Impact of Car Features🚙

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Project Description

The purpose of this project is to analyze the impact of car features on price and profitability in the automotive industry. By examining a dataset containing information on various car models and their specifications, I aim to provide insights that can help car manufacturers optimize their pricing and product development decisions to maximize profitability while meeting consumer demand.

The dataset includes variables such as car make, model, year, fuel type, engine power, transmission, wheels, number of doors, market category, size, style, estimated miles per gallon, popularity, and manufacturer's suggested retail price (MSRP). By analyzing this dataset, I can gain insights into trends, relationships, and patterns that can inform decision-making.

Approach

To address the business problem, I will employ various data analysis techniques in Excel, including descriptive statistics, visualization, and regression analysis. I will clean and preprocess the dataset to ensure accurate and reliable results. Our analytical methods will include pivot tables, combo charts, scatter charts with trendlines, regression analysis, bar charts, stacked bar charts, correlation analysis, and line charts. These techniques will help to explore the relationships between car features, market categories, popularity, engine power, price, fuel efficiency, and manufacturers.

Tech-Stack Used

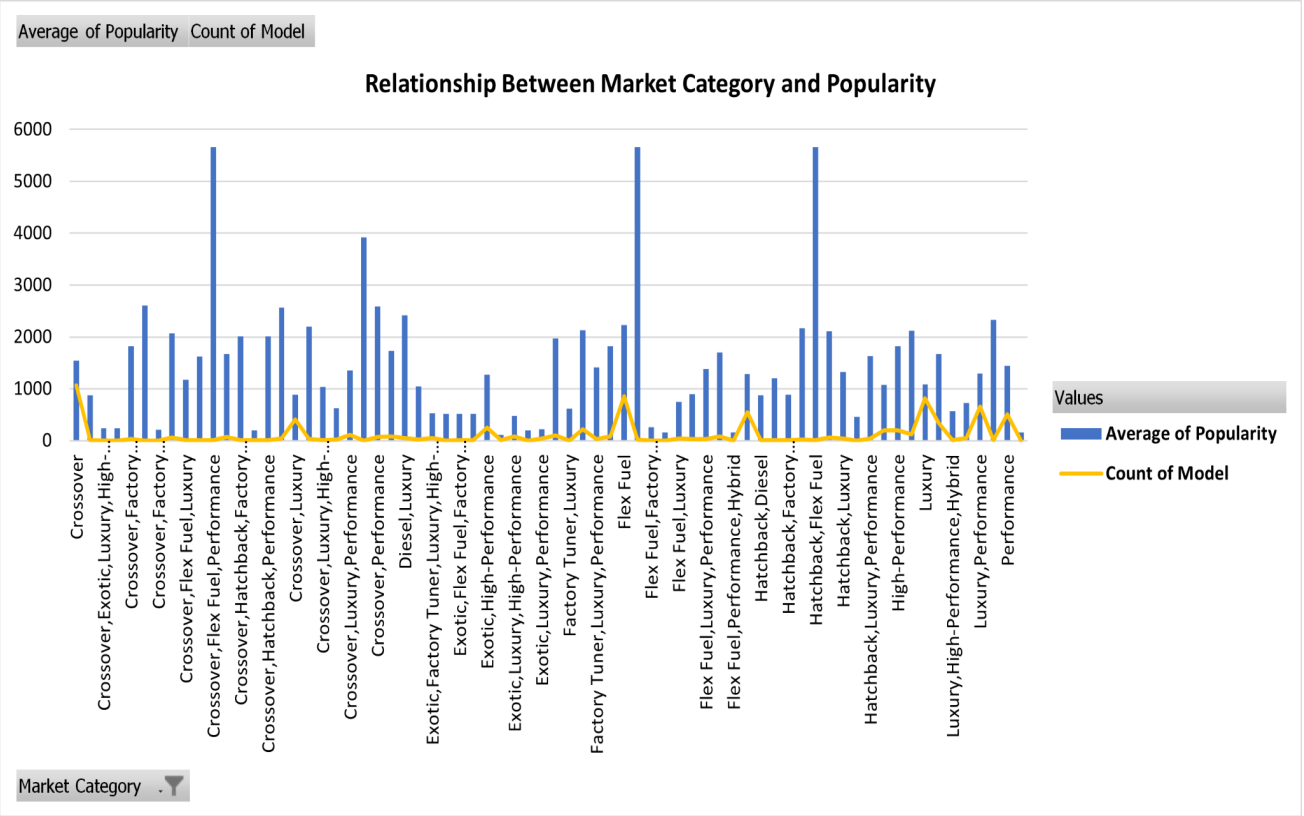
In this project, I will utilize Excel as our primary tool for data analysis and visualization. Microsoft Excel (2021) offers powerful functionalities such as pivot tables, charts, and regression analysis, making it suitable for exploring and analyzing the given dataset. I may also use additional Excel features such as filters and slicers to create an interactive dashboard. A choice of Excel is driven by its wide-spread availability, ease of use, and suitability for the given tasks.

