Used Car Market

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Introduction

The used automobile market is a vibrant, dynamic, and an evolving sector. The market has grown more competitive and diversified as a result of the rise in demand for inexpensive and dependable cars. Consumers now have access to a broad variety of automobile brands, models, and price points. Data visualisation tools may be used to study and examine patterns, trends, and insights to have a better knowledge of this market.

Key market determinants for used cars, such as location, vehicle type, age, mileage, and price, may be identified with the use of data visualisation. It is simpler to identify patterns and connections that may not be immediately obvious from raw data by developing visual representations of this data. This can aid in the purchase and sale of used automobiles by corporations and customers alike.

Data on the used automobile market may be shown in a variety of ways, such as graphs, charts, and maps. These tools may be used to display data on the most popular automobile brands and models as well as the typical selling prices for various vehicle types in various geographic locations. Overall, data visualisation may help make sense of the intricate and sometimes perplexing used automobile market, offering insights that can be utilised to guide strategic choices and enhance results for both buyers and sellers.

1 Insight Needs

Trends in demand and supply: Knowledge of the supply and demand for used automobiles is essential for making wise choices. Analysing data can reveal which makes and models are popular and which are not. It is feasible to identify whether automobiles are in short supply or high demand in certain places by looking at inventory levels, sales trends, and geographic distribution.

Price trends: Whether purchasing or selling a used automobile, price is one of the most crucial considerations. Finding average pricing, price ranges, and price variations for various makes and models is possible with the use of data analysis. Sellers may use this information to establish the best asking price for their automobile, and buyers can use it to decide what they should spend for a certain car.

Regional variations: There are considerable geographical variations in the used automobile market that may be found through data analysis. This knowledge can assist merchants and vendors in adjusting their pricing and marketing approaches to particular geographic areas.

1.1 Stakeholder Analysis

Car dealers: Being those in charge of purchasing, reselling, and exchanging automobiles, car dealers play a crucial role in the used car industry. Their performance is dependent on elements including price, inventory control, and customer service.

Car Purchasers: The success of the used automobile market depends heavily on the choices and wants of car purchasers, who are the sector's primary consumers. Vehicles that fit their unique demands and are reasonably priced, dependable, and safe are what buyers are looking for.

Sellers of Automobiles: Sellers of Automobiles can be either private citizens or corporations, such as fleet owners, rental car firms, and automobile dealers. Often, their objectives are to sell their cars as quickly and profitably as they can while still fulfilling the requirements of the customer.

Insurance companies: Insurance companies are active in the used car market since they offer coverage to automobile owners and purchasers and participate in the evaluation of the worth and condition of vehicles.

Investors: Given that the used automobile market has the potential to be a lucrative business with room for expansion, investors could be interested in it.

2 Data Acquisition

I plan to utilise Kaggle's used vehicle dataset, a well-liked dataset for data scientists and analysts interested in researching the used automobile industry.

2.1 Description of Data

Data on around 370,000 used automobiles from the German eBay website are included in the dataset, which also includes information on their price, brand, model, year, mileage, fuel type, and other factors., see Table 1.

Table 1. Data Analysis Reporting

Year	Selling_price	km_driven	Name
1994	9100	4100	Toyota
1995	10200	5641	Benz
1996	9101	4366	Audi
1997	9117	1244	Toyota
1998	4118	2250	Nissan
1999	5129	5647	Toyota
2000	8151	5245	GMC
2001	1152	5166	Subaru
2002	22172	5867	Subaru
2003	23192	2463	GMC
2004	45167	66646	Ford
2005	56268	7788	Ford
2006	22228	8963	BMW
2007	10216	4556	Ford
2008	15197	450	Audi

3 Analysis Methods

Web Scraping to get the desired data, data preprocessing to clean the data , correlation Analysis

3.1 Analysis Methods

Web Scraping: Web scraping to get the desired dataset set to perform data analyses. This can be done using tools such as beautiful-soup

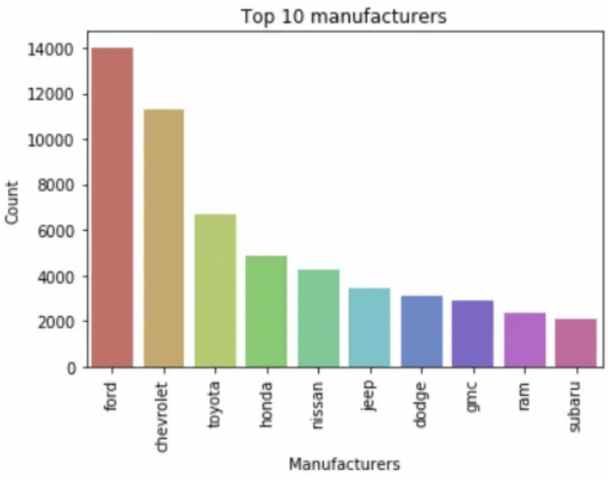
Data preprocessing: Processing the data to the format that is suitable for data analysis and visualisation removing any redundancies, missing or invalid data.

correlation analysis: Finding associations between variables in a dataset may be done via correlation analysis. For instance, a correlation study may be used to ascertain the connection between a car's age, mileage, and selling price. Heat maps and correlation matrices are examples of visualisations that may be produced using programs like Seaborn and Matplotlib.

