to the specific market demand

The design of vehicle models also needs to be carried out according to the specific market requirements. Only by doing relevant work according to the market demand can we fully meet the customer's needs and increase automobile sales. On the basis of the customer's needs, we can reasonably arrange the design of automobile electronic and electrical architecture, reasonably carry out relevant work, and improve the performance of

a certain aspect in a targeted manner, which has become an important basis for automobile manufacturers to produce. We can analyze the needs of users, innovate constantly on the basis of diversified development, improve the configuration of automobiles, and choose appropriate development methods to design different models reasonably, so as to achieve better results. We must proceed from reality and do a good job in relevant work. It can further promote the development of the automobile industry in meeting the needs of users, and the process of modernization is constantly accelerating. Only with a certain ability can we cope with different problems, and we can master more technology and development experience from it, and constantly innovate on the original basis to meet the development of enterprises. In the process of vehicle positioning, the designer should make a comprehensive analysis according to the customer's needs, on the one hand, meet the customer's needs to the greatest extent, on the other hand, comprehensively improve the performance of the vehicle, and fully display the characteristics of the vehicle, so as to attract the attention of customers. In the preparation of the new car leaving the factory, the vehicle type should be fully tested to make the vehicle type more reasonable and help meet the use demand. After completing the demand development of the vehicle type, the relevant components are reasonably configured on the basis of the vehicle type to effectively control the cost of the vehicle type. If the configuration is improved, the cost of the vehicle type will rise. According to the demand, the cost of vehicle can be controlled in an effective range.

3.4 Keep up with market demand, introduce new technology and give play to the role of modern technology

Optimizing the design of automobile electronic and electrical architecture can strengthen the stability and safety of automobile design, and there are more solutions to problems encountered in use. At present, the development of China's automobile design needs more growth. The design of automobile electronic and electrical architecture is a very complex work, which combines various technologies and knowledge, and needs to give full play to the role of information technology. In the optimization process of automotive electronic and electrical architecture design, it is necessary to select suitable optimization

tools to ensure the scientific and rational design optimization of electronic and electrical architecture, ensure that all electronic and electrical architecture design optimization can be accurately implemented, and enhance the scientific configuration of architecture. Master more good methods, solve problems effectively and better carry out related work, so that we can improve our own development and provide more development ways for the automobile industry. In this process, we should find our own development methods, stick to our own development ideas, improve our work from different aspects, introduce more knowledge about electronic and electrical architecture design, and further improve tools and construction methods, so as to achieve the expected goals and develop in this process.

According to the specific situation, China's automobile industry is still developing constantly, and has made good achievements in some aspects. We should constantly break through the tradition and improve the development level of designers, so as to achieve better results. It can make tools play a better role, and the system can be reasonably applied in the actual development, so that the automobile industry can get more benefits and realize the development in different aspects, which has a positive effect on us. We can also learn a lot from it, build a complete development structure, enable the automobile industry to build a new development concept, and achieve a higher level of development in design, so as to achieve long-term development and provide more choices for people^[3].

In the new development period, we must introduce advanced technology and the latest management experience, adapt to the development of the times and make corresponding improvements, so as to achieve better results and improve the overall development level. The design of automobile electronic and electrical architecture needs to keep pace with the times, which has an important impact on the development of automobile industry. We should not only grasp the key problems, but also put forward targeted problems. Different solutions should be put forward for different aspects of work. In addition, we should always pay attention to all kinds of information about the development of automobile industry. It can absorb the factors that are beneficial to our own development and constantly improve the related work, so as to achieve practical results and further pro-

mote the development of related work. The related contents of automobile electronic and electrical architecture design need to be further developed. We should carry out according to relevant standards and improve our own development level from different aspects, so as to get more benefits and improve the overall development effect.

4. Summary

The design of automotive electronic and electrical architecture has a great impact on the quality and performance of automobiles, and plays an important role in the actual development. What we need to do now is to deal with all the work and problems, build a complete development system, and deal with all the work in each link, so as to continuously break through the traditional construction and make greater contributions to the de-

velopment of the automobile industry. Improving the performance of automobiles and bringing better experience to people can expand and develop the automobile market in China and achieve better results.

References

1. Zhong X. Analysis of automotive electronic and electrical architecture design and optimization measures (in Chinese). *Electronic World* 2012; (19): 31–32.
2. Ni B. Research on design and optimization of automotive electronic and electrical architecture (in Chinese). *Electronic Technology and Software Engineering* 2013; (17): 270.
3. Feng X, Hu C, Zhang H. Automotive electronic and electrical architecture design based on PREE vision (in Chinese). *Automotive Electrical and Electrical Equipment* 2013; (10): 43–46.