Insights📈

Tasks: Analysis🔎

Insight Required: How does the popularity of a car model vary across different market categories?

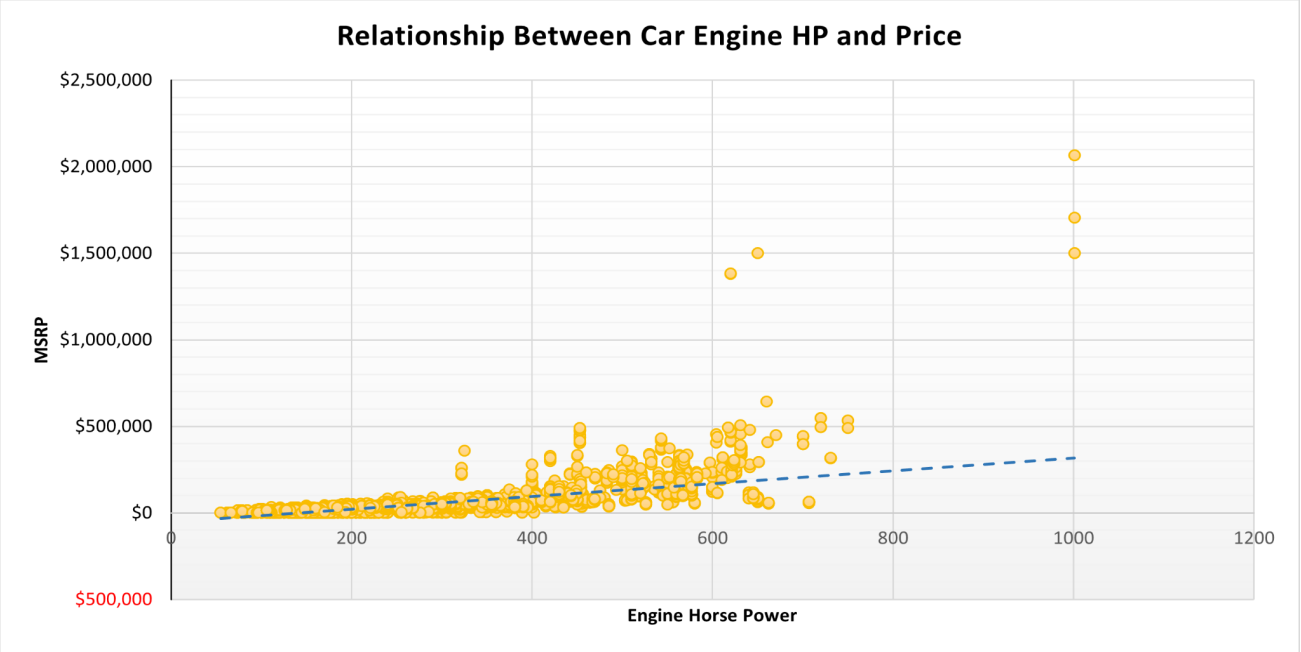
- **Task 1. A:** Create a pivot table that shows the number of car models in each market category and their corresponding popularity scores.
- **Task 1. B:** Create a combo chart that visualizes the relationship between market category and popularity.



Insight:- Crossover, flex fuel, diesel, hatchback, and performance are the most popular market categories for car models.