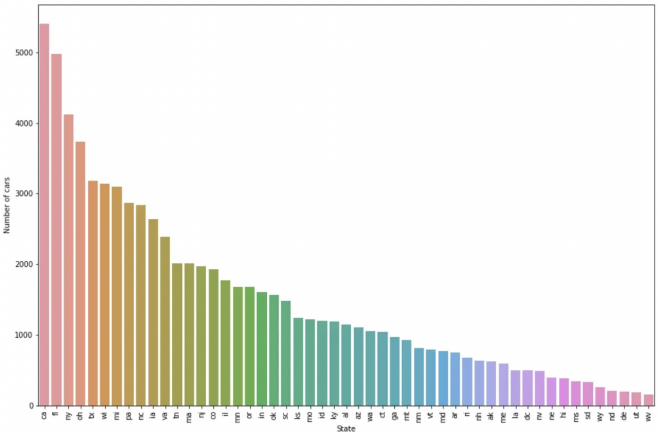
Currently there are many data analyses that are being done with used cars such as exploratory data analysis to show the relationship between several qualities and, in particular, the price of a secondhand automobile. We must first determine where and how used automobiles might be purchased in the USA before we can begin exploratory data analysis. We may utilise each car's latitude and longitude coordinates to put it on an interactive map of the Country for this purpose. Each dot on the map symbolises a pre-owned vehicle, along with its maker, model, and cost.

4 Visualisations

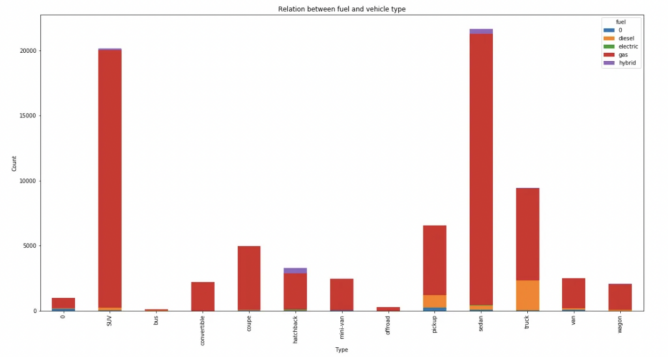
Below are the plots for Top 10 manufacturers, Sale pattern among different US states and relationship between vehicle and fuel type respectively.



Sales patterns in several US states:



Relationship between Vehicle and fuel type



Graphic Symbols Used:

Symbol Type	What its used for
Bars	Car Manufacturers
Bars	States in US
Bars	Type of Vehicle
Colour	Car manufacturers, States and Fuel Type
Text	Car Brand, States and Vehicle Type

Graphic Variable Used:

X-Axis, Y-Axis, Color, Size, tooltip.

5 Interpretation of Results

Ford is the automaker with the most vehicles available for purchase followed by Chevrolet and ToyotaAs these brands have shown positive sales growth over time and are the safest choice, dealers may focus on them.

The graph demonstrates how the trend toward hybrid and electric vehicles is gradually taking hold, particularly in hatchbacks and sedans. The breakthrough has not yet happened with regard to big vehicles like trucks, SUVs, and pickups. The main fuels used to power these cars are still diesel and gas. This shows that the market for sedans and hatchback electric cars may change in the following decades.

We can see that Florida and California top the leaderboard in terms of total sales. This might be a potential market place for investors to invest and for Car dealerships to open new branches.

Possible issues might arise if automobile vendors misrepresent the state of the vehicles in order to offer them for a greater price. This could lead to inconsistencies since the vehicle's condition could not be taken into account.

Regarding used vehicle sales patterns and the auto sector in general, we may successfully draw logical conclusions. In order to accurately anticipate pricing for further studies, additional data from reliable sources must be collected. This will allow anyone looking to purchase a used automobile to have an idea of what it will cost them in advance and avoid spending more than the vehicle is worth.

References

[1] I.A Wains. Exploring and Analysing Used car dataset, Nov 2020.
[2] D. Sowmya. Used Car Analysis, Jan 2023.