Database Management System

Project Name: Used Cars Management System

Phase II: User Interface Design and ER-diagram

Group 11
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Table of Content

Introduction

  To show the conceptual design of our program and user interface work flow corresponding to our functionality. We create two design graphs: User interface design and ER-diagram. The first one shows a series of generalized user interface connected by buttons logically related to other pages. The second one shows a traditional ER-diagram which covers all of our major datasets contents and derived information, such as user information, which support our program. Each section is followed by an in-depth explanation to clarify the detailed information and design rationale.

Overview of system

  The motivation behind our design is to provide a platform for users who want to buy used cars with a comprehensive view of car trading. Our database has over 500000 used cars for users to select including all kinds of popular manufacturers, models. Users can search their options by setting some important criterias such as size, fuel, number of cylinders and so on. Once a user decides to buy this car, he can order it in graphic user interface and the backend database will record the transaction. Our system also provides some interesting data visualization. We have seven trends of different complex queries. In each trend, users can set the parameters such as start year, end year or model of cars to display a customized trend graph. This visualization provides a clearer way to see the trend. This meant to show the result of complex queries and provide some novel insight about used cars which can help them make informed decisions. For example, by seeing the price fluctuation of cars in multiple years, users can find out some second

hand cars may become less popular and some limited production cars may gain popularity in the second hand market by years.
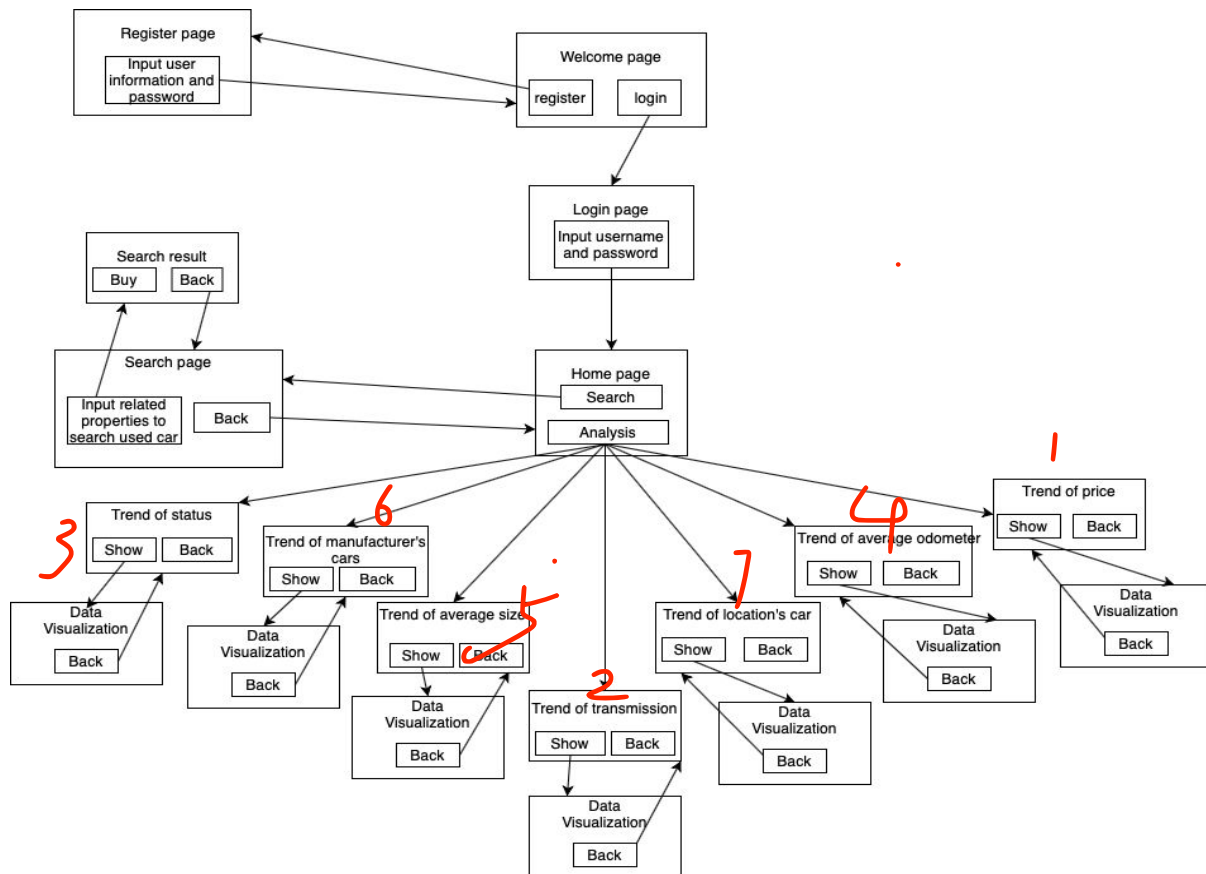
User Interface Design