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

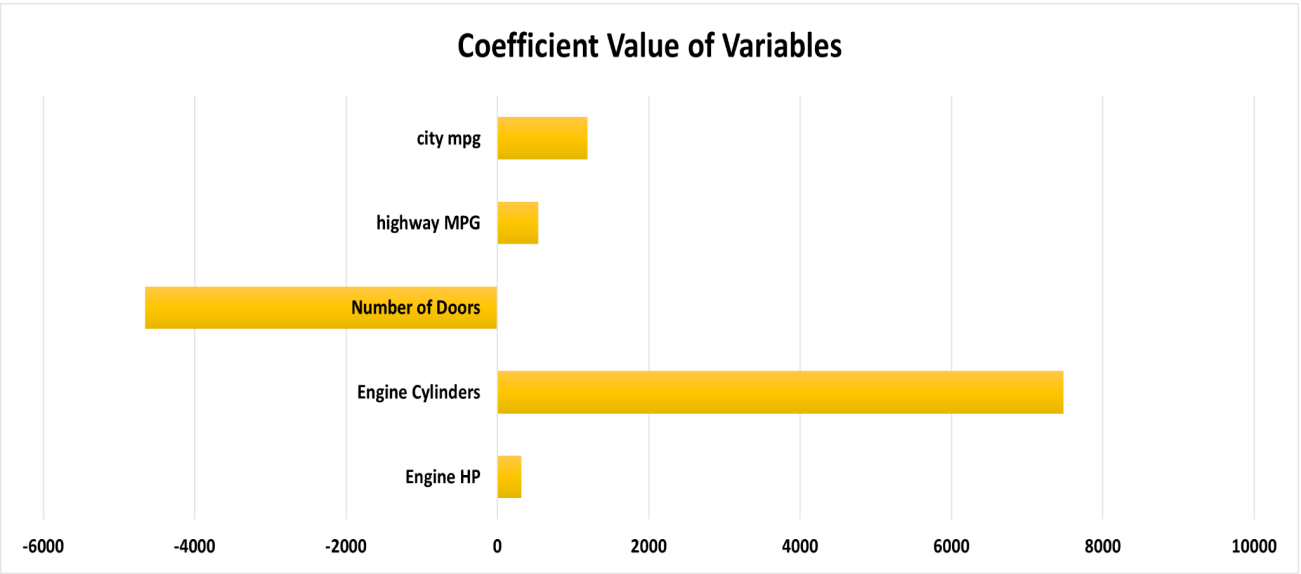
- **Task 2:** Create a scatter chart that plots engine power on the x-axis and price on the y-axis. Add a trendline to the chart to visualize the relationship between these variables.



Insight:- If the power of the engine increases then the price will also increase. So, We can have a positive relationship between both of them.

Insight Required: Which car features are most important in determining a car's price?

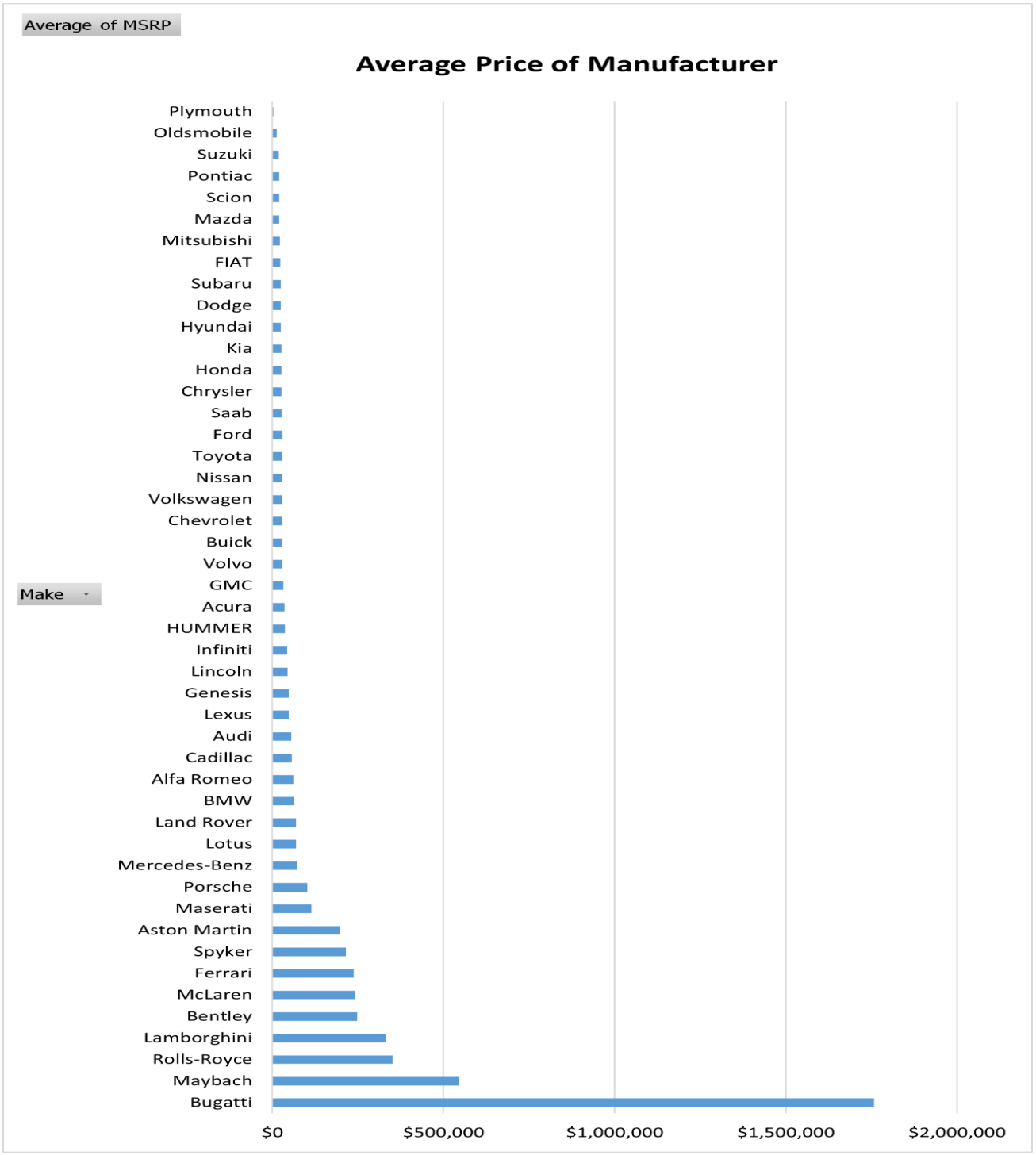
- **Task 3:** Use regression analysis to identify the variables that have the strongest relationship with a car's price. Then create a bar chart that shows the coefficient values for each variable to visualize their relative importance.



