CMPSC 431W Project Proposal

Team: Big Leg Carry

Sui, Haojun   Deng, Yuanpei

`hzs5220@psu.edu`   `dengyuanpei@gmail.com`

Zhang, Chenyu   Wang, Hao

`dianachenyuzhang@gmail.com`   `haowang5128@gmail.com`

Chen, Shiqing

`u0vv0u@gmail.com`

February 4, 2016

Contents

List of Figures

List of Tables

1 Introduction

2 Requirement Analysis

2.1 Sale Items

The items that we are offering for sale are automobiles. Items listed on our websites are stored in a database management system as an entity. Each item will have a primary key named the item_id which is unique to every item. As to offer better details to item listings as well as the sake of searching features. Several attributes will be present for the item entity. Some attribute will be visible to the customers as item specifics, and some will be only visible to those who have access to our database as listing specifics. The item specifics include Vehicle Make, Vehicle Condition, Vehicle Model, VIN (Vehicle Identification Number), Year, Mileage, Vehicle Title, Vehicle Type, Body Type, Options, Safety Features, Power Options, Sub Model, Fuel Type, Exterior Color, Interior Color, Drivetrain, For Sale By, Number of Cylinders, Engine Description, Transmission, Trim, and Warranty. On the other hand, the listing specifics indicators include Listing Status, Listing Type, Listing Duration, and Listing Start Time.

As most of thse item specifics are very straightforward, some still need further clarification. Vehicle Title refers to the current status of a vehicle, and has two types: clean title and clear title. A clean title is usually used to refer to any car that passes inspection without having any serious physical issues. A clear title is usually used to describe a financial lien that has been placed on a car. For Sale By refers to the type of the seller, which can be either dealer or individual seller. For listing specifics, listing status refers to the status of the listings, and can be active, ended, unsold, sold, and removed. Listing Type can be either auction or buy-it-now. Listing Duration is the time period when the listing is active.

2.2   Categories

"Shop by Categories" is a necessary way to browse items as customers may not know what to search. The items available at HelloWorld are categorized using a predefined classification tree. Customers will first choose the body type of the vehicle. So the root of the tree will be labeled as "All Body Type", which we have the nodes of the root as SUV, Pickup Truck, Convertible, Sedan, Crossover, Coupe, Luxury Car, Wagons/Hatchback, Green Cars/Hybrids, Sports Cars, and Minivans/Vans. On the lower levels of the first tree, from top to the bottom, we have: Make, Year, Model, Sub Model, and Trim.

An item can be specified by a path through this classification tree. For example, we may categorize an item as:

1. SUV > Audi > 2016 > Q7 > Q7 eTron > Base

2. All Body Type > Fiat > 2011 > 500 > 500 Abarth

The depth of the tree varies but is no more than ten levels deep.

2.3   Suppliers

In our case, supplier is the car dealer. The attributes of supplier (dealer) are dealer name, address, phone number and rates. The rate is how buyers (user) judge the dealer by several aspects, like customer service, quality of repair, buying process, etc. Dealer will have an inventory. The relation is called owns and the entity is cars. The dealer also has a relation named locates and the entity is address. The reason we choose to make *Address* as an entity instead of an attribute is that we can use the similar schema for registered users. Figure 1 shows the ER diagram for Suppliers.

Figure 1: ER diagram for Suppliers.
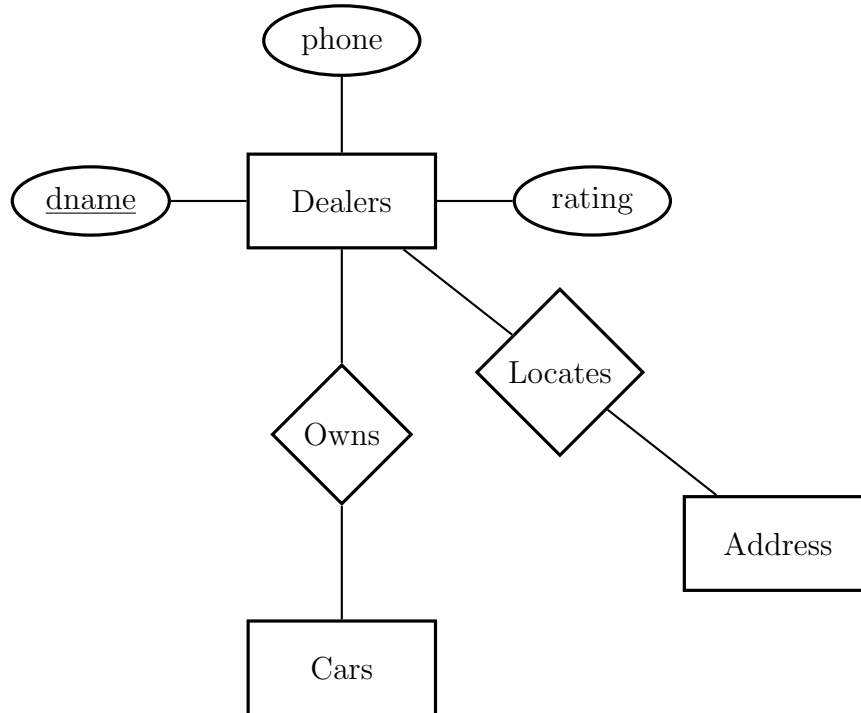
2.4   Registered Users

