Design and Development of the Personalized Customized Platform of Electric Motor Based on J2EE

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Abstract. With the rapid change of the times, the advent of the “Internet+” era, consumer demand continues to be personalized, and gradually promote the transformation of the production mode of motor manufacturing enterprises. Under the premise of satisfying customer needs and increasing participation, based on the characteristics of the production of motor companies, and combined with the status quo of motor manufacturing, through the company’s on-site inspection and enterprise needs analysis, in order to build a personalized manufacturing management system for motor manufacturing manufacturers. At the same time, the physical data model of the system and the structure and module of the personalized customization platform system were respectively developed and designed using Power Designer modeling software and J2EE technology. Through the practical application of the company, the customer’s experience with personalized design and the real-time interaction between the company and the customer are realized. The distance between the enterprise and the customer is shortened and take the customer as the center of the production mode is implemented.

Keywords: Motor production · Production mode · Personalized customization · Personalized design

1 Introduction

With the continuous development of internationalization, as a large manufacturing country, the motor plays an important role in China’s national economy. In the development of computer technology, to improve manufacturing level of today’s market economy; as has been widely used electrical equipment manufacturing, should raise the level of design and innovation of marketing mode, to enhance the customer experience and the enterprise competitiveness, promote the development of China to make power [1].

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Under the condition of economic globalization of the market economy, living in the era of “Internet+” the new generation of consumer groups of universality of life taste also from the traditional to individuation, differentiation, the standardization of traditional corporate interests centered, scale of production methods have been unable to meet the increasing personalized needs of consumers, to cater to the market changes, motor companies should keep pace with The Times, through personalization way to provide customers with personalized products and services, in order to attract customers, improve the enterprise core competitive ability, make the enterprise in the competition. According to the research on personalized customization, literature [2] summarizes the mass customization and personalization, and compares and analyzes the differences between mass customization and personalization, relevant technologies and practical applications. Literature [3] in order to identify and resolve problems when enterprises implement mass customization product, according to the characteristics of customization system and diagnosis of intentions, based on the fuzzy mathematics theory and set covering technology of multi-level enterprise customization diagnosis model was set up, customize the consistency of the diagnosis model and coverage is analyzed, and gives the solving strategy; In the literature [4], aimed at product customization, for the entire product family design and customize to create a consistent formal method, the integrated design model, and provide customized industrial application in a manufacturing company for case study; Through various cooperative mode, literature [5] was to implement mass customization production of cluster supply chain (CSC), based on the characteristics of MS building model, put forward the method of using various market under the condition of MSC, finally, according to the CSC actual production conditions, the simulation experiment to solve the problem; Literature [6], through the increase of the complexity of mechatronics products, was to adapt to the personalized and diversified demands of customers, the traditional design method of “product-centric” to “customer as the center”, the design method of the proposed modeling method for multiple customer requirements, obtain and describe the needs of customers, in high-speed train design, for example, to verify the effectiveness of the proposed complex mechanical and electrical products development and the rationality and feasibility of multidisciplinary requirements modeling method; Literature [7] used CAD/CAM/CAE software parametric functions and parametric design of series hardware modeling, through the parameters related to realize data update, so as to ensure its accuracy, for the mass customization furniture series hardware modeling new solutions are put forward; Literature [8] proposed a real-time reliable physiological data based on human-computer interaction interface and the personalization of three-dimensional fitness system design method, in order to design a set of use exercise bikes, the device body cameras, feeling the heart rate sensor devices such as fitness system, and through the field investigation and test to get a better evaluation; Literature [9] breakthrough the limitation of traditional model car design, draw lessons from the Internet, try to the existing auto appearance design, configuration, personalized collocation to carry on the design of choose and buy, let consumer personalized fun in design experience, at the same time, the change of mode led industry development.

Modeling method based on the above research, it was the personalized customization of the study was more, some furniture in terms of system design, 3D fitness areas such as obtains a good effect of experience, but the personalization system
research in the field of motor is relatively small, with the wide application of motor is manufacturing, to meet the personalized needs of customers, customization was carried out on the field of motor system study is very necessary. Customization production is the “single or mixed flow” type of production, is in recent years, with the improvement of economic level and the information technology and the development of new production mode, its characteristic is the number of small, high quality, quick market response ability, customer participation higher [10], the early stage of the custom at the customers demand, however, enterprise issued by the designer design stage, although it is the custom, but it can’t reflect the customer’s individuation.

This article embarks from the higher customer participation, and promote the real-time interaction with the user of the enterprise, to maximize meet customer custom experience for the purpose. Based on the J2EE technology, proposed personalization system was studied for the electrical products, to meet the personalized needs of customers.