Insight:- Engine cylinders are one of the most important features that determine the price of a car.

Insight Required: How does the average price of a car vary across different manufacturers?

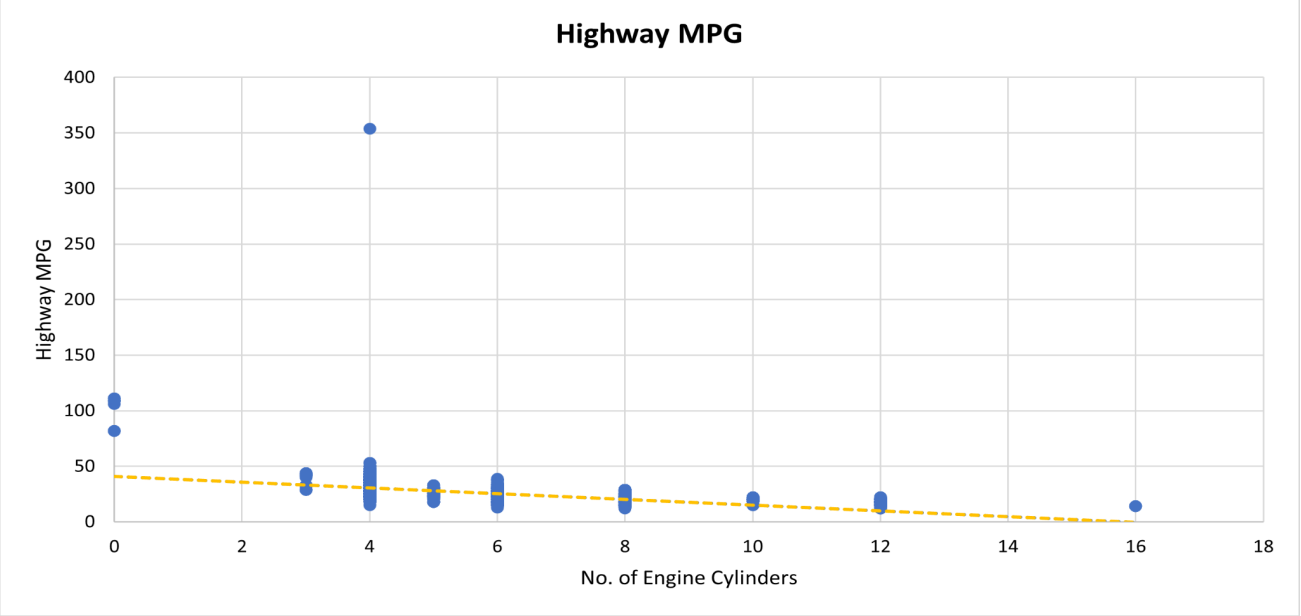
- **Task 4. A:** Create a pivot table that shows the average price of cars for each manufacturer.
- **Task 4. B:** Create a bar chart or a horizontal stacked bar chart that visualizes the relationship between the manufacturer and the average price.



Insight:- The Bugatti has the highest average price and the Plymouth has the lowest average price.

Insight Required: What is the relationship between fuel efficiency and the number of cylinders in a car's engine?

- **Task 5. A:** Create a scatter plot with the number of cylinders on the x-axis and highway MPG on the y-axis. Then create a trendline on the scatter plot to visually estimate the slope of the relationship and assess its significance.
- **Task 5. B:** Calculate the correlation coefficient between the number of cylinders and highway MPG to quantify the strength and direction of the relationship.



