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CarForMe

By virtue of submitting this document I electronically sign and date that the work being submitted is my own individual work.

Abstract

In the western hemisphere, the majority of people will own a car in their lifetime. Needless to say, they are essential. However, it is known that it is stressful to go car shopping, and frustrating for consumers to find a car that suits their needs in their budget.

Since people often need a car ‘now rather than later’, they will make uninformed decisions and end up with a car that either doesn’t suit their needs, or is not worth the value. This is where CarForMe comes in, a fast way to find a car ‘now’ that suits your needs.

CarForMe is targeted at students, and low-income families that need to make every dollar count. It aims to alleviate stress and help people find exactly what they need, by identifying many factors, not only the price, that will lead to outstanding value for users. The application will also focus on educating users on things to look out for when shopping for cars.

It will process a data set containing over 100,000 car records and supplement it with information available online in order to generate a car graph that will point the users to their desired car, as well as cars that are purchasable nearby.

Objectives And Scope

Problem Statement

Cars are expensive and gas is expensive. For many people, having a car is a necessity. At the same time, they often have to worry about even being able to afford them. Different fees can add up: the up-front cost, insurance, maintenance and perhaps most importantly fuel consumption. For most families, especially low-income ones, buying a good car is as important as buying a house.

The problem lies in the difficulty of finding a good car. There are thousands of different cars on the market, which easily confuses consumers. Many people will have a hard time looking for exactly what they need. For first-time car owners especially, they do not know what to look out for. There are a multitude of important steps to take before buying, and it is very easy to overpay for a car, or fall into a problem paying for any combination of the aforementioned fees. This is why I propose an application that will help car-buyers in their decision. This application will inform them of many of the costs associated with buying a car, and make them recommendations based on their lifestyle and requirements. If additional time is available at the end of development, it will also give users an avenue to begin looking for the cars, and give them advice for buying cars.

This application will aggregate various factors such as:

- Car cost/budget.
- Reliability.
- Car fuel economy.
- Car stress (amount of use.)
- Insurance cost (based on car cost)
- Other needs such as family size/recreational uses.

to in order to recommend the best possible options for the user.

Background Study

I am certain that there is a need for this kind of product. A quick research will lead one to multiple articles that recommend cars for university/college students. Here is a small sample of these articles:

Top 10 cars for students[1] – The Globe And Mail

5 best cars for students[2] – Huggington Post

Top 10 cheap cars for students[3] – The Telegraph

11 best cars for college students[4] - Edmunds

Best affordable cars for college students[5] - Moneycrashers

These lists emphasize fuel economy, safety and price, but these are not the only factors a car-buyer should consider. Nonetheless, the existence of these articles prove that there is a great need for car recommendations, especially for first time buyers.

In addition, time and time again it is proven that it is often very difficult to get the honest opinion from a car dealership. They will sometimes try bait and switch methods[6], or load your financing with hidden fees, in order to sell you a car. Having a non-biased second opinion from an application like this is useful.

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1 Listed: Top 10 cars for students. (2014, August 26). Retrieved February 01, 2017, from http://www.theglobeandmail.com/globe-drive/culture/commuting/listed-top-10-cars-for-students/article20195162/?page=all

2 U. (2016, December 04). 5 Best Cars For Students And Teens. Retrieved February 01, 2017, from http://www.huffingtonpost.ca/universityhubca/5-best-cars-for-students_b_8710622.html

3 (n.d.). Retrieved February 01, 2017, from http://www.telegraph.co.uk/motoring/picturegalleries/10353145/Top-10-cheap-cars-for-students.html

4 Published: 08/12/2015 - by James Riswick, New and Used Car Editor. (2015, August 12). 11 Best Used Cars for College Students. Retrieved February 05, 2017, from https://www.edmunds.com/car-reviews/features/11-best-used-cars-for-college-students.html

5 (n.d.). Retrieved February 01, 2017, from **http://www.moneycrashers.com/best-affordable-cars-college-students/**

6 (n.d.). Retrieved February 01, 2017, from http://www.telegraph.co.uk/motoring/picturegalleries/10353145/Top-10-cheap-cars-for-students.html

There are existing solutions, such as edmunds.com. This is the most in-depth car find that I can find, but it does not account for fuel consumption or driving habits of the user. For this reason it will just recommend you are car you can afford upfront, which is a bit limited.

As I have stated, cars are expensive[7] and care should be taken when putting money down on them. Cars are a necessity in the modern world, and unfortunately not everyone is able to figure out exactly what car they want. An application like this will truly help improve people's lives by informing their decisions when buying a car. As a student myself, I can see a need for a service such as this in the near future for myself and my peers.

7 (n.d.). Retrieved February 01, 2017, from https://www.nytimes.com/2016/07/02/your-money/new-cars-are-too-expensive-for-the-typical-family-study-finds.html?_r=0

Input/Output

Datasets

The project will be using 4 data-sets.

- Collection of vehicles and their fuel consumption[8] – 40 000 rows

  This set also includes details about the car, such as wheel configuration and type of fuel
- Collection of vehicles and their fuel consumption[9] - 15 000 rows
- Collection of vehicles and their fuel consumption[10] - 45 000 rows
- Daily data set to find the cost of a car on the list [11].

Output

The application will use the data sets to create several graphs of cars, based on cars that share similarities such as fuel consumption, reliability or upfront costs. It will then take user parameters and find cars that share the most in common with the user's input and return them to the user. The user can input their income level, car budget, driving patterns etc. in order to refine the search.

8 https://catalog.data.gov/dataset/fuel-economy-data

9 http://open.canada.ca/data/en/dataset/98f1a129-f628-4ce4-b24d-6f16bf24dd64

10 http://data.okfn.org/data/amercader/car-fuel-and-emissions#data

11 http://developer.edmunds.com/

Algorithmic Challenges

Algorithms

Graphing-Solution/Searching Algorithm

There will be a weighted N-dimensional graph used to determine the cars closest to the user's ideal car.

Tim-sort

This is a sorting algorithm that will be used to sort the cars in terms of favouribility on the client side.

Challenges

One big challenge will be processing the 3 different datasets and putting them into a graph database in an efficient manner. This will probably be done with a searching algorithm.

Another challenge will be updating the database with car prices on an interval in a time efficient manner.

Development Environment:

The back-end will be done using IntelliJ Studio (IDE) and Springboot (Framework). Springboot is a powerful way to implement API endpoints and websites using Java. With Springboot we will be able to set up a server that performs functions such as scanning the dataset, and returning processed information to the user over the web.

The website will use bootstrap and reactJS to populate the page and keep it looking visually pleasing. This can again be done in IntelliJ studio.

Scaffolding (or visual design) of the application can be done using photoshop.

Should we choose to make a mobile application, Ionic will be used, as it is a fast way to develop and deploy applications for both iOS and Android (the most popular mobile operating systems)

Deployment Environment:

After initial processing, the datasets could be stored to a neo4j database online.

Ideally this Springboot back-end could be deployed to either IBM Bluemix or Amazon Web Services as they offer reliable uptime.

If this becomes a website, the front-end could easily be deployed to a github website, with support for mobile devices.

As a mobile app it could be deployed to Android and iOS using Ionic (a hybrid app development tool.)

Project Timetable

Week	Milestone 1	Milestone 2
1	Data processed and Stored in Neo4J database	
2	Basic back-end deployed	Front-end Application Designed & Begin Development
3		
4	Back-end Application Ready	
5	Front-End Deployed	
6	Final Bug Fixes, No New Features	
7	Final Front and Back-End Deployment	

References