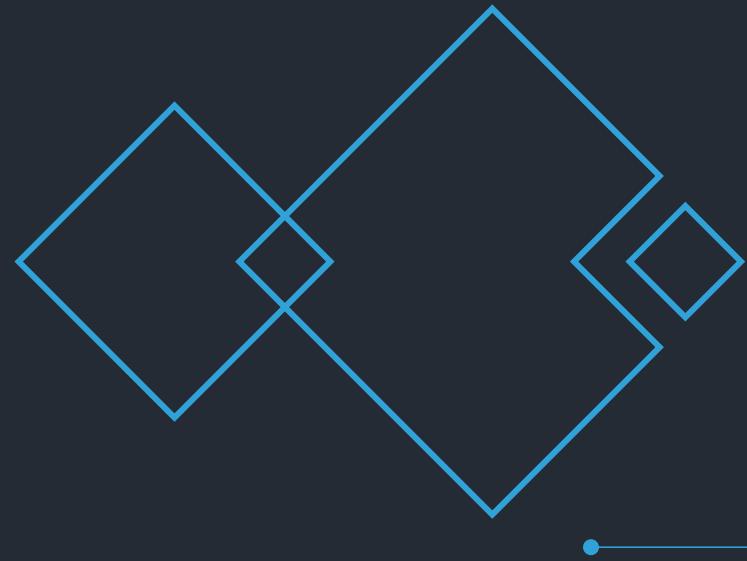
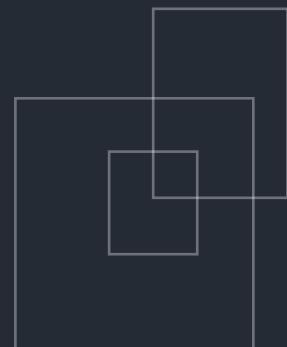


Project 7



Analysing Impact of Car features on Price and Profitability

Submitted By
Swathy Mugundan



Problem Statement



- The automotive industry has been rapidly evolving over the past few decades, with a growing focus on fuel efficiency, environmental sustainability, and technological innovation. With increasing competition among manufacturers and a changing consumer landscape, it has become more important than ever to understand the factors that drive consumer demand for cars. In recent years, there has been a growing trend towards electric and hybrid vehicles and increased interest in alternative fuel sources such as hydrogen and natural gas. At the same time, traditional gasoline-powered cars remain dominant in the market, with varying fuel types and grades available to consumers.
- For the given dataset, as a Data Analyst, observe how can a car manufacturer optimize pricing and product development decisions to maximize profitability while meeting consumer demand.

Understanding Dataset

- Make: the make or brand of the car
- Model: the specific model of the car
- Year: the year the car was released
- Engine Fuel Type: the type of fuel used by the car (gasoline, diesel, etc.)
- Engine HP: the horsepower of the car's engine
- Engine Cylinders: the number of cylinders in the car's engine
- Transmission Type: the type of transmission (automatic or manual)
- Driven_Wheels: the type of wheels driven by the car (front, rear, all)
- Number of Doors: the number of doors the car has
- Market Category: the market category the car belongs to (Luxury, Performance, etc.)
- Vehicle Size: the size of the car
- Vehicle Style: the style of the car (Sedan, Coupe, etc.)
- Highway MPG: the estimated miles per gallon the car gets on the highway
- City MPG: the estimated miles per gallon the car gets in the city
- Popularity: a ranking of the popularity of the car
- MSRP: the manufacturer's suggested retail price of the car

Car_data.csv
16 fields 11914 rows

Name
Car_data.csv

Fields

| Type | Field Name | Physical Table | Remote Fi... |
|------|-------------------|----------------|-----------------|
| Abc | Make | Car_data.csv | Make |
| Abc | Model | Car_data.csv | Model |
| # | Year | Car_data.csv | Year |
| Abc | Engine Fuel Type | Car_data.csv | Engine Fuel ... |
| # | Engine HP | Car_data.csv | Engine HP |
| # | Engine Cylinders | Car_data.csv | Engine Cyli... |
| Abc | Transmission Type | Car_data.csv | Transmissi... |
| Abc | Driven Wheels | Car_data.csv | Driven_Wh... |
| # | Number of Doors | Car_data.csv | Number of ... |