Insight:- As we can see here if the number of cylinders increases then the highway mpg will decrease. So, We can say that there is a negative relationship between both of them.

Note:- Here is the correlation coefficient between the number of cylinders and highway MPG the value is -0.614703148

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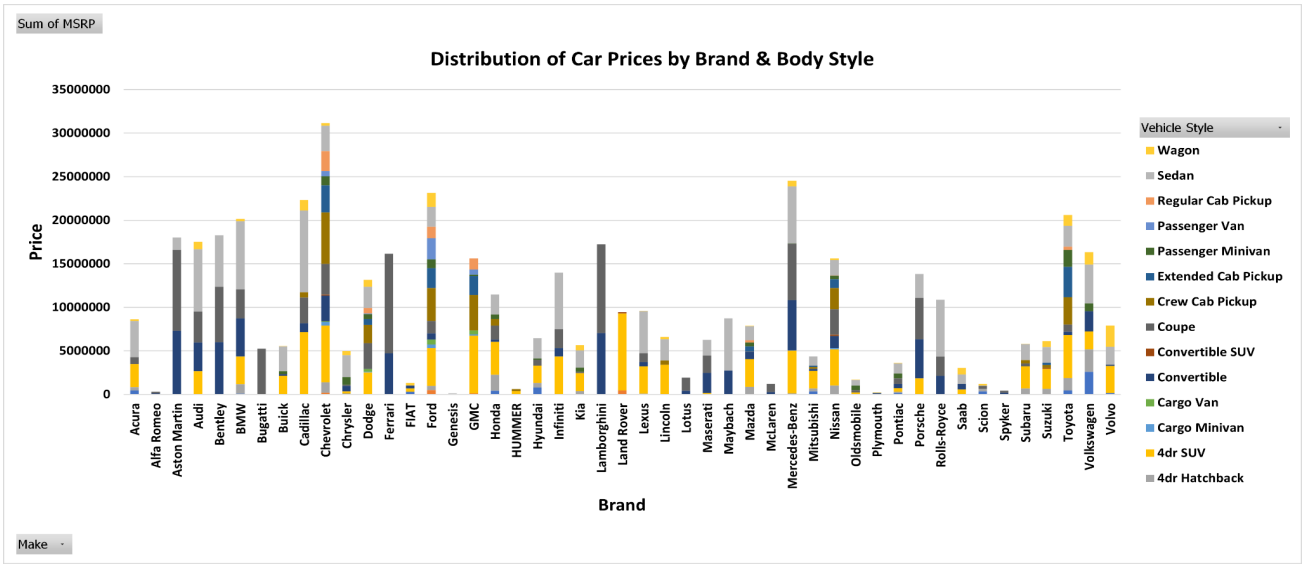
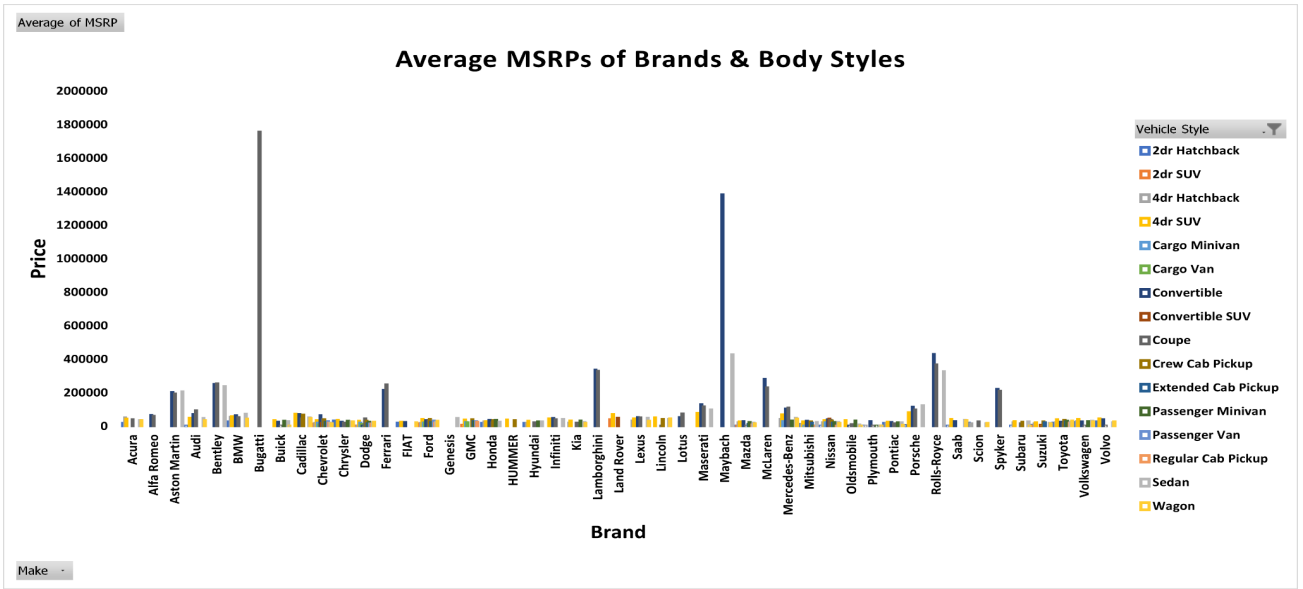
Tasks: Building the Dashboard 📊

