Analysing the Impact of Car Features on Price and Profitability

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Project Description

- Conducted exploratory analysis of a car dataset to uncover insights in the automotive industry.
- Analyzed factors influencing car pricing and fuel efficiency.
- Investigated distribution of car prices across brands and body styles.
- Explored relationship between transmission type, body style, and car pricing.
- Examined variation in fuel efficiency across body styles and model years.
- Studied relationship between car brands, horsepower, MPG, and price.
- Ensured data integrity through thorough cleaning and preprocessing.
- Made assumptions about dataset representing diverse market sample and data accuracy.
- Aimed to provide actionable insights for stakeholders in pricing, features, and fuel efficiency improvements.

Approach

- Our project utilized descriptive statistics, visualization techniques, and modeling to analyze the car dataset and address the business questions.
- We employed descriptive statistics to summarize the data and gain insights into various car attributes.
- Visualization techniques such as pivot tables, charts, and plots were used to represent the data visually and identify patterns and trends.
- Regression analysis was performed to identify the key variables affecting car prices.

Tech Stack Used

Excel

Microsoft Excel's user-friendly interface and powerful data manipulation tools make it ideal for efficient data cleaning. Its extensive range of functions simplifies error identification and correction, ensuring swift and accurate processing of large datasets.

Powerpoint

Microsoft PowerPoint offers a user-friendly interface with a plethora of creative tools, making it exceptionally easy to design visually stunning presentations

Notepad

Notepad offers a lightweight and efficient platform for quick note-taking and text editing tasks.

Its simplicity and minimalistic design ensure distraction-free writing, ideal for focusing on content.

Insights & Results

Tasks

A. How does the popularity of a car model vary across different market categories?

B. What is the relationship between a car's engine power and its price?

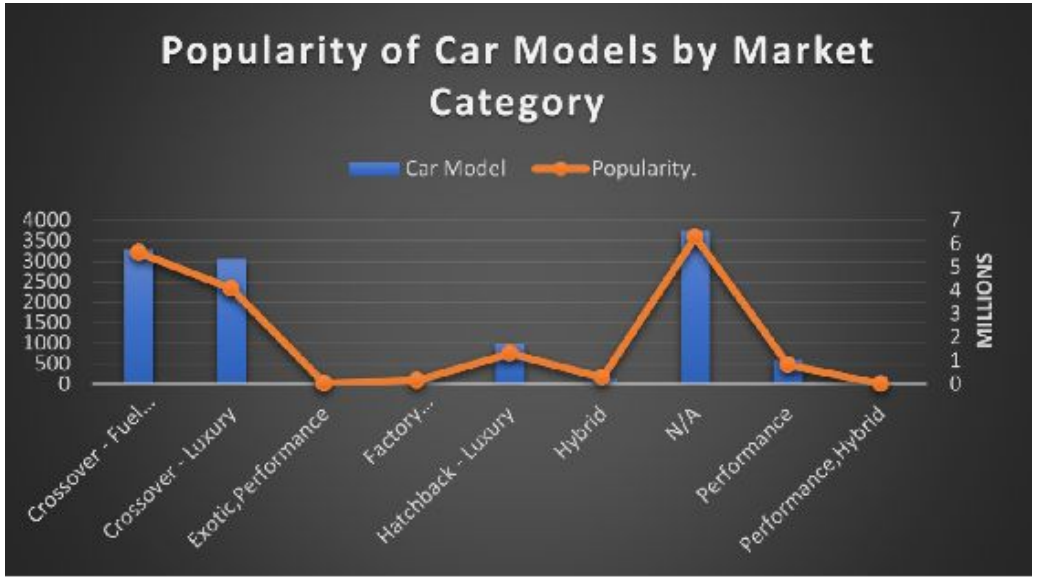
C. Which car features are most important in determining a car's price?