Figure 1. A user-interface workflow display showing logical relationship between different pages

Web Page information

In the welcome page, users can do two operations: register and login. Users without an account can go to the register page to register an account. Users with a registered account can go to the login page to login into the system.

In the register page, users need to input the necessary information such as username, birth of date, email, phone, password and other personal information. Backend system will check

whether this information is valid, and if they are all valid, a new account will be registered successfully. Otherwise, users need to correct the invalid information. Once registered successfully, users can return to the welcome page.

In the login page, a user needs to input the username and password. If username and password are valid, a user can login successfully and jump into the home page. Otherwise the user is required to re input the username or password.

On the home page, there are two available operations to choose from. One of them is search choice, which will lead users to search pages and allow users to search used cars they want to look through. The other one is Analysis operation, which will lead users to trend pages. To be noticed, there are a total of seven trend pages, all of them show the result of complex queries.

In the search page, users can input the properties and parameters to look through their desired used cars. For example, users can input the specific manufacturer or model, or number of cylinder, range of car's size and other important car information. The result of the search is shown in the search result page. Once the user finishes searching or the user wants to see the analysis part, the user can go back to the homepage.

In the search result page, users can see the list of user cars with properties user input in the search page. Users can get all the information and properties of these cars. Additionally, users can buy cars on this page, once a user clicks the button behind a specific car, the user will buy this car. Back button can bring the user back to the search page.

In the seven trend pages, users can input the different parameters including start years, end years, locations and others. Different trend pages support different parameters. Once the user finishes

inputting parameters and clicks the show button, the user will be brought to data visualization pages. Users can also go back to homepages from current trend pages.

