Design and research on real-time material management system based on production process

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Abstract

The paper primarily introduces the real-time material management system in the course of machinery production. This system is developed and designed using C# language and SQL2008 database, using C/S and B/S mixed mode, the C# language-related programming skill and database information together, through the C/S and B/S architecture for network communication, the database Server-related production material information sharing management system feedback to the specific user, thus enhancing the production efficiency.

Keywords: database, C# language, ASP.NET, module design, real-time material system.

1. Introduction

With the rapid development of science and technology, the automation level of enterprise production is higher and higher. For corporations, Production management is the main part of its development. An efficient production management system plays a key role in the continuous development of enterprises and the improvement of their overall competitiveness.

In the whole enterprise production, the use of material amount is an indispensable part of production management, because in most industry production cost, material cost accounts for a large proportion. Therefore, to achieve efficient management of materials can save a lot of cost for enterprise production. In addition, the degree of information sharing has become an important symbol of the level of enterprise modernization. The standardized design of the database is considered as one of the effective links to solve the problem of enterprise data management [1].Through the data visualization analysis to achieve the collection and sharing of information in the production management stage, Enterprises can more effectively arrange material inventory, improve the utilization of production machines, reduce inventory losses, improve staff efficiency and customer service levels.

In this paper, based on computer communication technology, we create material production information system, establish database and data communication system. This system is developed using C # language an d SQL2008 design database, SQL Server 2008 database management system for data storage and management, performs data warehouse functions [2].C # programming, combined with ASP.NET technology, the system has a safe and reliable performance[3]. Network communication is carried out through C/S and B/S architecture, and the information of production materials related to the database is shared to the user to realize real-time monitoring of the target in the production process. The company realizes production process automation through network technology, computer technology and database technology.

2. System overall functional framework design

The producer needs to know and monitor the production status in real time, and can master the whole production process without going to the

production site. In addition, enterprises hope that through the information management system accurate and timely control of production operations, in order to be able to quickly and accurately refueling work to achieve the full range of product production control. Prior to this project, we reviewed the relevant materials and visited the actual operation of the machinery in the workshop and the actual use of the materials. The Production site is shown in Fig.1.

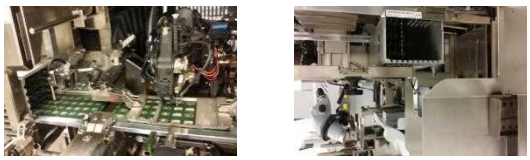

Fig.1. production site

2.1 The overall system design goals

To build a software system, the overall framework model of the software system (blueprint) is first planned [4]. The main objective of this project is to design a production material real-time management communication system. System users are divided into two categories, one is the operation workers, They mainly operate the production process in real time; The other group is the production manager, which is mainly responsible for looking at the overall production situation and determining the specific production requirements of the product. The system development process includes the development of the mobile front desk and the computer PC terminal and the design of the background database. Among them, the worker through the mobile terminal for inquiries, Production manager through the PC side to view. Then, according to the actual demand design and development of the foreground procedure, the relevant functions of the production schedule information in the production process are realized. System function module connection diagram is shown in Fig 2.

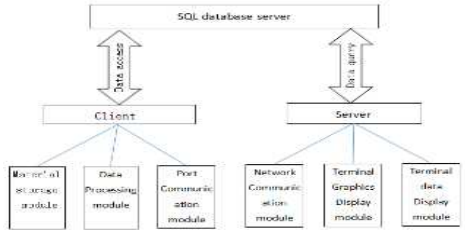

Fig.2. System function module connection diagram

2.2 System demand analysis

The system is mainly used for information interaction between production speed and material management in workshop production. In order to ensure the security of information, it works mainly within the company's internal local area network. System requirements in the PC terminal and mobile terminal devices on the display, according to the display function to design a different interface. Describe the main functions of each module and to achieve. The system should realize the information sharing in the company's production process.

2.3 Overall design planning

After the system function analysis, it can be divided into three modules: Background database server system module, User front desk device system module, User mobile Android device system module. Project overall module diagram is shown in Fig 3.

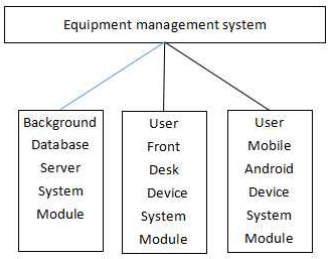

Fig 3. Project overall module diagram

2.3.1 Background database server system module design

The module is mainly to store some data in the production process, such as production materials information. According to the actual situation of production, the background database server system module can divide itself into several sub-modules: Production information module and equipment management module

- Production information module

The function of this module is mainly to provide the user with some information in the production process, including production equipment list, production record, production material situation, production machine and material inquiry and so on.