D. How does the average price of a car vary across different manufacturers?

E. What is the relationship between fuel efficiency and the number of cylinders in a car's engine?

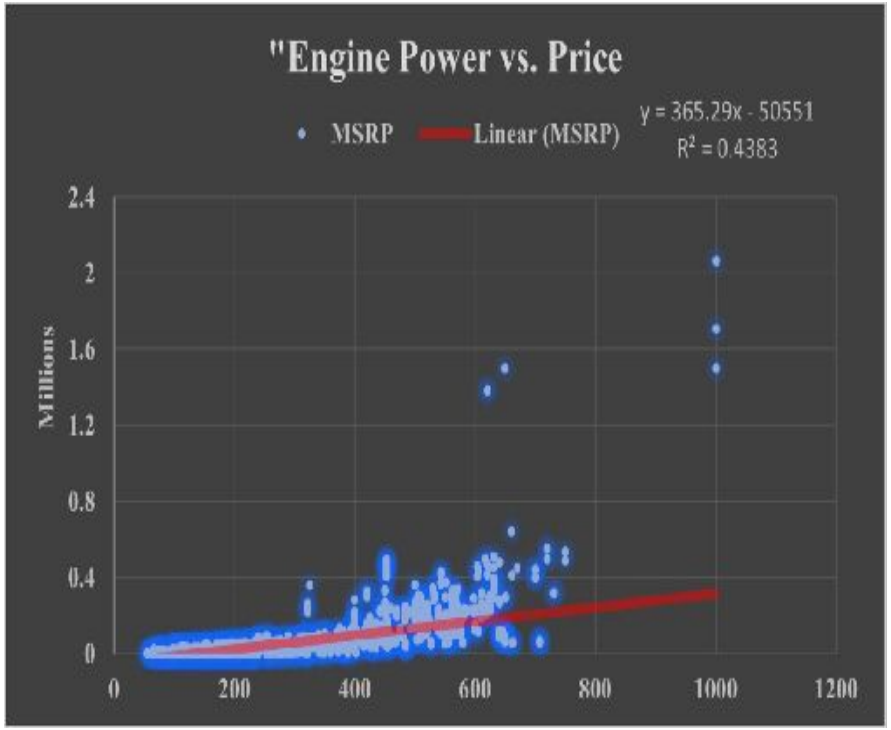
Task A : How does the popularity of a car model vary across different market categories?

- For this task, Market categories were Consolidated. By grouping similar market categories together, we simplify the chart. For example, grouping of "Crossover, Diesel" and "Crossover, Flex Fuel" under a broader category called "Crossover - Fuel Type" or "Crossover - Diesel/Flex Fuel." Similarly, you can consolidate other market categories based on similarities.
- Crossover-Fuel type has the most Car Models and is very popular.
- Factory Tuner, Performance' and 'Exotic-Performance' are the Market Categories which needs Improvement.



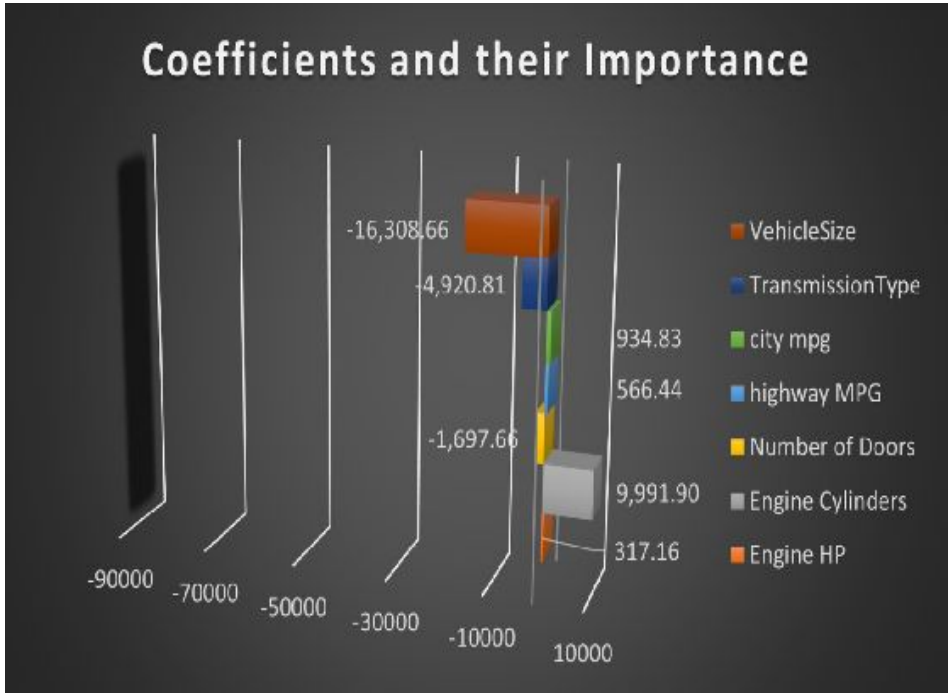
Task B : What is the relationship between a car's engine power and its price?