In the data visualization page, it will show the result of trend with parameters user input in the trend pages. This page will show some different kinds of graphs of data, mainly focusing on its trend. This can help users understand the trend of their interested part and cars, which may help them buy the desired cars. For researchers, this visualization may help them understand the data better and do some innovative research. Once users finish looking through the visualization, they can go back to the trend pages.
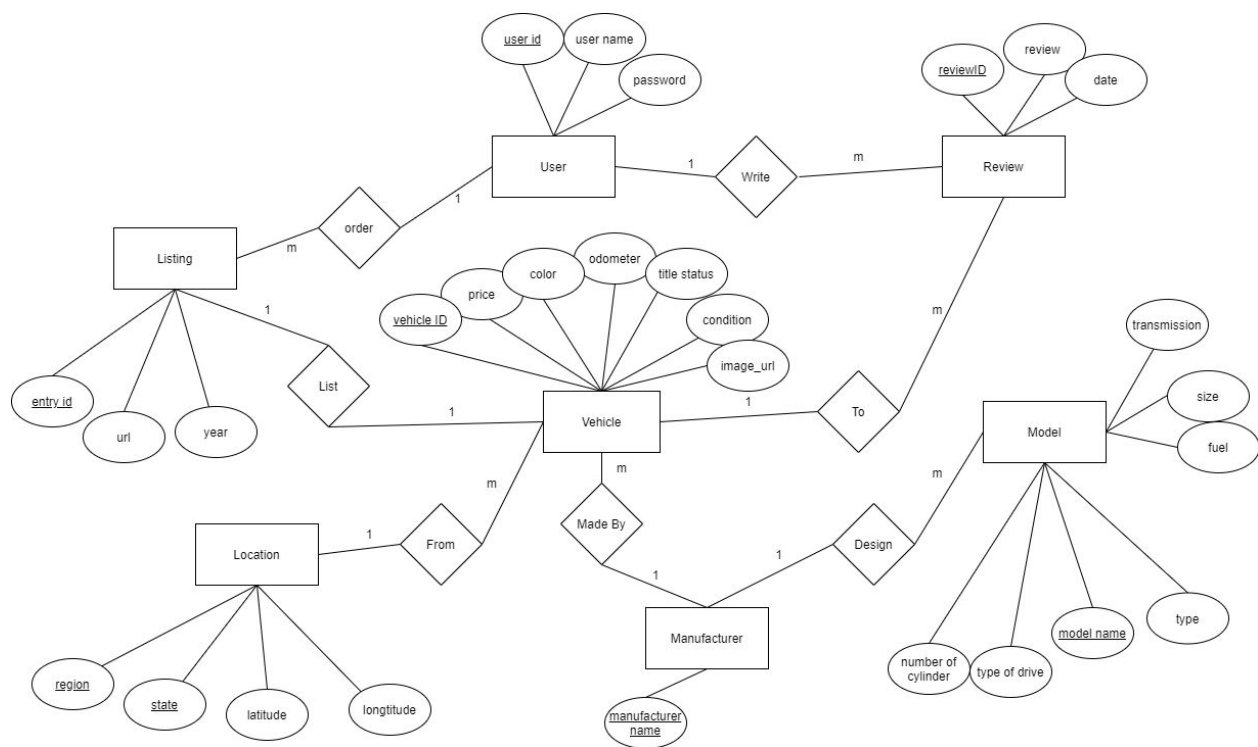
ER Diagram

Figure 2. ER-diagram detailedly describes the relationship of user car exchange market

Entity Information

User: This includes every registered user id along with username and password. User id is the primary key. This information will be important to recognize users' identity to help them matching with corresponding listing they ordered.

Listing: This includes every online listing for car dealerships. Entry id is the primary key. Every listing associated with an entry id is used to identify listing. It also includes listing URL directing to that website and listing year.

Review: This includes every user review to a certain car after the user bought the listing. Review id is the primary key. Review will include a review id to identify it, the review content and date.

Vehicle: This includes every vehicle 1-1 associated with every listing. Vehicle id is the primary key. This entity includes important car information such as title status, condition, price, color, odometer etc.

Location: This indicates every location that the listing is associated with, along with the geographical position by latitude and longitude. The combination of region and state name is primary id since there is no repeated geographical name in state level.

Manufacturer: This includes every car manufacturer name, and since manufacturer name is a trade mark, it is used as a primary key.

Model: This includes the designed model's important information of the car such as type of drive, number of cylinder, size, fuel, and others. Because model name is a trade mark, it is used as a primary key.

Relationship Information

Write: Every user can write multiple reviews, and it does not make sense that multiple users are writing on the same review. Thus, it forms a 1:m relationship.

To: A review can only point to a single vehicle information composition. Multiple reviews can point to the same vehicle information composition. It does not make sense that a review can point to multiple vehicle information composition. Thus, it forms a m:1 relationship.

Order: A user can buy multiple listing, and it does not make sense that multiple users can buy a single listing. Thus, it is a 1:m relationship.

List: Every listing on a website should only be associated with one car, and it does not make sense otherwise. Thus, it is a 1:1 relationship.

From: Every car has to be physically located in the real world after it is listed. A car cannot present at multiple places at the same time, and it is reasonable that multiple cars come from the same place. Thus, it is a m:1 relationship.

Made By: Multiple cars can be made by one manufacturer brand, it does not make sense vice versa. Thus, it is a m:1 relationship.

Design: Manufacturers can design multiple models, it does not make sense that multiple manufacturers design a single model because at least only one of the manufacturers keep the major ownership of that model. Thus, it is a 1:m relationship.