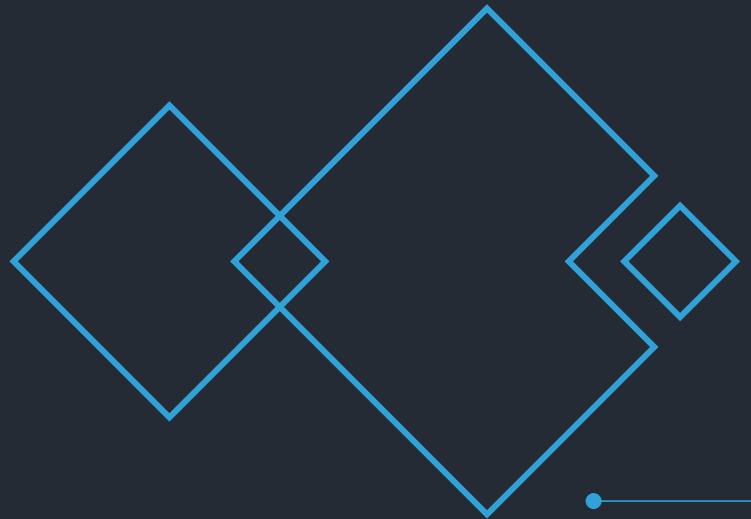
100 → rows

| Abc Car_data.csv Make | Abc Car_data.csv Model | # Car_data.csv Year | Abc Car_data.csv Engine Fuel Type | # Car_data.csv Engine HP | # Car_data.csv Engine Cylinders | ... |
|-----------------------------|------------------------------|---------------------------|---|--------------------------------|---------------------------------------|-----|
| BMW | 1 Series M | 2011 | premium unleaded (required) | 335 | | 6 |
| BMW | 1 Series | 2011 | premium unleaded (required) | 300 | | 6 |
| BMW | 1 Series | 2011 | premium unleaded (required) | 300 | | 6 |
| BMW | 1 Series | 2011 | premium unleaded (required) | 230 | | 6 |
| BMW | 1 Series | 2011 | premium unleaded (required) | 230 | | 6 |
| BMW | 1 Series | 2012 | premium unleaded (required) | 230 | | 6 |
| BMW | 1 Series | 2012 | premium unleaded (required) | 300 | | 6 |
| BMW | 1 Series | 2012 | premium unleaded (required) | 300 | | 6 |
| BMW | 1 Series | 2012 | premium unleaded (required) | 230 | | 6 |
| BMW | 1 Series | 2013 | premium unleaded (required) | 230 | | 6 |
| BMW | 1 Series | 2013 | premium unleaded (required) | 300 | | 6 |
| BMW | 1 Series | 2013 | premium unleaded (required) | 230 | | 6 |
| BMW | 1 Series | 2013 | premium unleaded (required) | 300 | | 6 |
| BMW | 1 Series | 2013 | premium unleaded (required) | 230 | | 6 |
| RMW | 1 Series | 2013 | premium unleaded (required) | 300 | | 6 |

Project : Tech Stack Used

- Tableau is a leading data visualization tool used for data analysis and business intelligence.
- Gartner's Magic Quadrant classified Tableau as a leader for analytics and business intelligence.
- Tableau supports powerful data discovery and exploration that enables users to answer important questions in seconds
- No prior programming knowledge is needed.
- It can connect to several data sources that other BI tools do not support.
- Tableau enables users to create reports by joining and blending different datasets
- Tableau Server supports a centralized location to manage all published data sources within an organization





