Design and Implementation of Garbage Classification System under the "Double Carbon" Target

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Abstract: With the national goal of "carbon peaking" and "carbon neutrality", the society is increasingly advocating garbage classification, energy saving, environmental protection and low-carbon life. This paper designs and develops a garbage classification system, analyzes the business process, data process and database design of the system, and realizes the core functions of garbage classification information management, mall gift management, points management, message management, etc., which can improve the waste recycling link. , The user's initiative is not strong and so on.

Keywords: Garbage classification system, Business process, Data flow, Database

1. Introduction

The time for the national "carbon peak" and "carbon neutrality" goals requires vigorous development of the renewable resource industry. How to realize garbage recycling and reuse is a hot research issue. The primary key to garbage collection is garbage classification. The purpose of classification and collection is to improve the garbage recovery rate and facilitate classification and treatment. Garbage classification from the source can make a part of the garbage local resources, which greatly reduces the screening and processing of garbage. Manual sorting is difficult to improve the efficiency of garbage disposal. Taking advantage of the convenience of the Internet era, a scientific and practical waste classification system can be established from the perspective of the information system, and citizens can be educated in all aspects of waste classification, cultivate the awareness of waste classification, encourage people to live green, and form a consensus of the whole society.

2. System Analysis

The functional modules of the whole system are mainly to make corresponding units for the combination, decomposition and replacement of each project element. Finally, a simple principle is made according to each system module. The overall design of the system is designed according to the needs of users. In order to better serve users, it is necessary to make corresponding functional modules and internal information in the design and implementation of the garbage classification system to keep consistent connections.

2.1. Feasibility Analysis

It is technically feasible to develop this system through JSP technology and MySQL database. During the project development cycle, in addition to the labor cost of the project team members, there is basically no additional cost, which is also economically feasible. The development and login interface of the garbage classification system is completed by the most common login window. Users can use the computer to log in and simply access without any operation. The system interface is more user-friendly, and the user is more convenient to use, so it is also feasible at the operation level.

2.2. Functional Requirements Analysis

This system needs to complete the development and implementation of a garbage classification

system. The main functions are included as below.

2.2.1. Front-end User Function

(1) System home page: Users can view the home page, spam information, shopping mall gifts, test paper list, information information, message feedback, personal center, background management, online customer service and other content.

(2) User login and user registration: Users register and log in by entering account number, password, name, age, mobile phone and other information.

(3) Viewing garbage information: View and submit information such as garbage number, garbage name, garbage image, garbage classification, garbage introduction, hazard level, and countermeasures on the garbage information interface.

(4) Personal Center: You can fill in the account number, password, name, gender, age, mobile phone, photo, etc. on the Personal Center page to update information and log out.

(5) Message management: Users can post spam-related messages and communicate with each other.

(6) Test paper list: Users can view the test paper, test duration and other information for detailed operations on the garbage classification knowledge test paper list.

(7) Wrong question book: The user can check the user ID, test paper, test question name, score, correct answer, examinee answer, test question analysis, test time and other operations on the wrong question book.

(8) User credit management: Users can view the account, and make details, modification and deletion of name, credits and other information.

2.2.2. Background Administrator Function

(1) User management: The administrator fills in the account number, name, gender, age, mobile phone, and photo for the user management, and deletes, modifies and views it.

(2) Spam information management: The administrator can check, delete, and modify information such as garbage number, garbage name, garbage image, garbage classification, garbage introduction, hazard level, countermeasures and other information in the garbage information management.

(3) Garbage classification management: The administrator can edit, classify and other information for garbage classification management and perform operations such as details, deletion, and modification.

(4) User credit management: The administrator can edit, delete, modify and other information on user credit management, such as account number, name, and number of credits.

(5) Mall gift management: The administrator can edit, delete, and modify information such as commodity number, commodity name, commodity classification, commodity picture, number of points, commodity brand and other information in the mall gift management.