Task 1: How does the distribution of car prices vary by brand and body style?



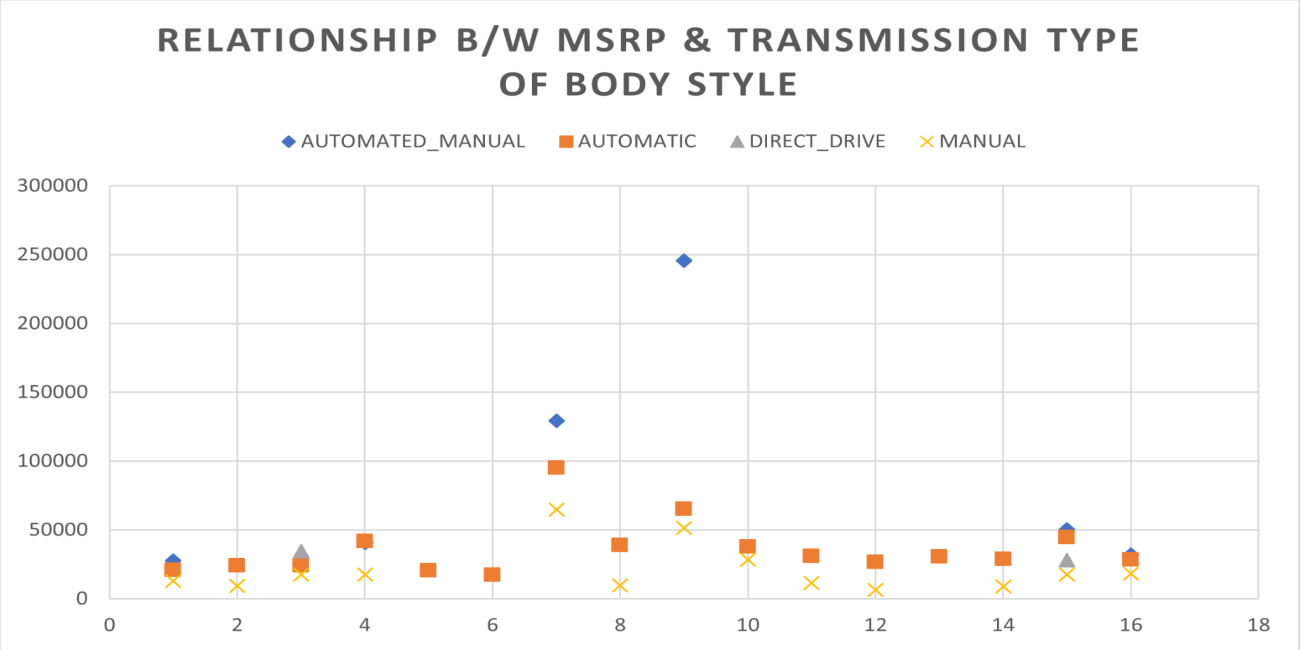
Insight:- Chevrolet has the highest price distribution by body style.

Task 2: Which car brands have the highest and lowest average MSRPs, and how does this vary by body style?