- Equipment management module

The module is controlled by the database administrator, according to the operation status, set the product, input the material information, and modify the production speed.

2.3.2 User front desk device system module design

The module is used to view production information. The manager needs to check the overall demand of the production workshop through the computer, Do not need to go to the scene to be able to know the production workshop need material situation, facilitate timely and accurate delivery. After the material is delivered, the worker will log on the PC side, feed the data back to the database, and update the relevant display information.

2.3.3 User mobile Android device system module design

The module mainly provides production information for production operators, the mobile terminal window is developed using jQuery Mobile, Through the AJAX technology to receive the return data and analysis. Loading the terminal APP into the phone allows the operator to easily query the real-time production status.

3. Design and Implementation of Database Management System

Based on the comprehensive consideration of material production information data volume, operation platform support degree, software development cost and other aspects, the system background database is developed using Microsoft SQL Server 2008 relational database. The following are the main steps in database design:

A: According to the actual production requirement design database to store data, carry on the overall frame design, grouping.

B: According to the data packet design to create the form.

C: Set the properties of the data in the table

D: Determine the relationship between tables and optimize the data structure.

Generally speaking, the design database system mainly includes data demand analysis, conceptual model design, logical structure design. As a database application management system, all production data involved in the production process should be stored in the database system.

3.1 data demand analysis

Through the analysis of system function requirements, need to establish a database server system that can store the front-end client display information, including product number, production schedule, running machine code, the required materials. Through the software development, based on the working conditions of the production workshop, the real-time information of machinery production is precisely understood, and the information is summarized into the database server

3.2 Database Conceptual Structure Design

Currently widely used and can effectively represent the data conceptual model is the entity-contact diagram, it is also called E-R chart. E-R chart reflects the relationship between entity type and attribute. The entity and properties of the database system design are shown in the Fig 4, where the rectangle represents the entity set and the ellipse represents the properties of the entity.

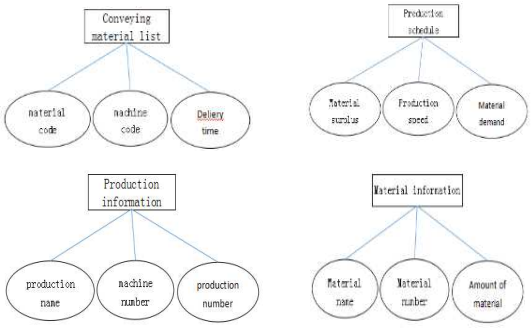

Fig 4 entity and properties of the database system design

3.3 Database logical structure design

The logical structural design of data is to transform the data conceptual model into a concrete data model supported by DBMS on the computer. According to the analysis of data needs, we can get the relevant entities that are available for production and determine the relationship between the entities.

4. System implementation and testing

In the first half of the article, the system is analyzed and the overall framework is designed, and the design of each functional module and the creation of database are realized. This section will implement the design of the corresponding interface based on the previous analysis.

4.1 System background database administrator interface implementation

This interface is used by database administrators to modify the data in the update production. The database administrator is required to log in to determine the identity before entering the system, after logging is eligible to modify and query the data and other operations. Database administrator login interface is shown in Fig 5.

Fig 5. Database administrator login interface

4.1.1 Mobile terminal information display interface

The interface displays the real-time production status of the machine in the production workshop, including the machine code of each machine, production status, and material consumption (expressed as a percentage of the material). For ease of differentiation, the production status of each machine is represented by rectangles, the whole rectangle represents the total amount of materials (background set to yellow), and the consumption of materials is expressed in red. Information display interface is shown in Fig 6.

Fig 6. Information display interface

4.1.2 Prepare material information display interface

The interface is distributed on the lower left of the mobile information display interface, and the real-time data status of the parts of the machine is displayed in the same interface for the production personnel to view. Prepare material information display interface is shown in Fig 7.

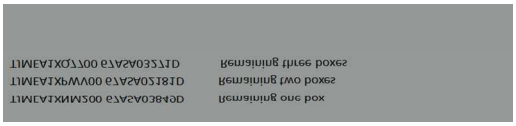

Fig 7. Information display interface

4.2 Background database login module test

System can distinguish between different users, according to the user's login information to determine whether to allow access to the system, when the user name and password exist an incorrect, the user cannot enter, to prevent non-professionals from making arbitrary changes to the database. Randomly selected multiple user names and passwords for testing, and found that only the user name and password match to enter the system, achieving the desired results.

5. Conclusion

Through continuous analysis and improvement, the overall functional framework of the system was established, and an effective database management display system for enterprises was implemented. Through the system module test, all achieved the expected effect, satisfied the enterprise to realize the various functional requirements.

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