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Research on New Energy Vehicle Development Publicity System Based on Computer Intelligent Marketing Promotion

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Abstract

This paper designs a new energy vehicle development publicity system for computer intelligent marketing promotion. This paper uses the relevant theories of database design to start from the database requirements analysis, conceptual design, logical design, physical design and database realization, and elaborates the construction process of the new energy vehicle development publicity system database in detail. The front end is implemented using the progressive framework Vue, and the back end is developed using the Spring Boot framework. This paper starts with the design and implementation of the system, and studies the technical framework, functional modules and implementation process used to develop the system. The system solves the problems of monitoring and collecting a large number of real-time operating parameters of new energy vehicles, vehicle management and demonstration operation display, which are faced by large-scale demonstration operations of new energy vehicles. The system has good expansibility, maintainability and stability.

Keywords

Computer; Intelligent Marketing Promotion; New Energy Vehicles; Development of Publicity System.

1. Introduction

Energy-saving and new energy vehicles include: hybrid new energy vehicles, pure electric new energy vehicles, fuel cell new energy vehicles, hydrogen engine new energy vehicles, and other new energy vehicles. The multiple links of the new energy vehicle industry chain and the intersection with peripheral industries determine the diversity and complexity of new energy vehicle consumption [1]. In addition to car purchase consumption, the consumption of new energy vehicles can be extended to repair, maintenance, beauty, accessories, insurance, credit, etc., which determines that consumers can easily log on to online sites when they have needs and enjoy the various services provided by the online platform. Information and services, online advertising can use text, sound, image, animation and other means to comprehensively and truly provide products to online users. Energy-saving and new energy vehicles are high-priced and durable commodities. Consumers have relatively high consumption costs before choosing to buy commodities, and consumption decisions are generally repeated and balanced. The high degree of information extensibility and reading convenience of the online marketing platform greatly facilitates consumers' understanding and understanding of energy-saving and new energy vehicles, and reduces consumption costs.

2. System Requirements Analysis

The analysis of the publicity system for the development of new energy vehicles provides a basis for system design and system implementation, and is related to the success or failure of

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system development. Therefore, system analysts must use scientific methods and tools to carry out detailed and sufficient system objectives, functions, and software and hardware environments. The investigation and analysis of the system, and a thorough demonstration of the feasibility, benefit/cost of the system development. Through oral inquiry, operation demonstration of the old system, and comprehensive analysis, it is known that the functions and performance requirements of the new system are as follows: (1) A variety of methods can be used to forecast, and the forecast results should reach medium-term forecasts (1 to 5 years). (2) It can arbitrarily select the range of historical data to verify or predict the marketing volume within 1 to 5 years according to the needs, and draw the forecast trend chart according to the forecast results. (3) The system administrator has full authority, including entering, modifying database content, and changing passwords and passwords. (4) Friendly interface, simple operation and easy maintenance.

3. Advocacy Development Marketing Forecasting Model

There are many factors that affect the development of Chinese new energy automobile industry. As trucks, passenger cars, and cars, because of their different scope of application, the factors that affect them are also different [2]. Therefore, it is often difficult to predict their sales by considering a certain factor alone. biased. Therefore, we choose to start with the analysis of the coordination relationship of the relevant factors of the economic system, and use the multi-factor coordination prediction model to make predictions. Its manifestation is:

$$F^*(e) = \hat{F}(e) + f\left[R(e), H_j(e), K_i(e)\right] \quad (i, j = 1, 2, \ldots) \tag{1}$$