- By visualizing the data points on the scatter chart, we can observe the overall pattern or trend between engine power and price.
- The trendline is providing the insight that there is a positive correlation between engine power and price and the degree to which they are related.
- The equation y = 365.29x - 50551 suggests a positive linear relationship between engine horsepower (x) and car price (y). The R^2 value of 0.4383 indicates that approximately 43.83% of the variability in price can be explained by engine horsepower.
- The correlation coefficient of 0.66 suggests a moderate positive relationship between engine horsepower and car price. As engine horsepower increases, there is a tendency for the car price to increase as well.



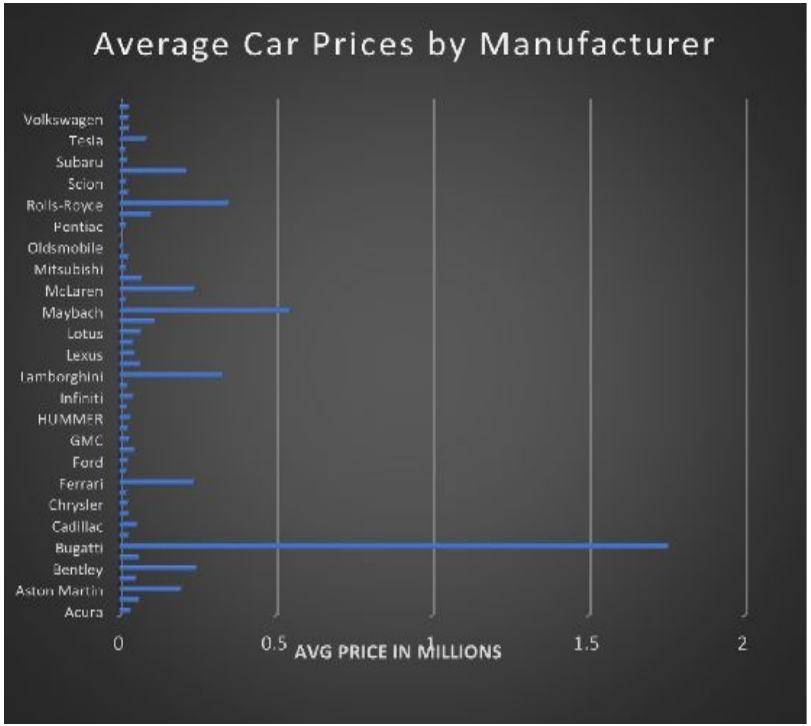
Task C : Which car features are most important in determining a car's price?

- Regression analysis allows us to analyze the relationship between the dependent variable (car price) and multiple independent variables (car features). By analyzing the coefficient values obtained from the regression analysis, we can assess the impact of each variable on the car's price.
- For Vehicle Style and Transmission Type, Rank System is used, The more the importance, lesser is the Rank.
- Regression analysis was conducted to determine the car features that have the strongest influence on the price. The analysis revealed that variables such as Engine HP and Engine Cylinders positively impact the price, while variables like Number of Doors, highway MPG, city mpg, Transmission Type, and Vehicle Size have a negative impact.