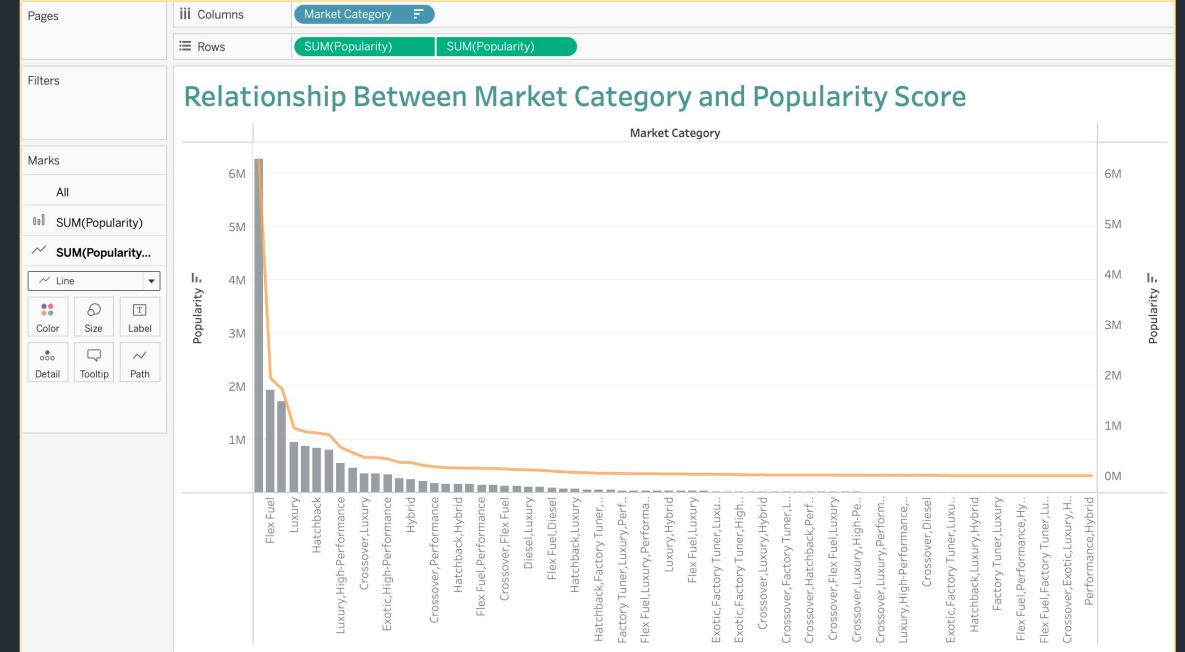
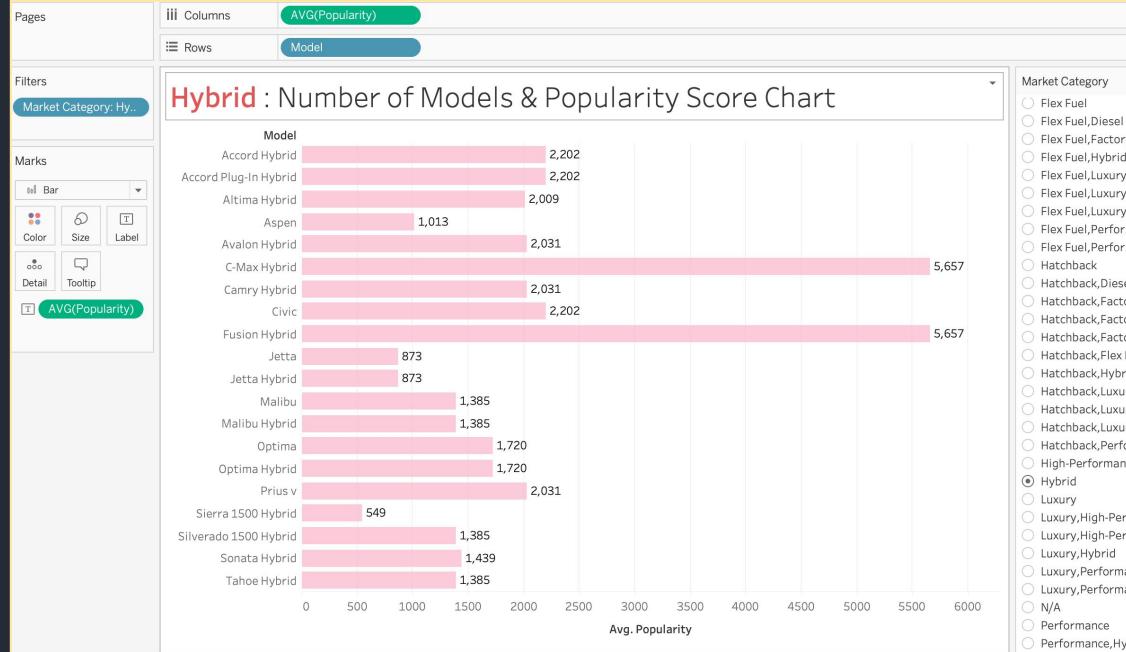
Business Analytics Tasks

As a data analyst, to provide valuable insights to a car manufacturer and help them optimize their pricing and product development decisions to maximize profitability while meeting consumer demand using techniques such as regression analysis, pivot tables, sensitivity analysis, optimization, and time series analysis.