In the formula, e is the time variable, $F^*(e)$ is the single forecast value of the sales volume of trucks, and $f\left[R(e), H_j(e), K_i(e)\right]$ is the forecast value of related factors. $f\left[R(e), H_j(e), K_i(e)\right]$ is an important part of the coordinated forecasting model, and its form depends on the specific problem. Due to the continuous strengthening of Chinese macro-control capabilities and the gradual improvement of the market economy, the economic situation is relatively stable, and the fluctuation range is significantly reduced; in addition, the state's planning for the entire new energy vehicle industry and the new energy vehicle manufacturers' understanding of the market economy continue to strengthen. Chinese new energy automobile industry is developing in a stable direction. Taking into account the stability of the development of new energy vehicles in the future, the following forms are proposed:

$$f\left[R(e), H_j(e), K_i(e)\right] = \lambda(e)\left[P(e) - \hat{F}(e)\right] \tag{2}$$

In the formula, $\lambda(e)$ is the correction coefficient, and $P(e)$ is the coordination guide function. This method is an effective method to analyze the mutual influence degree of two closely related economic variables, which is the ratio of the growth ratios of the two variables [3]. The elastic coefficient method is usually used to predict the demand for new energy vehicles. The elasticity coefficient of demand for new energy vehicles is equal to the ratio of the number of new energy vehicles to the growth rate of its related factors. Its basic formula is:

$$Y = \frac{\Delta Q / Q_0}{\Delta Y / Y_0} = S_0 / S_Y = \frac{(Q_N - Q_0)/Q_0}{(Y_N - Y_0)/Y_0} \tag{3}$$

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Among them, Y is the elasticity of demand for new energy vehicles, ΔQ , S_0 , Q_0 , Q_N represent the growth rate, growth rate, base period and the number of new energy vehicles in the reporting period, respectively; ΔY , S_Y , Y_0 , Y_N represent the demand related to new energy vehicles, respectively Growth, growth rate, base period and reporting period values of economic indicators. System operation is a process of processing information, and the information here is data. Analyze the data flow during the operation of the system, and draw the data flow chart as shown in Figure 1.

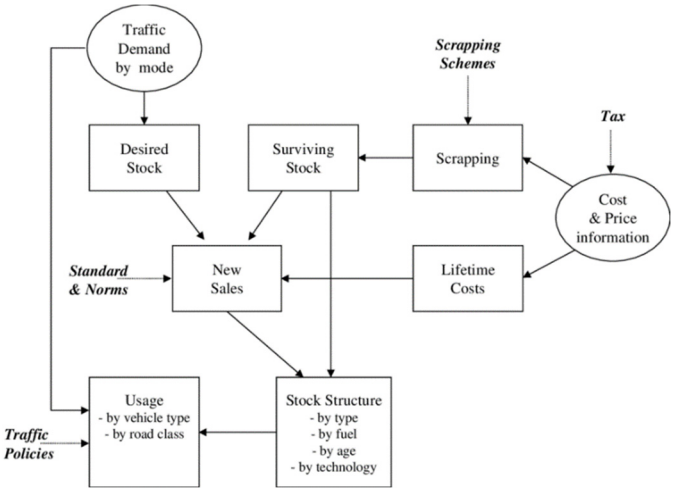

Fig 1. System data flow diagram

4. New Energy Vehicle Development Publicity System Database Design

The new energy vehicle company marketing information system is based on the tower network organization, that is, a marketing chain such as new energy vehicle marketing outlets, distributors, and marketing companies. Each level of the marketing chain has a marketing information subsystem with certain functions, which uploads the marketing information of different regions in a timely and accurate manner, and realizes the hierarchical processing of marketing information [4]. New energy vehicle is a special commodity with high added value. In order to improve the service quality of new energy vehicle products, Chinese new energy vehicle manufacturers have proposed a set of four-position "vehicle marketing, spare parts supply, after-sales service and information feedback". Integrated new energy vehicle marketing service model. The system organically combines the four-in-one marketing model with the enterprise integrated information platform, and realizes the intelligent management and rapid response to the needs of customers, marketing outlets, dealers and company marketing through database servers and network technology.