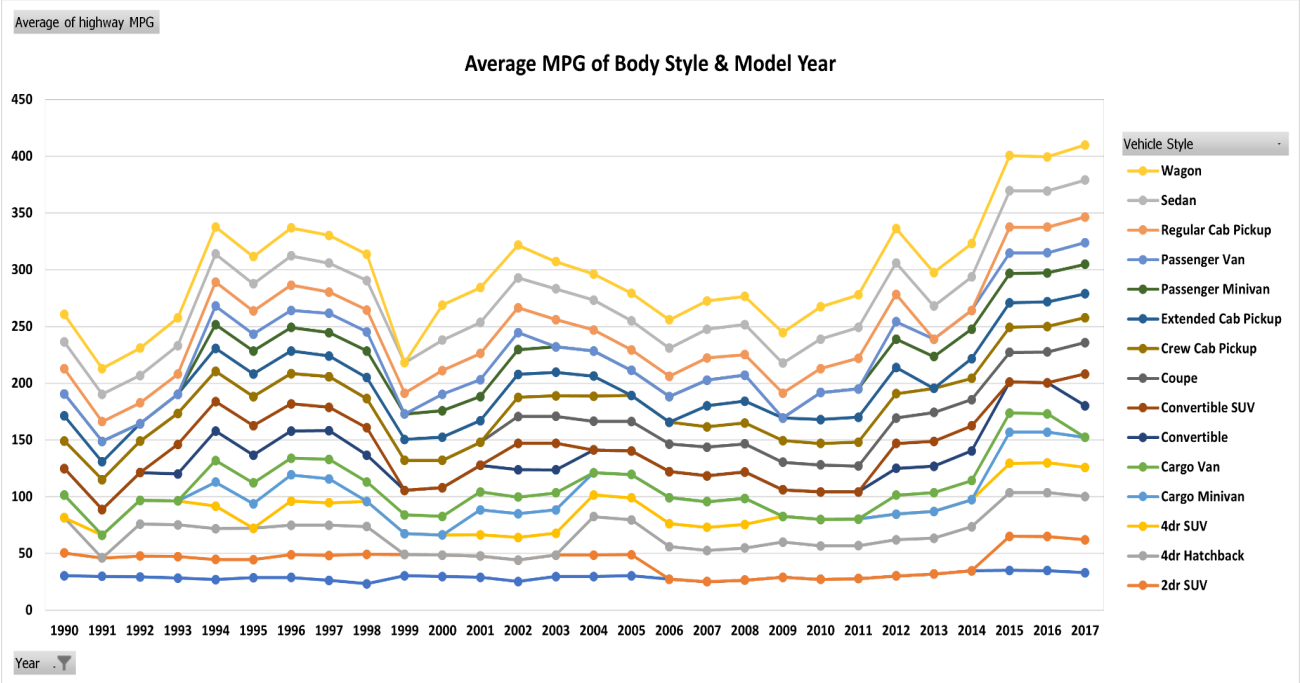
Insight:- Bugatti has the highest average MSRP and Plymouth has the lowest average MSRP.

Task 3: How do the different features such as transmission type affect the MSRP, and how does this vary by body style?