Task 1 : Popularity of Car Models over Categories

- **Insight Required :** To understand how popularity of a car model vary across different market categories.
- **Approach :**
 - To create chart that shows the number of car models in each market category and their corresponding popularity scores.
 - To create a combo chart that visualizes the relationship between market category and popularity.
- **Tableau Link :** https://public.tableau.com/views/Project_7_16973847952860/Dashboard3?:language=en-GB&:display_count=n&:origin=viz_share_link
- **Sheet Name :** Task 1A, Task 1B

Task 1 : Popularity of Car Models over Categories



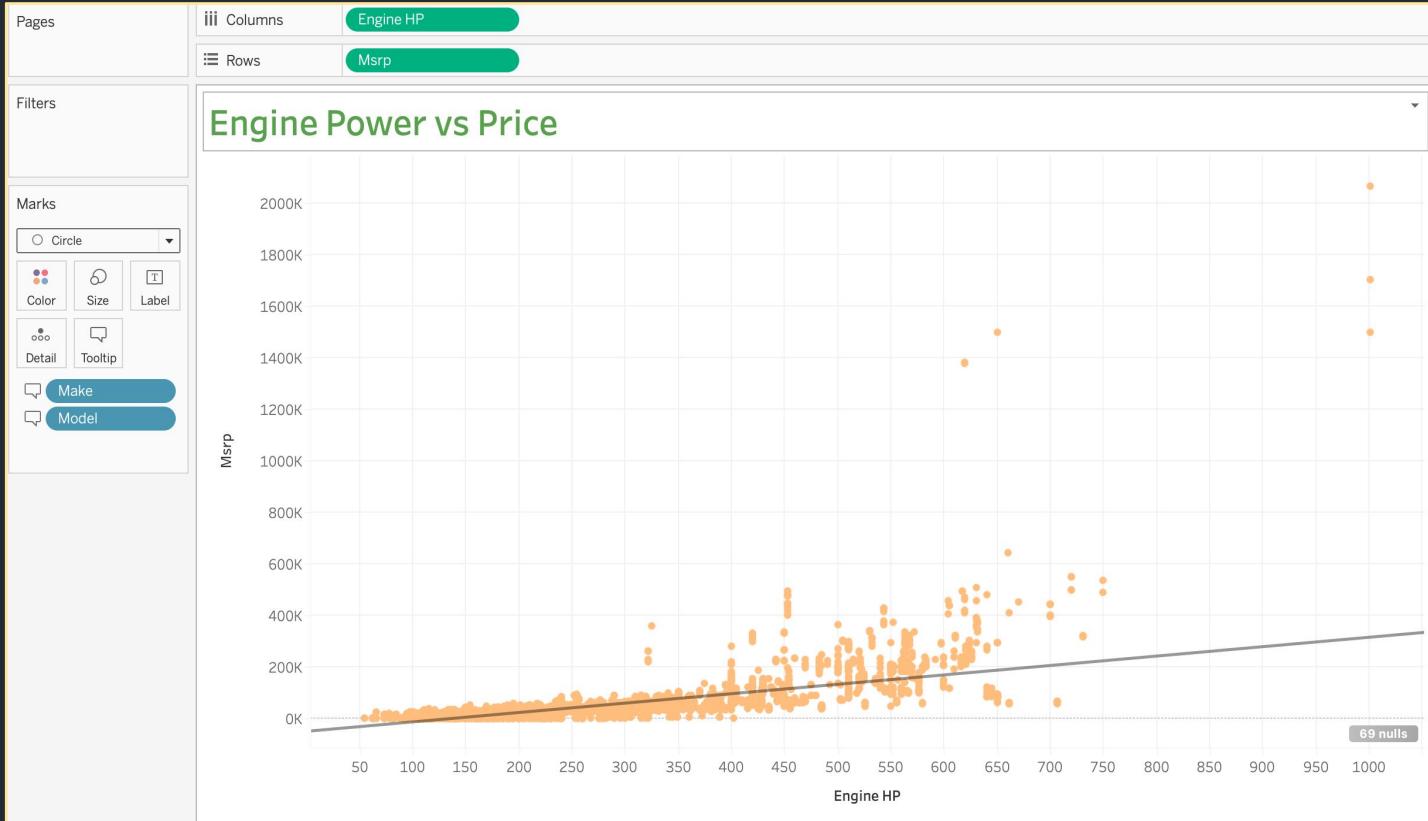
Bar charts and Combo Charts are created for Market Category, Car Model and Popularity Score.

Filters are used for Market Category. Dual Axis concept was used for combo chart.