(6) Gift exchange management: The administrator edits the exchange number, commodity number, commodity name, commodity picture, and number of points, account number, name, delivery address, exchange time, audit reply, audit status, audit and other information for the gift exchange management. Perform operations such as details, deletion, and modification.

(7) Point consumption management: The administrator can edit the account, name, exchange number, commodity name, number of points and other information for details, delete, modify and other operations on the point consumption management.

(8) Test paper management: The administrator can edit the test paper name, test duration, test paper status and other information for details, delete, modify and other operations on the test paper management.

2.3. Business Process Analysis

It is a more important part to investigate and analyze it in the system process analysis, because it involves the business process of each link in this system, so from the overall design of the garbage classification system, it is necessary to ensure the correct input and output of each information and correct The data is stored completely, and a specific flow chart is drawn in combination with the actual

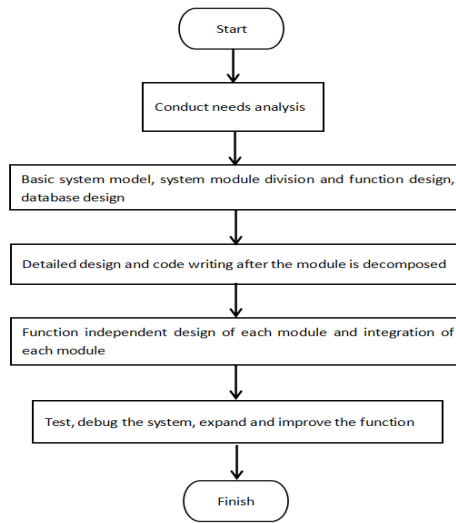operation steps. The specific flow chart is shown in Figure 1.

Figure 1: System development flow chart

In order to ensure the security of the system, users must log in if they want to enter the garbage classification system. The user login flowchart is shown in Figure 2.
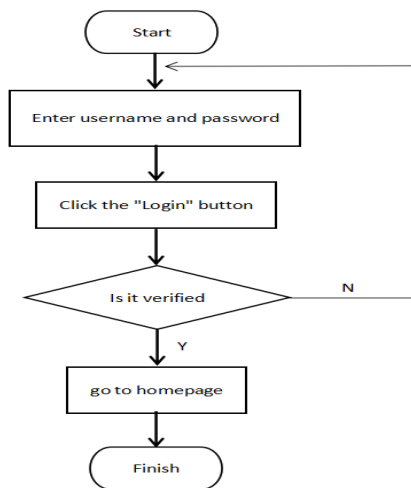

Figure 2: Login flowchart

3. System Design

3.1. Functional Structure Design

Through the analysis of system requirements, the main functions of this garbage classification system include: administrator: home page, personal center, user management, garbage information management, garbage classification management, user credit management, credit increase management, mall gift management, commodity classification management, gift management Exchange management, point consumption management, message board management, test paper management, test question management, system management, test management, user: home page, personal center, user point management, point increase management, gift exchange management, point consumption management, message board management, Exam management and other functions. Its functional structure diagram is shown in Figure 3 below.
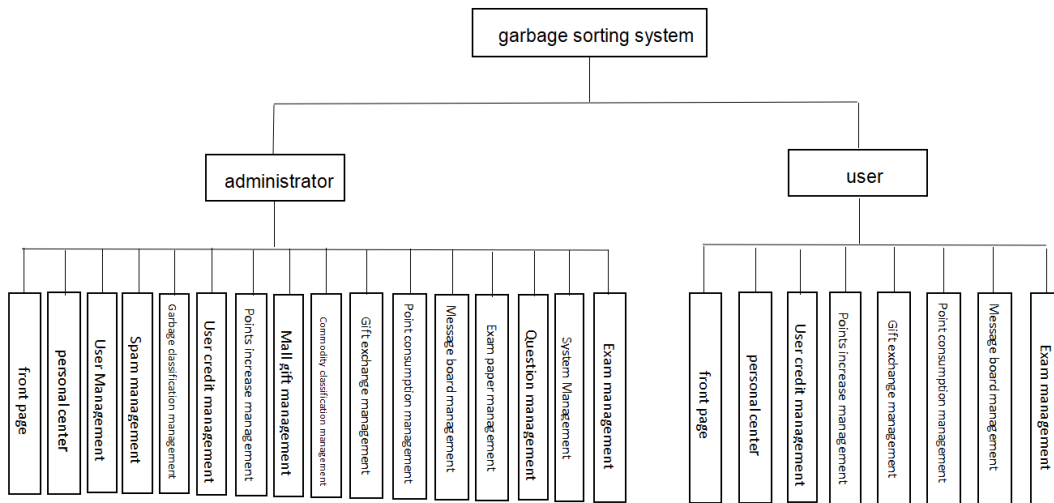
Figure 3: System function structure diagram