Considering that a new energy vehicle is a product with many parts and a complex structure, as well as the complex and changeable characteristics of new energy vehicle failures, a new energy vehicle after-sales service information subsystem is established. This subsystem is mainly based on the new energy vehicle maintenance expert system. On the one hand, it provides an expert-level diagnosis implementation platform for remote maintenance personnel, and on the other hand, it provides a reliable platform for the company's new energy vehicle maintenance, model improvement design and new energy vehicle product development. basis and backend support. In addition, it provides emergency assistance for faulty new energy vehicles [5]. The overall structure of the system is shown in Figure 2.

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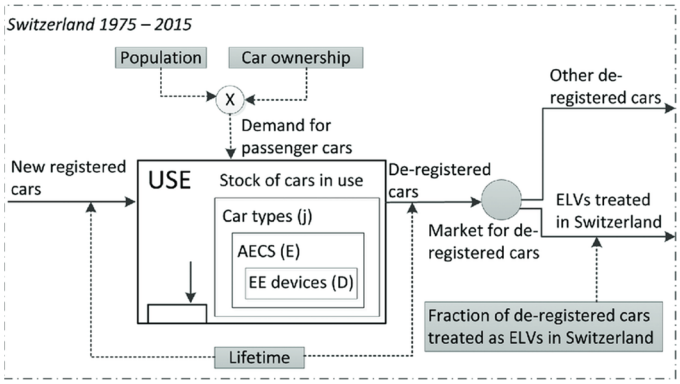

Fig 2. Overall system structure

4.1. Database Concept Design

The conceptual structure design of the database is to abstract the user requirements in the database requirements analysis stage to obtain a conceptual model. After abstracting the results of the analysis in the database requirements analysis stage, a partial data view is constructed, and then multiple partial views are constructed. Merge, and use relevant rules to eliminate conflicts. Finally, after eliminating conflicts and data redundancy, a basic E-R diagram is designed [6]. According to the analysis of some requirements in the new energy vehicle marketing system, customers can submit multiple orders, each order can contain multiple order items, customers can submit multiple return applications, and each model of new energy vehicles can be used for multiple order items, it can also be used in multiple return applications. The specific E-R diagram after merging and optimization is shown in Figure 3.

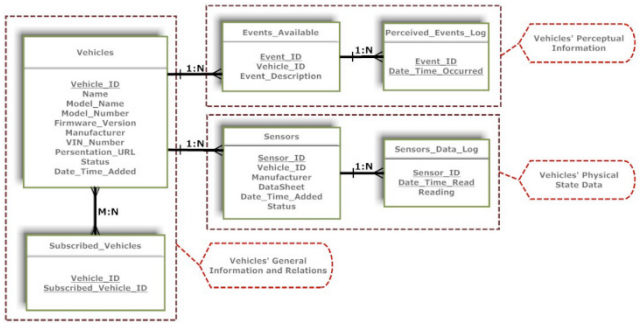

Fig 3. E-R diagram

4.2. Database Logic Design

The logical structure design of the database is to design the data model based on the conceptual structure design of the database. Convert the conceptual model of the database into a data model supported by the database management system, normalize the relationship according to the paradigm, and then adopt an optimized strategy for it. Based on the correspondence between entities and entities in Figures 1E-R, it can be transformed into the following relationship patterns: (1) Customer (customer number, customer address, customer name, customer authority, customer purchase history, customer level, customer password , customer mobile phone number) (2) new energy vehicles (new energy vehicle number, new energy vehicle name, new energy vehicle color, new energy vehicle price, new energy vehicle inventory quantity, new energy vehicle pictures, new energy vehicle detailed data, has Buying user's evaluation, new energy vehicle manufacturer number) (3) order (order number, total order price, order creation time, order status, customer number) (4) administrator (admin number, administrator password, administrator Name, administrator phone number, administrator address) (5) Order item (order item number, order quantity, price, order number, new energy vehicle number) (6) Return (return number, return time, review status, customer number) ,

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new energy vehicle number), the logic design is the main task of the database logic structure design, which has nothing to do with the specific content of the database system. After showing all the business logic, the design of the database logic structure is basically completed.

