Design and Implementation of Supermarket Management System

Yongchang Ren[a], Mengyao Chen[b]

College of Information Science and Technology, Bohai University, Jinzhou, 121013, China

[a]1213552916@qq.com, [b]1181829604@qq.com

Keywords: small and medium-sized **s**upermarket; Oracle; J2EE; design and implementation; management system

Abstract. This supermarket management system has realized the transmission and control of large goods, so as to facilitate the management and decision of sales, and reduce a big burden for supermarkets and supermarket managers. It also can help to improve the work efficiency of supermarket. Its requirements is to provide the basic information maintenance function of employees, memberships and products so that managers can through the function to add, delete, and modify the basic information of employees and the employees can through it to add, modify and delete the basic information of memberships and goods. Supermarket management system is very convenient for manage, input, output, and find the data so as to make the messy supermarket data to specific, visualizations, rationalization. In the aspect of software, the supermarket management system using Java language and Oracle as the background database. In the aspect of software, various configurations in computer including input and output capacity, internal memory and external memory capacity can meet the requirements of users.

Introduction

With the rapid development of modern science and technology, computer technology has penetrated into all fields and becomes the necessary tools for various industries, especially the Internet technology promotion and the establishment of the information highway. It makes the IT industry increasingly shows its unique advantages in the market competition. Into the digital age, there is a huge data information waiting for processing and transmission, which makes the further development and use of the database is particularly urgent. As some small and medium-sized supermarkets in the domestic market, they are falling behind the large and medium-sized supermarkets during the informatization, but for these enterprises' resource management, information storage and processing also shows the urgent need. To adapt to market competition, it requires efficient handling and management methods, so it is indispensable that accelerate the process of the computerization of supermarket.

Small and medium-sized supermarkets has an important position in Chinese economic development. At present, our country has a lot of small and medium-sized supermarkets, regions are widely distributed, and the information level of small and medium-sized supermarkets is still very low. With the development of the technology, the computer operation and management is increasingly simplified, computer knowledge is increasingly popularization. At the same time, the fast changing of market economy and intense competition, it is must become inevitable trend that the supermarket industry uses computer to manage inventory, sales, and many other link. As a small and medium-sized supermarkets, their main business is selling products. But at present a lot of questions exist in the system operation, all sales orders are artificial fill, time-consuming and prone to errors; inventory is artificial bookkeeping and unable to keep track of the most accurate inventory situation; For sales data, it often spend a lot of time and energy to calculate the sales performance of each business membership and each good sales. In order to solve the above problems and improve the economic benefit, we will prepare for computerized management for the supermarket.

General Situation of Small and Medium-sized Supermarket

With the increasingly fierce competition, how to reduce the cost has become the supermarket's vital

problem. For ordinary supermarkets, involving the management of the sources of raw materials, sales and inventory, and the good or bad management is very important to the durability of the supermarket. Generally speaking, the user's demand for procurement, sales and inventory system is universal. Supermarket management system used in the supermarket's procurement, sales and warehouse department, controlling and tracking the whole business of supermarket procurement, sales and warehouse effectively. Using the supermarket's procurement, sales and inventory management system can effectively reduce the blind procurement, reduce the costs of procurement, reasonable control inventory, increase market sensitivity, and enhance the market competitiveness of the supermarkets.

Compared with the domestic and foreign large-scale supermarket, small and medium-sized supermarkets has obvious difference in the operation and management. And in order to design the management software which conforms to the small and medium-sized supermarket, we will understand some characteristic of small and medium sized supermarket management [1]. The function of management system which Small and medium-sized supermarkets need is not as comprehensive as big supermarkets and chain supermarkets, it puts forward higher requirements on concise and practical. Features of small and medium-sized supermarkets: (1) The size is relatively small, and may not have their own warehouse, inventory backlog is less; (2) The employee is less and a person might has multiple positions, and has low quality skills. So this requires a system to have perfect function of help and check, but also requires the system easy to operate, concise and clear; (3) The interval of clearing inventory is uncertain, may be a long time hasn't inventory, may be at any time.

Economic Feasibility Analysis

Transferring the sales message through the network can not be restricted by distance, so you can save a lot of manpower and material resources, ease of management. Thus you can reduce unnecessary spending, at the same time the system can improve the efficiency of enterprise sales, which improve the enterprise economic benefits as well. So it's entirely feasible economically.

Supermarket, as a cutting-edge high-tech industry, the requirements of the employees are higher than the normal enterprises, and understand more for system development and software industry. So in the process of self development management system, the enterprises will easy to arrange manpower, so that you can save most of the extra costs for the enterprises. At the same time, compared with other products, it belongs to high-end industries. Both in the price of the product and the quality is higher, and the products dealers or businesses are require abundant capital to support. So, in the process of system development, the enterprise completely have the ability to bear the development costs.

Management system is a aggregate of informatization, intelligence and advanced management. Management is a dynamic process which should take measures in the process of its operation. So the economic benefit in management is a comprehensive benefits, and it is difficult to direct quantitative analysis. Generally, the economic benefits of the new system is indirect, its main performance is to reduce the enterprise management costs and manpower costs. While other problems are resolved through the analysis of the new system, it not only saves a lot of time but also the provides valuable information for the decision of enterprises. What's more, it brings huge economic benefits for the enterprises.