3.2. System Database Design

3.2.1. System E-R Diagram

In the information of the system, due to the support of the database, we can collect, organize, update and process the database. Due to the powerful storage function of the database, the database has become an indispensable part of the computer, and the quality of a database directly affects the quality and efficiency of the system. The database in a system is essential and plays a decisive factor. Through the previous system analysis, the main functions used in this system can be planned. The entity relationship diagram of these key entities is designed below:

The attribute diagram of the mall gift management entity is shown in Figure 4.
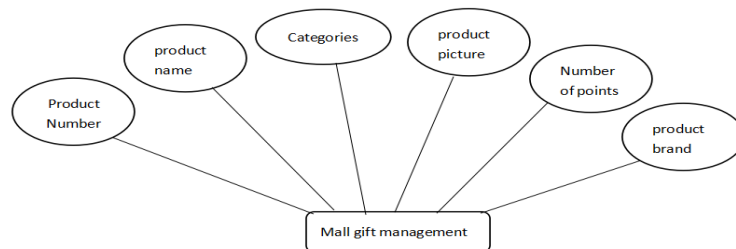

Figure 4: Mall gift management entity diagram

The attribute diagram of the user management entity is shown in Figure 5.
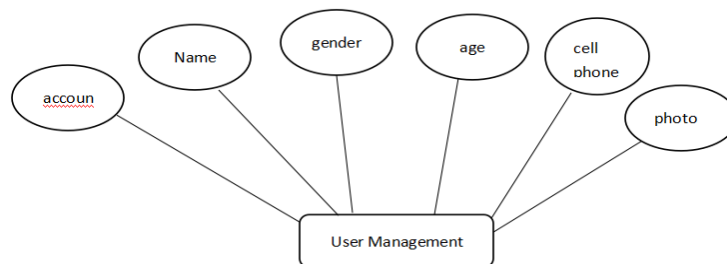

Figure 5: User management entity diagram

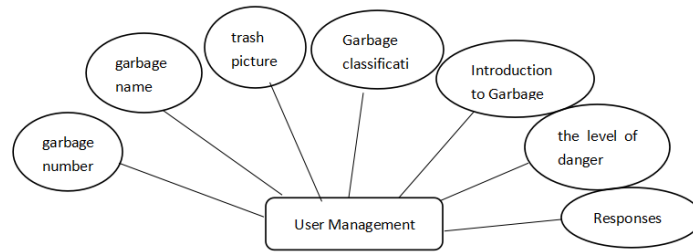The attribute diagram of the spam management entity is shown in Figure 6.

Figure 6: Spam management entity diagram

3.2.2. Data Table Field Design

According to the requirements of system function design and the division of functional modules, the physical table of garbage classification mainly involves 5 data sheets, and the specific information is shown in Table 1 to Table 5.

