COP5727 Data Base Management System
Project Report I

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I. Project Introduction

For this project, we are planning to create an online trading platform for used cars, where the customers will be able to sell their cars or find used cars' related information and contact the dealer.

II. Objective

Our main objective is to establish a transparent vehicle marketplace to create meaningful connections between dealers and buyers. For the dealers, we are willing to build up a full circle environment, where they will be able to post information of their cars on our website, and the information will be visible to all the customers. And for the buyers, we are engaged to offering updated car information and assisting them to find the most suitable one. Moreover, we also aim at becoming an active vehicle knowledge sharer and providing the most cutting edge information of the vehicle industry. To achieve such goals, we plan to design an application wherein:

- The user interface will be designed with HTML5, Javascript and PHP.
- The database will be connected via ODBC.
- The database itself is based on CISE Oracle DB.
- The data we use is imported from a Chinese car dealer website.

III. User functionality

In the deliverables, we are planning to have the application implemented with various user roles and corresponding functionalities:

1. Buyers:

   The car buyers will be the main user of our application and will be able to perform various tasks such as:

   - Create a customer account and profile: Each customer account is identified by a unique customer ID, which will be automatically assigned when the customer sign up for the website. The customer profile includes a user name, email address, password, and a favorite cart, which is similar to the cart of an ecommerce car website such as AutoTrader and CarsDirect.
   - Edit favorite cart: Each user has a favorite cart. When coming across a car that the customer prefers but needs more time to make the decision, the customer would be able to save the car into his own favorite cart. The customer has fully flexibility to manage his own cart, which means he can check his cart at any time, and is also able to remove the stored information or totally clear the cart.
   - Search for car information: Our application connects to a database with the information of the cars. The dealers can get access to the database, but can only take charge of the information of his own cars. And the buyers can make

a query and search for a car by giving the car's brand, mileage and expected price range. Our application will then filter and retrieve a list of the suitable cars from our database. After that the buyers can get the detailed information by just clicking on the car he or she is interested in.

- The buyer can also edit his or her profile details such as name and contact information.
- The buyer can contact the dealer or ask for more information about the car that he or she is interested in by contacting the dealer with the given contact information.

2. Dealers:
   - Create a dealer account and profile: Each dealer's account is identified by a unique dealer ID, which will be automatically assigned when the dealer sign up on the website. The profile of the dealer includes first name, last name, email address, password, contact information, etc.
   - Input the car's information: The dealer will be able to input the car's information after signing up for the website. This would include the car's current location, brand, price, dealer's contact information, history, mileage, drive type, dealer's description, etc.
   - Input business information: If the dealer is not a specific person but a car dealer company, the company will be able to input the name, location, and description of the company.
   - The dealer will be able to check how many buyers are interested in his or her car.
   - Delete the information of his or her own car: If the car is no longer available, the dealer can delete the car from our website.
3. Data Management User:
   - This user is a part of the application management team. His responsibility is to verify the customer and car information in the database. The details of his tasks are as follows:
   - Delete the unverified car information: If the car information provided by the dealer is fake or not verified, the data management user is responsible for deleting such junk information.
   - Delete dealer account: If a dealer account always post fake or unverified car information, the data management user can even delete his account.
4. IT Support User:

   This user is also a part of the application management team. The objective of this user is to maintain the account of normal customers, dealers and data management users. Besides, he is also responsible for supporting data management user to take charge of the database and offering online service.

IV. Dataset and possible query introduction

Dataset:

Our data resource is grabbed from a Chinese car dealer website through a web crawler tool.
Source Link: https://www.renrenche.com/
The download data itself has several feature records of cars including transaction date, cars' name, ID number of cars, city, old cars' price, new cars' price, drove distance, emission standard, transfer times and the image URL of the cars.

Besides, we need to design extra tables in order to implement our website successfully.

Buyers' Information table:

It is used to store the basic information of buyers when they register and login. The attributes are customer ID, user name, password and email address. It's also associated with the buyer's favorite cart table.

Buyers' favorite cart table:

This table is used to store users' favorite cars, including the customer ID and source of cars. When the users want to check the cars in their carts, all information will be presented by using the source number of cars, which is the unique symbol of a used car.