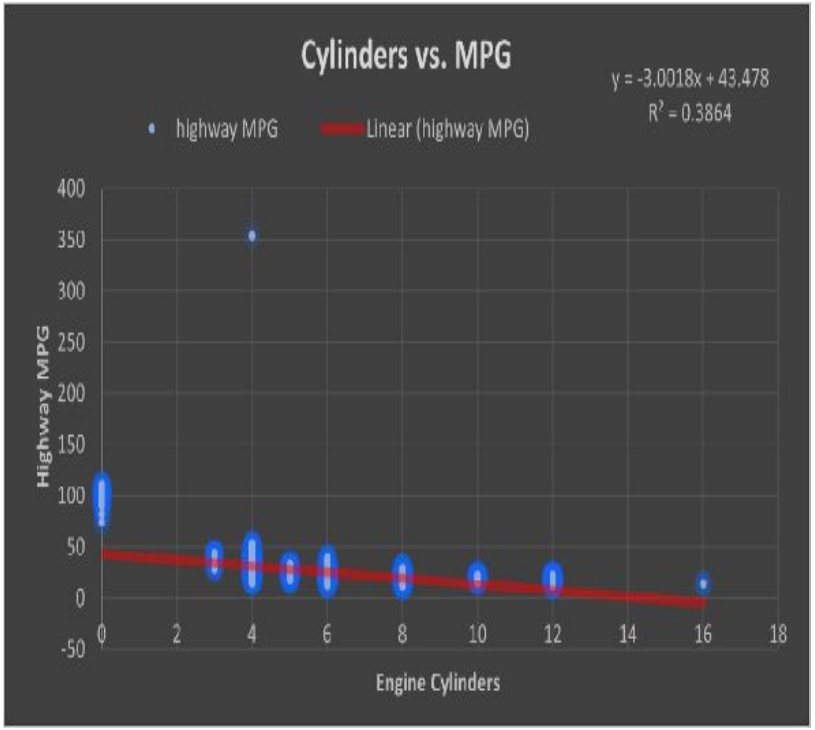
Task D : How does the average price of a car vary across different manufacturers?

- In Task 4.A, a pivot table was created to calculate the average price of cars for each manufacturer. The pivot table aggregates the data and summarizes the average price based on the manufacturer. This provides a comprehensive overview of the average price range associated with each manufacturer.
- In Task 4.B, a bar chart or a horizontal stacked bar chart was generated to visually represent the relationship between the manufacturer and the average price. The bar chart allows for easy comparison between different manufacturers, showcasing the variations in average prices across the industry
- The results revealed a wide range of average prices, with luxury brands like Aston Martin and Bugatti commanding higher prices compared to mainstream brands like Honda and Toyota. Visualizing the relationship between manufacturer and average price through a bar chart provided a clear representation of the price distribution.



Task E : How does the average price of a car vary across different manufacturers?