The registered users are the buyers who can buy or bid on an item (car). Buyer must be registered, and identified by a user name and authenticated with a password. When registering, the user must enter the following required information in order to register successfully. These information includes: email address, name, address, phone number and credit card info like type of card, card number, cvv and expiration date. These are the basic information of a registered user. Figure 2 shows how does the interface of registering page look like. (In real design the credit card information will be added.)

In addition, after register a user can complete his whole profile by adding other information like age, gender and annual income. These attributes can be NULL if the user chooses not to fill.

Figure 2: Interface of Registering Page.

2.5   Rating

2.6   Browsing

Browsing is one of the most important feature of a website, especially for a car selling website. It has great impact on user experience for the website, a good browsing feature can give user easy access to the target items, however, a bad browsing feature will prevent user from accessing the target items and sometimes even browse the wrong items.

How it works

According to the input, using SQL to select proper table or a specific record. Users

are able to browse the items bty traversing the category tree. At each point, they are given a summary of all the items that appear in that category.

Design

A good browning feature should have the following attributes:

1. Easy to use (good design)

2. Accurate (well built database and proper SQL instructions)

3. Quick response (well built database and proper SQL instructions)

Browsing is usually done by a browsing bar. There are two types of browsing bar in our website: horizontal bar and vertical bar. Horizontal bar is on the top of the page and vertical bar (box) is on the right of the page.

Horizontal bar consists of 3 buttons and 3 drop-down menus (See in Figure 3):

Figure 3: Horizontal Bar Design.

On the main page, browsing bar is placed horizontally on top of the page which is a striking position. By doing this, it provides easy access for users to browse our inventory right after they enter the website.

New Car button and Used Car button: For users who do not have a target car to buy, take users to the new/used car page with our full new/used car inventory.

SELL YOURS button: Take user to sell page.

Drop-down menus: For users who have a target car in mind. First, select make of the car and then select model will take them to the result selected from our database

according to the given input. Or users can browse the car by type (sedan, coupe, SUV, other), and jump to the result page with cars of that type.

All inventory pages have a vertical browse bar with all the attributes according to previous input (new/used/type...) Figure 4 shows the design of the vertical bar.

Figure 4: Vertical Bar Design.
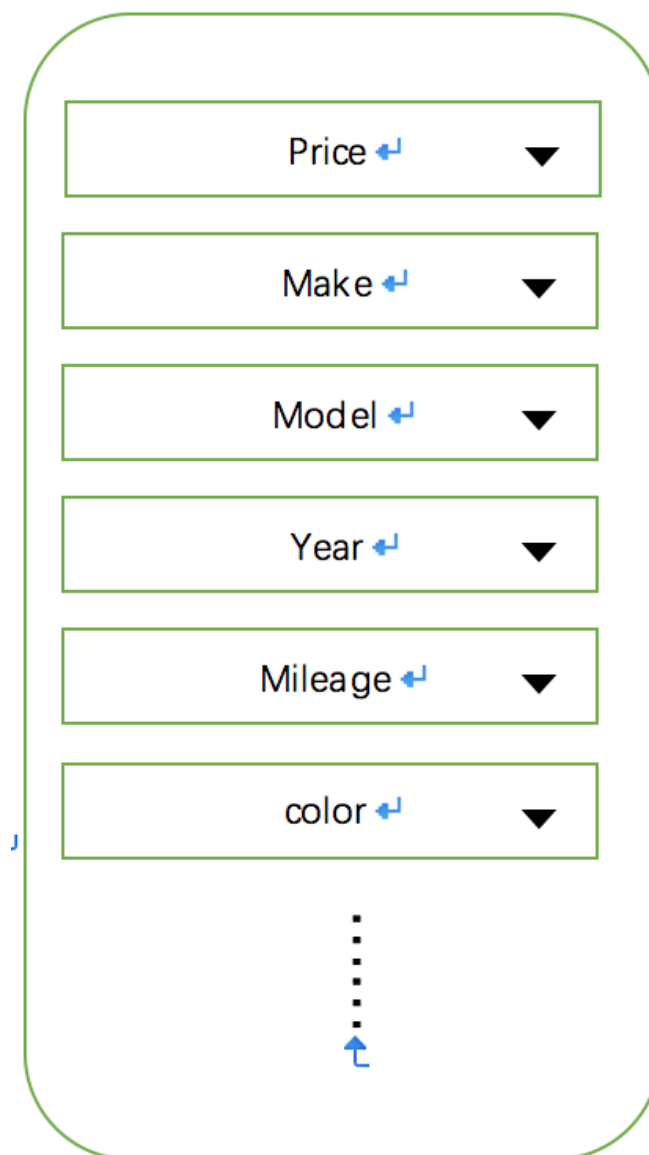
The reason that it is on vertical and on the right is that user are not disturbed by drop-down menus and focus more one the content.