2 Manufacturing Status of Motor Enterprises

Through on-the-spot investigation and analysis of some motor manufacturing enterprises, and found that the motor industry in our country have formed a complete system of business, product varieties, specifications, performance and production also has basically meet the requirements of the development of the national economy, the industry growth rate is on the rise as a whole. However, from the current policy and market, the motor enterprises have the following problems:

(1) Though motor product variety in China, but its efficiency was generally not high, there was the “big horse-drawn cart” phenomenon, thus design and application of high efficiency motor become the inevitable choice of enterprise;

(2) As customer’s requirements and the differentiation of increased demand for motor, the motor needs to be customized: A new generation of consumers has been gradually tends to the trend of personalized customization, customer to improve energy efficiency and specialization of products of the demand was higher and higher, prompting companies according to the actual needs of customers design and manufacture of related parts and components of the motor parameters, with customers to design research and development into enterprise enhance motor is a new way to research and development ability;

(3) Customer requirements for the reliability of the electrical product quality and after-sales service more and more high: Motor product quality and after-sales service level and fault repair ability gradually becomes a key indicator of evaluation of enterprises for the customer.

3 System Function Design

According to the investigation and analysis of some motor manufacturing enterprises, the modular function of the motor personalized customization system is as follows
(1) Access system: Users can register on the access interface through the system entry, enter the motor personalized customization system, and then the system was accessed.

(2) Personnel management system: The function modules according to different users set different permissions, according to the information submitted to the backend database, through the system management review, to assign different access permissions.

(3) Spare parts library management system: This module can see the appearance of all accessories and corresponding functions, and even browse to the origin of accessories.

(4) Order information management system: The platform provided customers with the delivery of orders, queries, modifications and deletions of orders, and provides technical support for the management of the order.

(5) Product display system: The system can display the 3D model of existing products, can also according to the customer choice of parts in the system generated in the product design drawings, in 3D model, system interface for custom products have a more intuitive display.

(6) Design evaluation system: The system through the platform will complete the products sent to customers design background evaluation system database, in accordance with the relevant indicators of product performance and security of the objective evaluation, it was concluded that weight range, the final assembly of customer expectations through the system customization product model [11].

4 System Data Model Design

Personalization system in this paper, the motor design mainly includes the personnel management, parts inventory management, order information management, product information, evaluation system and so on several parts, based on the physical database model is established. Power Designer modeling software was adopted in this system was designed and developed the system database relational model, a complete function and convenient application of the computer aided modeling tool, it can provided different models with different development environment, and between the model and can be independent, and then connect [12]. The physical data model of the motor personalized custom system (partial module representation model) designed by Power Designer was shown in Fig. 1.

5 System Architecture Design

J2EE was the Sun’s launch of a new concept for enterprise application development model, it used a multi-layer distributed model, according to the function could be divided into components, application layer distribution of the various application components according to their application in different machines. A multiple stratification application was able to provide different services independent layer, typical
Fig. 1. Physical database model of personalized custom system
J2EE architecture was divided into the following four layer structure: the Web client and a Web component layer, business logic layer components, enterprise information system software, based on the components design, development, assembly and deployment of enterprise applications, high portability, scalable, easy to maintenance, apply to the design and development of the enterprise information system, a good development environment for enterprise application developers [13].

System integrated use of computer network technology, J2EE platform and SQL Server database technology, motor product customization design based on J2EE platform, designed for real-time interaction between customers and enterprises and the view was to provide a fast and convenient communication platform. The system was divided into four layers: client layer, business layer, access layer and data resource layer, as shown in Fig. 2. Based on the characteristics of J2EE “write once, run around”, easy access to database technology and the ability to secure data in Internet applications, solve complex problems in system development effectively [14, 15].

Fig. 2. System diagram
6 System Development

The system used tomcat as the Server, SQL Server as the background database management system, and the personalized customization system was developed. The key functions in the system development were briefly introduced as follows:

(1) Login system
   The login system was the authorization of users who accessed the system. Through the authentication, the user can customize the product and interact with the product designer.

(2) Main interface of system
   The main interface of the motor personalized customization management system was shown in Fig. 3, which mainly shown the types of motor, main parts of the motor and national standards.

(3) Customize the system
   Motor personalization system interface as shown in Fig. 4, the module to visual display system of personalized customization, set the important parameters of the motor for customers to choose according to individual be fond of, and select the results on the same page.

![Fig. 3. Main interface of the motor personalized customization system](image-url)
7 Conclusion

In order to improve the market competitiveness, motor manufacturing enterprises with the development of the modern market economy, put forward motor product customization platform based on J2EE technology, analyzes the architecture of the platform and related functions, to customer satisfaction and participate as the ultimate purpose, effectively meet the personalized needs of customers to provide support for the enterprise, reducing production cost, improve enterprise in the position in global market competition; After completion of system development, after some motor enterprise applications, make customers to be able to realize personalized experience, let customers fully enjoy the pleasure of design, the realization of the maximum customer satisfaction, as well as motor enterprise development provides a new train of thought.

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