Dealers' information table:

Similar to the buyers' information table, this table stores the basic information of the users. Except for that, this table also saves the dealers' contact information and is associated with the dealers' post table.

Dealers' post table:

This table is used to store the information of the cars which users want to sell. Its attributes are customer ID and all the information of a car. When the users post, both this table and the car sale table (real-world database) will be updated.

Transaction detail table:

This table is used to store transaction ID (primary key), customer ID, car virtual ID, transaction time, money and the balance in their account. When the transaction is formed, one new record will be added. We need this table to calculate the whole volume within a certain time.

Possible Query:

1. Registration & Login
   - To check whether the same username or email address have been used.
   - To check whether the password is correct when users login.
   - If the customer forget their password, they can reset if they want.
2. Search Engine
   - Search cars in dashboard and users can limit the features such as brand, year, miles, price, etc. according to their interest.
   - Search customers' own transaction history.
   - Compare two or more cars by displaying the attribute.

- Search the best-selling cars.
- Search the number of cars sold or the volume within a certain of time such as one year or one month.
- The cars rank by selling amount, price, brand, etc.
- The total user number.
- Total posted car number in different time.
- Total transaction number in different time.

3. Make Transaction

   Customers can purchase car through any dealers by paying online and then, they can keep track of their transaction records.

4. Edit

   - Customers can edit their user name, email address, password and contact information.
   - Dealers can post their car sale information, get it updated or withdraw their information if they don't want to sell.

V. Data management requirements

According to the imported data and the functionality of the whole application, systems are divided into several modules below in order to present clear structure and efficient performance.

1. User data

   When users register for a new account, we will ensure password safety and use email to verify the user. After receiving a huge amounts of registration, our application database will store the basic information of the users, including the customer ID (primary key), a user name, password, email address, which will be presented to the user directly when they login their account. Another table will be established to store cars that the buyers' have viewed and the sellers have posted.

2. Car data

   This part of data is imported from dataset website, which is illustrated before. We will filter the most useful data, ensure the accuracy of the data based on real situation and make sure that the information is up-to-date. Each posted car will have a unique virtual ID (primary key), name, miles, price, etc. Other attributes such as color will also be stored. When users want to check the detailed information of cars in dashboard, proper data of this part will be presented on the website according to the requirements of users.

3. Transaction detail data

   When users make purchase or sales, or recharge money from their credit card, we will keep his transaction record in database. A single record will include transaction ID (primary key), customer ID, car virtual ID, transaction time, money and the balance in their account. This part helps the user to keep track of

their past transaction. This can help other buyers and sellers to consider a proper price for their transaction.

VI. Application potential

1. Registration & Account Verification

   The Application Management Team is responsible for this part. Users only need to register and login. When they register, they have to use an email to verify their account and when they want to change their password they have to use the email. There will be a profile page that they can see their information like name and credit card information. We will use “INSERT” and “SELECT” SQL clauses to implement these.

2. Dashboard

   This part is for a part of information search, which is controlled by buyers and dealers who have already created an account.

   Post

   The dealers can post their cars’ information including picture, type, and price on the Dashboard, which will be checked by the application management team. After verification, the information posted will be visible to all users.

   Search

   Buyers can search cars on the Dashboard with their preferred features. For example, buyers can search by the car’s brand, year, color, mileage and even the car’s current location. This allows them to choose cars nearby and get them earlier, which is more efficient.

   Compare

   By listing all the features in a table, buyers can easily compare the cars in their favorite cart before making a final decision.

3. Report page

   This part is a page that can show some statistic results like

   - The Best-selling car brand and type.
   - Number of cars sold in different years and months.
   - Number of cars sold in different states.
   - The average price for different type of cars in different time.
   - Number of cars on sale.
   - The relationship graph between mileage and price for a certain type of car.

VII. Software requirement

- JavaScript: Front-end & Back-end web development
- HTML: Front-end web development
- CSS: Front-end web design
- PHP: Back-end for data exchange
- SQL: Implement all kinds of queries
- CISE Oracle Database: Implement database and its functionality
- Github: Create repository for version control