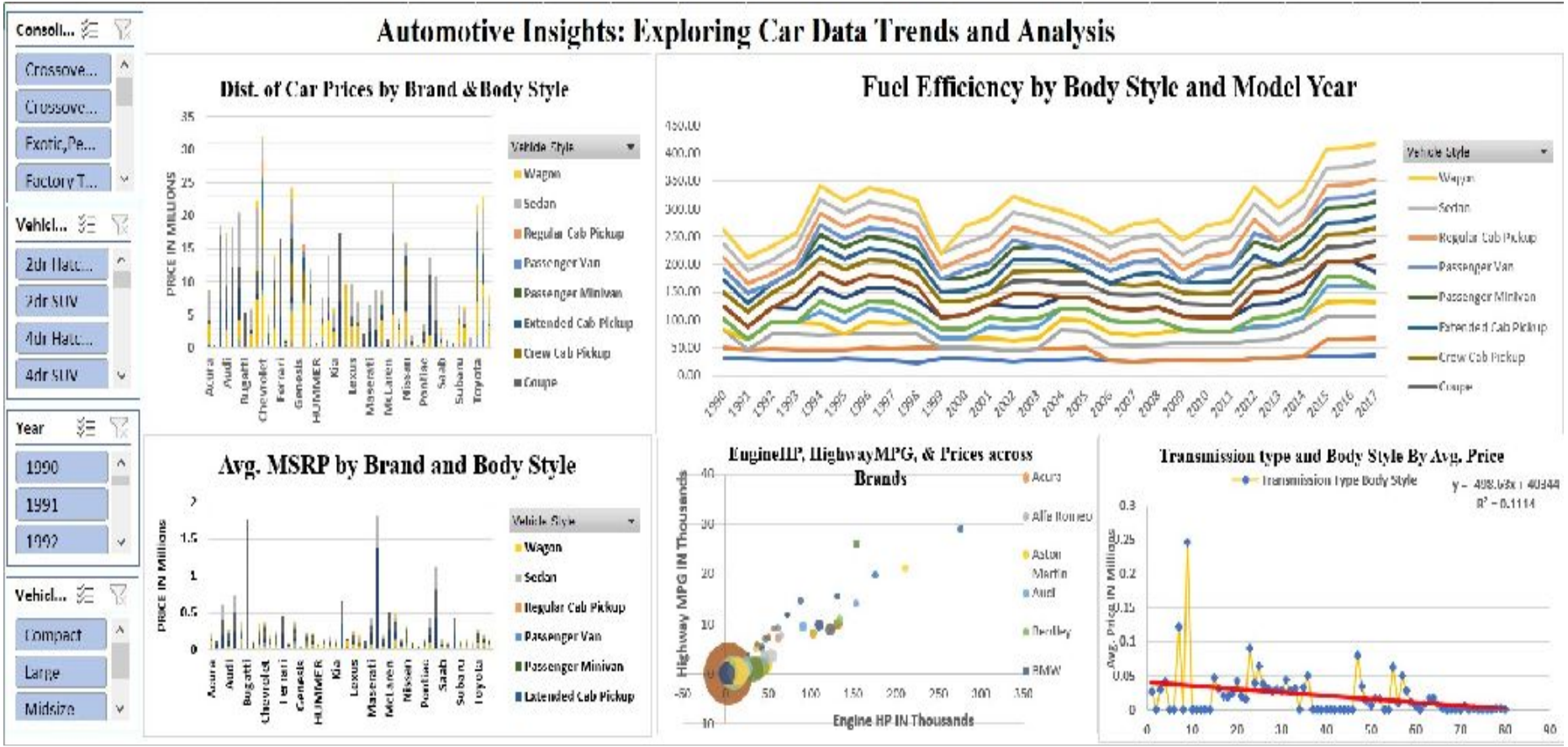
- In Task 5.A, a scatter plot was created with the number of cylinders on the x-axis and highway MPG on the y-axis. there is a negative relationship between the number of cylinders in a car's engine and its fuel efficiency, as represented by highway MPG. As the number of cylinders decreases, the car tends to have lower fuel efficiency. This insight can be valuable for car manufacturers, buyers, and policymakers in understanding the impact of engine configuration on fuel consumption and making informed decisions related to vehicle efficiency and environmental considerations.
- In Task 5.B,the correlation coefficient was calculated to quantify the strength and direction of the relationship between the number of cylinders and highway MPG. The correlation coefficient measures the degree of linear association between two variables. In this case, the correlation coefficient was found to be -0.62. The negative value indicates an inverse relationship.



Dashboard Creation

1. How does the distribution of car prices vary by brand and body style?
2. Which car brands have the highest and lowest average MSRPs, and how does this vary by body style?
3. How do the different feature such as transmission type affect the MSRP, and how does this vary by body style?
4. How does the fuel efficiency of cars vary across different body styles and model years?
5. How does the car's horsepower, MPG, and price vary across different Brands?

Automotive Insights: Exploring Car Data Trends and Analysis



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