System Business Analysis

The main business of supermarket management including three aspects that are procurement, inventory control and sales, and the key of the supermarket management system is to deal with the relationship between these three aspects [2].

Procurement plays a very important role in all supermarkets. Before purchasing, supermarkets should investigate goods for each big markets and understand the company's situation. In order to

evaluate the credit level and market reputation, then choose the right goods to purchase according to the supermarket's conditions and sales situation.

Inventory control can also cause some problems if handled improper. If the inventory is too much, it will result in the backlog of goods and capital consumption. If the inventory is too little, it will affect the normal sales of the supermarket.

Sale in supermarket management is also very important. The situation of sales is good or not will depend on the two reasons as above. In the fierce market competition, manage the procurement and inventory properly can improve the sales, so that the supermarket can in an impregnable position.

System Function Analysis

This system is mainly used in small and medium-sized supermarkets and the function of the system mainly realize the login, procurement management, inventory management, sales management, staff management and membership management.

Procurement management can query the information of incoming goods, and maintain the good information. Refund management and stock management are two departments, but considering the management situation of small and medium-sized supermarkets, system put it in stock management to operate together.

Inventory management can query the information of existing goods, record the warehouse's basic information which includes number, name, size, type, contact information, etc., and maintain these information.

Sales management can query the sales record in any time. Supermarket can judge goods according to the sales record and determine the amount of goods in next time stock.

Managers can query a employee according to the staff management [3], such as according to the employee id, name, gender, age, date of birth, home address and contact information. And you can add, modify, delete an employee.

After employees logged in, he or she can query, add, modify, delete a membership through the membership management [4]. Employees can query a membership according to membership id. The function structure diagram as shown in Fig. 1.

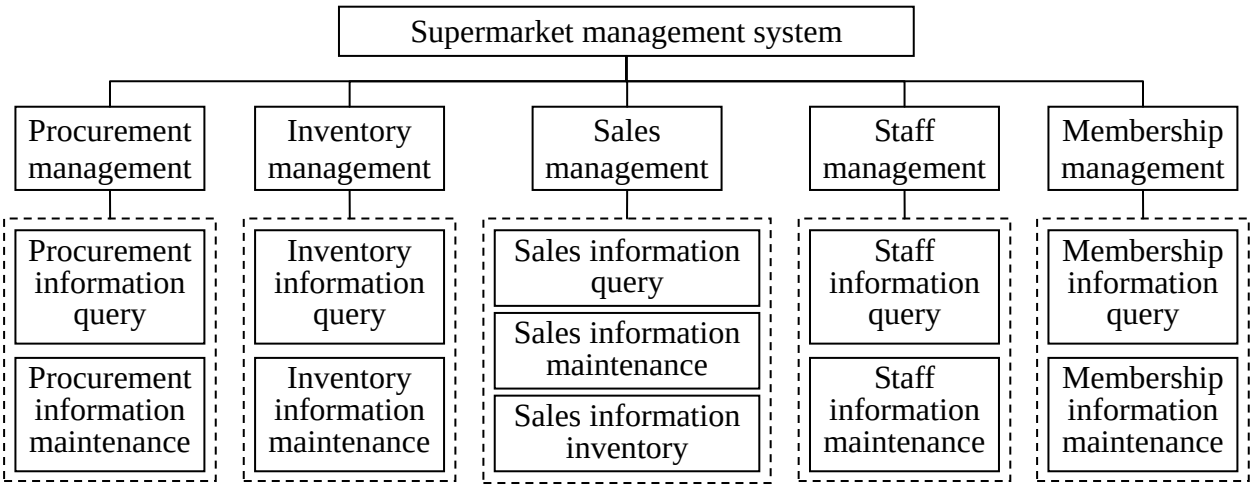

Fig. 1. Function structure diagram

Database Design

With the widespread use of computer technology and network technology, the development of database technology has become an important part of advanced information technology. Many enterprises have their own database, and stored a large number of key data in it, which proved the importance of the database again. So the database security problems also not allow to ignore. The core of the supermarket management system is how to use and operate database, so the database design is critical [5].

This system uses the Oracle database which is a relational database management system of Oracle. It is a product that always has been a leading position in the field of database [6]. The Oracle database system is the world popular relational database management system which easy to use, strong function and suitable for all kinds of large, medium and small, microcomputer environment. It can realize data sharing and the facilities don't need to have the powerful data storage and processing capabilities so that to reduce the hardware cost of supermarket. Supermarket management system mainly including the table of goods information, employee information and membership information. Shown in the following table.