Every change of the drop-down menu will immediately execute a SQL instruction and bring the result to the page.

2.7   Searching

Users are able to search the items by entering some keywords or conditions. As a search result, a list of items that satisfy the search criteria is returned to the users. Searching is another function to get quick access to the target item besides browsing. If a user has a specific car in mind, by using our search bar, he can filter out the non-matching records and gets the desired results directly from our database.

How it works

User types a keyword in the search bar and hit enter to search. Website breaks the keyword into several words. The website will search the first word in all the related tables in our database, then search the next word in the result from last word searching.

Simplified Example

Assume user search for Audi A5, we breaks the search words into keywords 'Audi', 'A5'. We first search for Audi. Figure 5 shows the results to users.

Figure 5: Search for Audi.

Vid	Make	Model	Year	Price	New/used
100	BMW	M3	2015	60000	New
200	Audi	A5	2015	40000	New
300	Audi	A4	2013	25000	Used
400	Audi	A5	2014	35000	Used

Car Table

We then search for A5. Figure 6 shows the results to users.

Figure 6: Search for A5.

Vid	Make	Model	Year	Price	New/used
200	Audi	A5	2015	40000	New
300	Audi	A4	2013	25000	Used
400	Audi	A5	2014	35000	Used

Design

Figure 7 shows the design of the search bar.

Figure 7: Search Bar Design.

Keywords

It will be on every page, together with browsing bar so that user can perform a search no matter what page they are on.

2.8   Sale

2.9   Bidding

At HelloWorld, bidding is pretty easy and fair. When seller lists a vehicle on our website, he can choose auction as the listing type. Then he will set a starting price for the auction, a duration, and a reserve price as an optional feature. The starting price has to be greater than 0.99, and lower than the item's buy-it-now price if it has one. The duration can be 3 days, 5 days, and 7 days max. The reserve price which is invisible to

buyers is the price threshold where buyers have to bid higher price than the reserve price in order to win the item. If no bid achieves the reserve price at the time when the listing ends, then the item isn't sold. Seller can't change an auction type listing to fixed price listing, but he may end an auction earlier than the projected end time. Seller can change a fixed price listing to an auction type at any time before the end of the listing period, and then the auction duration will be added to the listing upon a successful change from fixed price to auction. To maintain the fairness of the auction, bidders are anonymous to sellers, only the highest bid is visible to the seller.

On the buyer side, one can bid on any item at any time, and the number of bids is unlimited. There are two types of bids, one is a one-click-bid, and the other is a max-bid. A one-click-bid is the bid which is one bid increment higher than the current bidding price. The bid increment is determined by the range of current bidding price. Table 1 shows the current bid increment.

Table 1: Current Price Bid Increment

Price Range($)	Bid Increment($)
Up to 99.99	5
100 to 999.99	25
1000 to 4999.99	50
5000 to 9999.99	100
10000 to 49999.99	200
50000 or more	500

The max bid is the maximum price a buyer is willing to pay for the item. The max bid is required to be at least one bid increment higher than the current price. When a buyer placed a max bid on an item, the current bid will raise only one bid increment. Buyer can raise the max bid any time during the auction. All the one-click-bids are visible to all the buyers, but max bids are only visible to the buyer who placed it. Buyer can retract

his bid any time during the auction, and only if the bid is the highest bid at the moment, but leaving a record of retraction. After retraction, the highest bid placed by other buyer will be the current bid. When buyer A places a bid higher than the current bidding price, buyer B with that bid will be outbid, which means the buyer B will have to bid higher in order to win the item. If buyer B has a max bid, then the bid from buyer A may not be high enough to compete, then buyer A will be automatically outbid with a bid increment at the current bidding range. Buyer A will then place higher bids until the highest bid is lower than his max bid. The highest bid at the end of auction is called a winning bid, the buyer who placed the bid will be the winner of the auction. However, if the highest bid isn't higher than the reserve price, then the buyer isn't winning.

2.10 Order and Sale Reports

2.11 Delivery

3 Conceptual Design