Digital Arch. Final Project Proposal: Car Pricing Analysis

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I. OBJECTIVE

Transportation is a crucial cornerstone of our society and greatly impacts the standard of living. Having said that, personal vehicles are by far the most popular means of transportation. In fact, whole industries have sprouted due to personal vehicles being available to individuals. It is one of the most important, and oftentimes, a necessary investment in many people's lives. Therefore, it is crucial to be aware of the trends the industry is taking to help individuals make better decisions regarding the vehicle they plan to purchase with their hard-earned money.

The objective of our final project is to analyze and extract various trends from the historical pricing of cars to the present day. We plan on analyzing datasets and APIs that keep track of various information regarding vehicles for approximately the past 10 years in order to discern relevant trends that are impactful to the present day. We want to explore differences between car makes, models, features, pricing, etc. to determine how the industry has evolved and the direction it is planning on heading towards. For example, how the introduction of various features such as the rear-view camera has impacted the pricing of vehicles, how fuel efficiency has improved due to climate and resource concerns, and how the introduction of hybrid and electric vehicles has influenced the market and consumers. Being able to log the various trends in the industry would provide useful insights moving forward.

II. MOTIVATION

The car market is constantly evolving: the economy, technological progress, political viewpoints, and climate concerns are all elements that impact the decisions made by car manufacturers. Understanding how the market is changing, allows consumers to make better decisions regarding buying a vehicle, understanding the true value of a particular vehicle, as well as what to expect in the near future. The data we collect will hopefully help us answer important questions such as what vehicles are within my budget? Which manufacturer produces vehicles best aligning with my needs? Are hybrids and EVs the future? Our aim is to help answer these questions through a data-driven approach to provide users with all the information they need to best prepare them for one of the most important investments of their lives.

III. APPROACH

There are a few methods that will be used to collect data for this project. It will most likely involve some web scraping for more recent data on newer cars and possibly some used cars. However, most of the data will be obtained through the use of pre-existing APIs or datasets. Currently, we hope to look at data for a few different makes and models over the last 10-15 years. All makes and models will also have various different features such as driver aids, GPS, etc.

Once enough data has been found and collected, analysis will be preformed to see what can be pull from it. We will use the data to look at how the various makes and models varied in price over the last decade and a half and see how the various features of each car affected the sale price. If time is permitted, we also hope to look at how the price of different vehicle types varied based on locality. For example, how the price of a small sedan varied in a city versus in a more rural setting.

Lastly, we will be using Python to perform the web scraping and API calls for the needed data. Python will also help us to better understand the data through visualization by various graphing techniques.

IV. MEMBER RESPONSIBILITIES

A. Braxton Haynie

NetID: bhaynie
Responsibilities:
- Work on developing a web scrapper to pull current car pricing
- Visualization of the data from web scraper
- Help develop ML model for price prediction

B. Karan Patel

NetID: kpatel68
Responsibilities:
- Work on pulling data from APIs
- Visualization of the data from APIs
- Help develop ML model for price prediction

C. Jacob Hawkins

NetID: jhawki41
Responsibilities:
- Work on pulling data from APIs

- Help develop ML model to identify key trends
- Visualize results of ML model

D. Matthew Rosenbalm

NetID: rrosenb4
Responsibilities:

- Develop web scraper to parse raw web data
- Model data to help identify key trends

V. TIMELINE

Week 1	Develop project idea and proposal.
Week 2	Collect relevant data.
Week 3	Clean up data.
Week 4	Begin writing scripts to analyze data.
Week 5	Continue writing scripts.
Week 6	Begin testing and training models.
Week 7	Complete testing.
Week 8	Present findings.

TABLE I

TABLE SHOWING THE PROJECT TIMELINE

VI. EXPECTED OUTCOME

From our analysis, we expect to find trends relating a car's price over time to its features and where the car was bought. Within this data, we expect to see a dramatic increase in prices over the COVID-19 pandemic as well as general price increases due to inflation over time. We also expect to see price increases in cars that have implemented things like driving assist, parking assist, and adaptive cruise control. By the end of this project, we hope to be able to accurately predict a cars price based on its feature sets and purchase location. We also hope to be able to accurately judge existing car prices and determine if it is a fair price for the features and location.

REFERENCES

[1] CarsXE, "Documentation - carsxe API," CarsXE Vehicle API, https://api.carsxe.com/docs

[2] "Used Cars, New Cars, Reviews, Photos and Opinions - CarGurus,". https://cargurus.com

[3] "Edmunds Developer Portal - Edmunds Developer Network - Welcome to the Edmunds API,". https://developer.edmunds.com