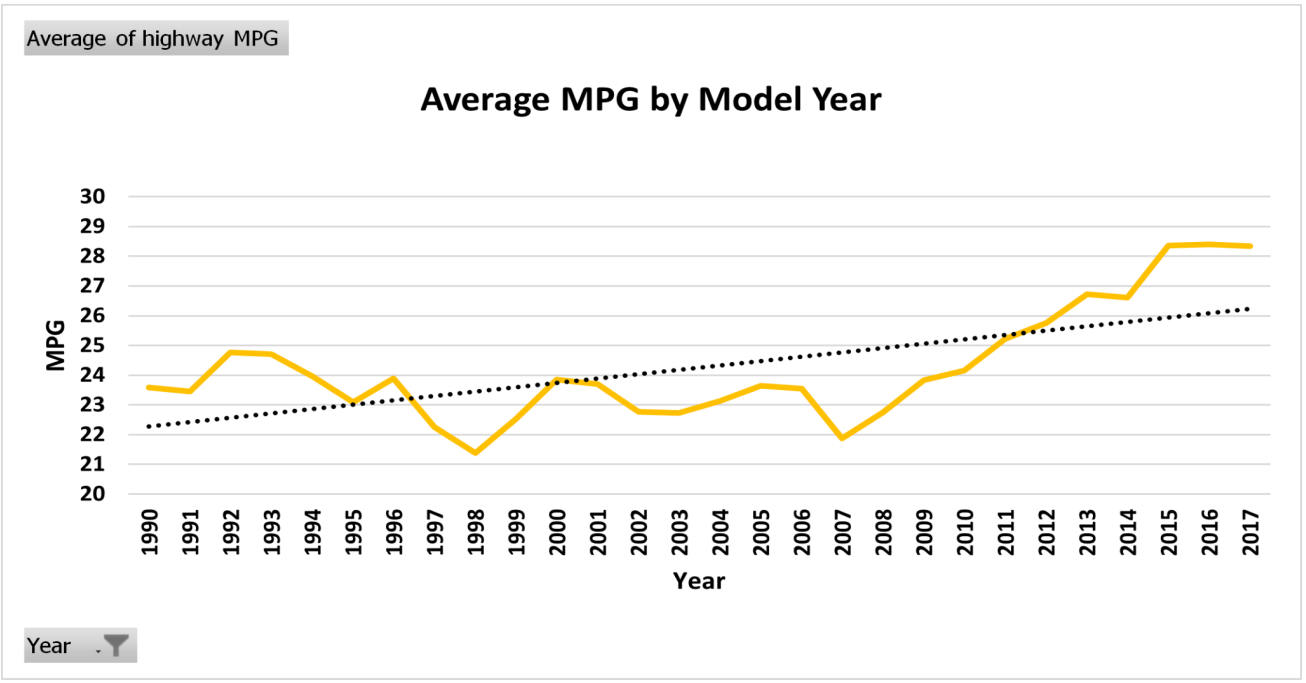


Insight:- The automated manual is the most expensive transmission. And the automatic is a popular transmission.

Task 4: How does the fuel efficiency of cars vary across different body styles and model years?

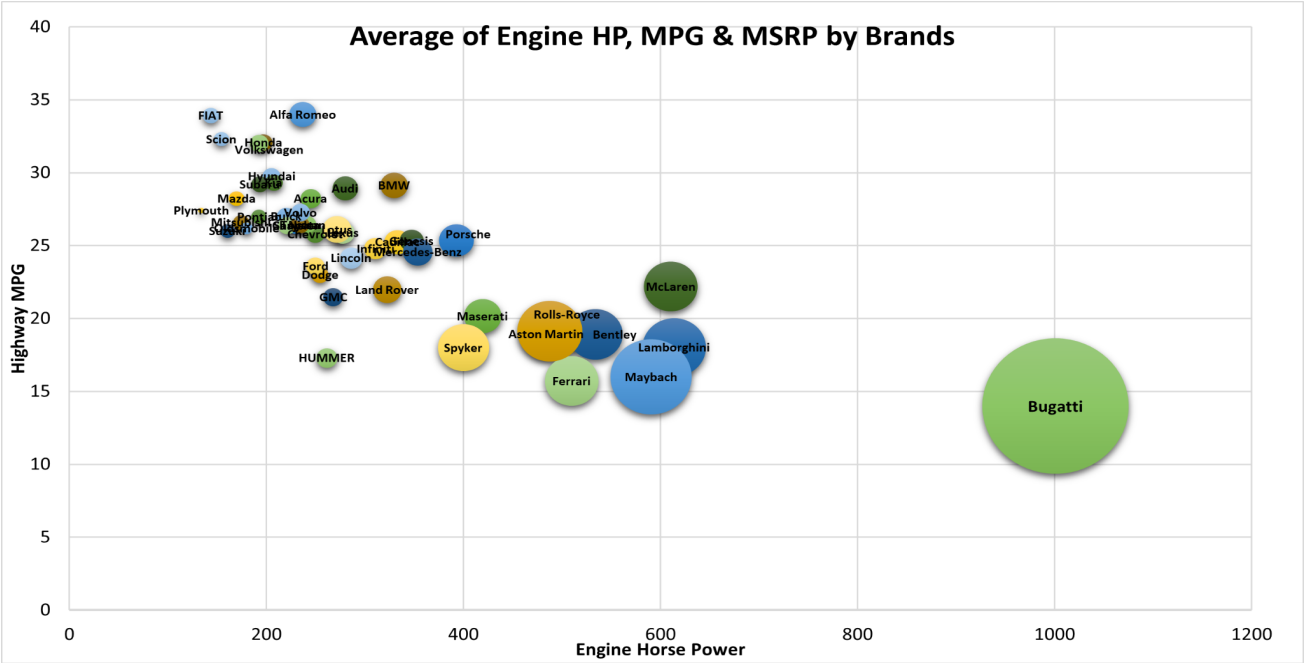


Insight:- The fuel efficiency of cars increased across different body styles.



Insight:- Overall fuel efficiency increased regularly after 2007 at a slower rate year-on-year.

Task 5: How do the car's horsepower, MPG, and price vary across different Brands?



Insight:- If engine horsepower goes up then highway mpg will go down and the price also will go up.

📌**Click here to view My Dashboard File.**🚀

Results

The interactive dashboard created in Excel allows stakeholders to explore various aspects of the dataset. They can visualize the distribution of car prices by brand and body style, compare average MSRPs across different brands and body styles, analyze the impact of transmission type on MSRP by body style, observe the trend of fuel efficiency across different body styles and model years, and understand the relationships between horsepower, MPG, and price across different car brands.

The insights gained from the analysis provide valuable information for car manufacturers to make informed decisions regarding pricing, product development, marketing, and competitiveness in the market. By optimizing these factors, manufacturers can maximize profitability while meeting consumer demand.

Thank you

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