4.3. Implementation of the Database

The realization of the database is to establish database views, data tables, etc. with the help of the specific database environment based on the results of the completed database physical structure design. According to user needs and optimization strategies, the new energy vehicle marketing system finally establishes 6 database tables, these tables are: customer information table, new energy vehicle information table, order information table, administrator information table, order item information table, return Information Sheet [7]. The new energy vehicle marketing system contains a large number of data tables, this paper selects the customer information table to focus on the introduction. The customer information table is used to store the detailed information of the customer, and some of the recorded data are shown in Figure 4.

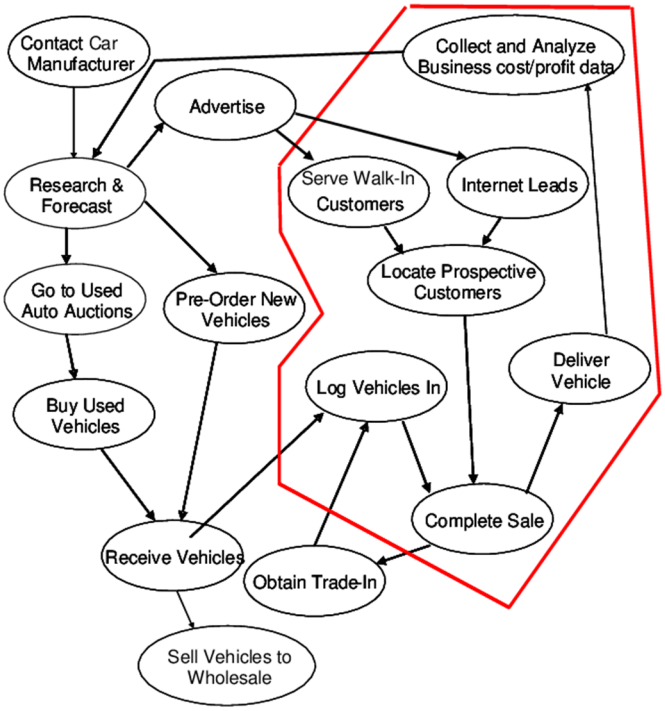

Fig 4. Implementation of the customer information table

5. System Test

After completing the tasks in the system design phase, the system is also tested. The testing method used in this system is mainly black-box testing. Black-box testing means that the tester treats the program as a black box, that is, does not consider the internal structure and internal characteristics of the program at all. The tester is concerned with finding situations that make the program not work according to the specification, and exporting test data only according to the specification of the program. In general, all errors in the program can be found in this way only by exhaustive input testing. Two inferences can be drawn from this: Program testing does not guarantee that there are no bugs in the program. Since exhaustive testing is impossible, the goal of testing should be to maximize the benefits of limited testing investment, that is, to find the most errors with limited testing situations.

The testing process of the whole system is: from point to surface, from unit to whole, from top to bottom. That is to say, the function test of each module such as the marketing volume forecast data module, the data maintenance module, and the input and output module is carried out

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respectively, and then the function test of the whole system is carried out. The use of this forecasting system can improve information processing ability, enhance the accuracy of input information, reduce the labor intensity of forecasters, and provide strong information support for leadership decision-making. The benefits in this area cannot be directly converted into the economic benefits of the enterprise or organization, but its significant impact on the management activities of the enterprise or organization will become increasingly obvious with the use of the system.

6. Conclusion

This paper decomposes the basic business process of new energy vehicle marketing in detail. Based on the user demand analysis report, in the conceptual design stage of the database, the E-R diagram is obtained by analyzing and abstracting the user's demand. In the logical design stage of the database, the abstract E-R diagram is transformed into a relational schema, which is used as the basis for the database data table design. In the physical design stage of the database, the database data table is designed, and finally, this paper implements the specific implementation through the SQLserver2016 database. The new energy vehicle marketing system database designed in this paper improves the level of enterprise informatization and accelerates the speed of information management.

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