Table 1. Goods information table

No	Field	Data Type	Length	Empty Y/N
1	Goods ID	Int	10	N
2	Goods name	Varchar	10	N
3	Goods type	Varchar	10	N
4	Goods number	Int	20	N
5	Price	Numeric	10,2	N

Table 2. Staff information table

No	Field	Data Type	Length	Empty Y/N
1	Staff ID	Int	10	N
2	Staff name	Varchar	10	N
3	Gender	Varchar	10	N
4	Age	Int	10	N
5	Date of birth	Datetime	10	N
6	Address	Varchar	20	N
7	Contact	Int	20	N
8	Date of entry	Datetime	10	N

Table 3. Membership information table

No	Field	Data Type	Length	Empty Y/N
1	Membership ID	Int	10	N
2	Membership name	Varchar	10	N
3	Gender	Varchar	10	N
4	Date of birth	Datetime	10	N
5	Address	Varchar	20	N
6	Contact	Int	20	N

J2EE Development Platform

(1) The structure is simplification and clear. J2EE platform support simplified and component - based development model. Because the J2EE based on the Java programming language and J2SE platform, it provides the portability which write once and run anywhere, and all server followed the J2EE standard supports the model. The application based on the J2EE is not dependent on any specific operating system, middleware or hardware. Therefore, the reasonable designed applications which based on the J2EE need only once development that can be deployed in a variety of platforms, it is critical in a typical heterogeneous enterprise environment.

(2) Improve the development efficiency. Due to the use of component technology, which can be carried out division of labor, parallel development, provide overall development efficiency in accordance with the developer's skills for application development.

(3) A strong portability. In addition to the inherent portability of Java language, EJB architecture provides a set of standardized application programming interfaces between the Bean and the container which supports Bean [7]. It enables developers to convert beans from one operating environment into another without having to rewrite the source code.

(4) A good reusability. Because various software components are strictly separated in the EJB model, it can configures server-side application from existing software components. In common with configures the client application from existing JavaBean, the two both can make the software reuse.

(5) Easy to maintain. The design based on the component simplifies application maintenance. Because components can be updated and replaced independently, the new functions can be easily increased through updating the specific components of application.

(6) Scalability. Applications based on J2EE platform can be deployed in a variety of operating systems and products based on the J2EE platform almost able to run on any operating system and hardware, so the existing operating systems and hardware can be keep using [8].

(7) Widely accepted and approved. Mainly IT supplier adopts the EJB architecture, so different supplier's products can interoperable only according with the EJB architecture.

Conclusion

The small and medium-sized supermarket management system is use Oracle database and Java language to develop and realize. Procurement and inventory management has always been an essential part of the supermarket [9]. In order to save money, there still has a lot of small and medium-sized supermarkets uses the way of human purchasing which is waste time, poor secrecy and low efficiency. These disadvantages will lead to small and medium-sized supermarkets managers faces the difficulties of related documents, query and maintain the data for supermarket. Supermarket management system realizes the function of procurement management, inventory management, sales management, staff management and membership management that supermarket needed. With the continuous improvement of science and technology, the computer's powerful function has been known and used. Compared with the old manual work, the system not only reduces the workload, but also greatly reduced the occurrence of human error.

System can realize the function of the service management informatization so that the staff can observe the conditions of goods inventory and sales at any time. The system also has the advantage of the interface aesthetics, simple operation, convenient query and data storage security, etc. It can gradually improve staff quality and strengthen the management level of the supermarket through the use of the supermarket management system. The system maintenance is convenient, reliable and has higher security and meet the requirements of practicality.

Acknowledgement

This work is supported by social science fund project of Liaoning province (L13DTQ01).

References

[1] Y. She, "The Design of Small and Medium-Sized Supermarket Management System," Journal of Silicon valley, vol. 10, no. 12, pp. 54-55, 2012.

[2] J. Y. Wang, X. L. Tian, "The Analysis and Design of Small and Medium-Sized Supermarket Management System," Journal of Equipment Manufacturing Technology, vol. 39, no. 12, pp. 57-59, 2012.

[3] H. Z. Zhang, R. Huang, L. A. Gu, "The Supermarket Staff Information Management System Based on VB Development," Journal of Fujian Computer, vol. 28, no. 3, pp. 151-152, 2013.

[4] H. Gao, "The Analysis and Design of Supermarket Management System Based on Membership," Journal of Electronic Design Engineering, vol. 20, no. 13, pp. 47-49, 2012.

[5] Y. C. Kong, Y. W. Xia, L. L. Liu, "The Strategies and Methods of ORACLE Database Security," Journal of Coal Technology, vol. 31, no. 3, pp. 190-191, 2012.

[6] J. Y. Chen, C. Y. Lin, H. C. Zeng, "Optimization of Oracle Database Application System," Journal of Information Security and Technology, vol. 4, no. 12, pp. 73-74, 2014.

[7] J. G. Wang, J. Y. Wang, "The Struts + Spring + Hibernate Framework and Application Development," Monograph of Beijing: Tsinghua University Press, pp. 157, 2011.

[8] J. Wang, "The Depth Adventure of the J2EE Framework," Monograph of Nanjing: Southeast University Press, pp. 184, 2009.

[9] J. J. Wang, "The Analysis the JAVA Programming Language Based on Computer Software Development," Journal of Henan Science and Technology, vol. 38, no. 7, pp. 17, 2013.