Table 1: All users table

column name	type of data	length	constraint
id	int	11	NOT NULL
username	varchar	50	default NULL
pwd	varchar	50	default NULL
cx	varchar	50	default NULL

Table 2: Jifenxiaohao table

column name	type of data	length	constraint
id	int	11	NOT NULL
addtime	varchar	50	default NULL
zhanghao	varchar	50	default NULL
xingming	varchar	50	default NULL
duihuanbianhao	varchar	50	default NULL
shangpinmingcheng	varchar	50	default NULL
jifenshu	varchar	50	default NULL

Table 3: Jifenzengjia table

column name	type of data	length	constraint
id	int	11	NOT NULL
addtime	varchar	50	default NULL
zhanghao	varchar	50	default NULL
xingming	varchar	50	default NULL
jifenshu	varchar	50	default NULL
jilushijian	varchar	50	default NULL

Table 4: Lajixinxi table

column name	type of data	length	constraint
id	int	11	NOT NULL
addtime	varchar	50	default NULL
lajibianhao	varchar	50	default NULL
lajimingcheng	varchar	50	default NULL
lajitupian	varchar	50	default NULL
lajifenlei	varchar	50	default NULL
lajijianjie	varchar	50	default NULL
weihaichengdu	varchar	50	default NULL
lajixiangqing	varchar	50	default NULL
yingduicuoshi	varchar	50	default NULL

Table 5: Lipinduihuan table

column name	type of data	length	constraint
id	int	11	NOT NULL
addtime	varchar	50	default NULL
duihuanbianhao	varchar	50	default NULL
shangpinbianhao	varchar	50	default NULL
shangpinmingcheng	varchar	50	default NULL
shangpintupian	varchar	50	default NULL
jifenshu	varchar	50	default NULL
zhanghao	varchar	50	default NULL
xingming	varchar	50	default NULL
songhuodizhi	varchar	50	default NULL
duihuanshijian	varchar	50	default NULL
sfsh	varchar	50	default NULL
shhf	varchar	50	default NULL

4. System Implementation and Testing

The system is designed according to the expected function and implemented with JSP and MySQL database. System testing is mainly carried out from the following aspects:

(1) Form test: In order to ensure that the small window of each submenu pops up on the system operation interface, a simple simulation information operation data is made for the system function user, and each specific management form has specific additions. , delete and other functional operations, and ensure the correct realization of the functions of each window.

(2) Data tracking: make correct operations for the system query operation and function test, and then input the original data according to the project module design to carry out the corresponding data statistics, and compare with the previous manual calculation, it is It is more accurate to compare according to the correctness of the data tested.

(3) Comprehensive test: After passing the above tests, make an overall test of the system, and the system functions basically meet the design requirements.

Taking user login as an example, the design of the test case is introduced. The specific information is shown in Table 6.

Table 6: Login test case table

Use case number	UC-TEST-002	use case number	login test
Preconditions	Open the home page without logging in		
step	Operation Description	data	Desired result
1	Click the login button	none	Jump to login page
2	Fill in the username and verification code, click the login button	username	The input box is empty and prompts "Please enter user name and password"
3	Fill in the password and verification code, click the login button	password	The input box is empty and prompts "Please enter user name and password"
4	Fill in the username and password and click the login button	Username Password	The content of the input box is cleared and the prompt "The verification code is entered incorrectly"
5	Incorrect or non-existent username and password	Username Password	The input box is empty and prompts "username or password is incorrect"
6	Fill in the correct username and password	Username Password	Jump to the home page, the user name is displayed in the upper right corner
test introduction	none		
Test Results	success	tester	

5. Conclusions

This paper analyzes and designs the garbage classification system in detail, analyzes the business flow chart, data flow chart and database design, and tests the realization and function of the platform. With this platform, it can effectively help people enjoy a green and low-carbon life, enhance the sense of social responsibility for waste sorting and recycling, and allow more people to consciously and actively carry out waste sorting, so as to contribute to the early realization of the national "double carbon" goal.

Acknowledgements

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