Task 2 : Relationship between Price and Engine Power

- **Insight Required :** To understand the relationship between a car's engine power and its price.
- **Approach:**
 - To 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.
- **Tableau Link :** https://public.tableau.com/views/Project_7_16973847952860/Dashboard3?:language=en-GB&display_count=n&origin=viz_share_link
- **Sheet Name :** Task 2

Task 2 : Relationship between Price and Engine Power

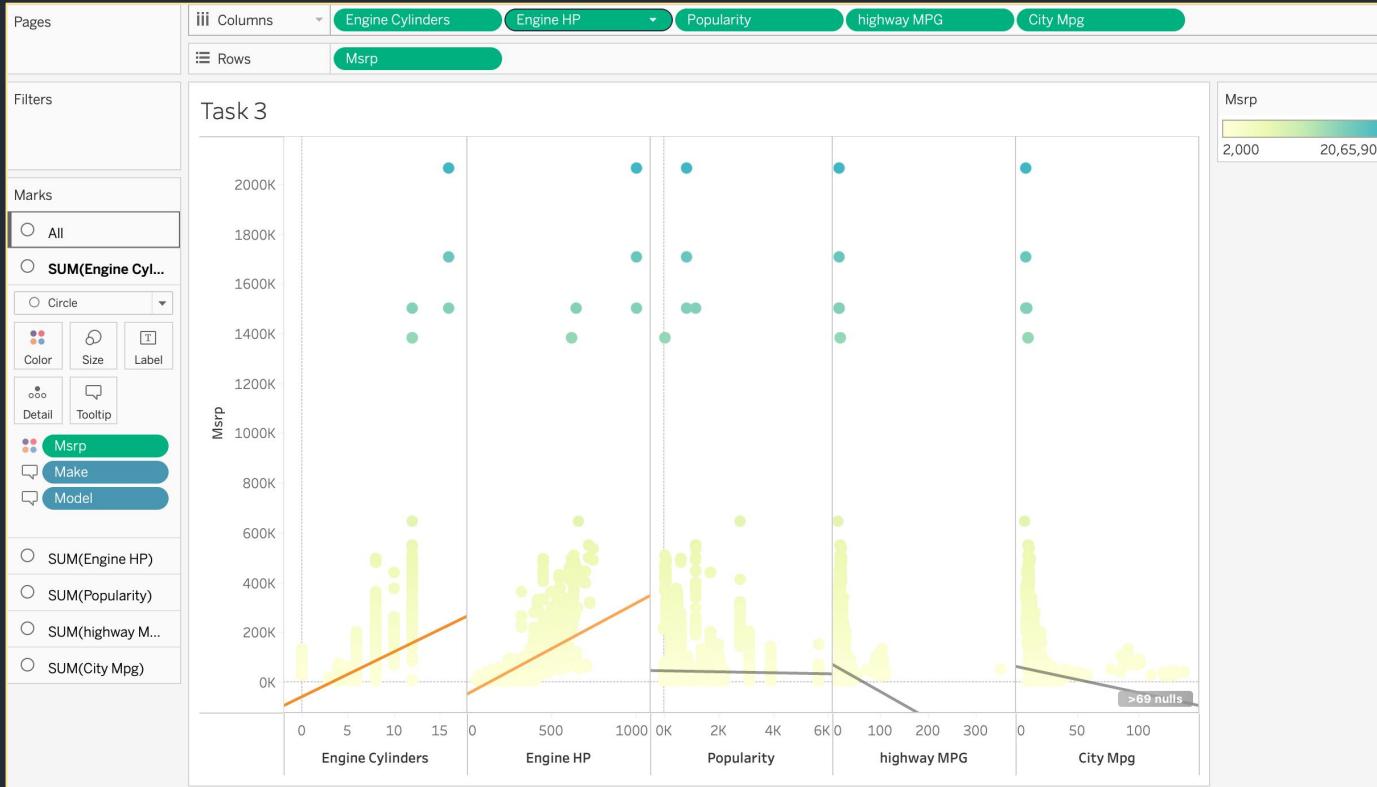


As observed in the trend line, there is a positive correlation existing between the car price and engine power. As the engine power of vehicle increases, the car price also increases. Hence, they both are directly correlated.

Task 3 : Regression Analysis on Various Attributes

- **Insight Required :** To understand which car features are most important in determining a car's price.
- **Approach:**
 - To 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.
- **Tableau Link :** https://public.tableau.com/views/Project_7_16973847952860/Dashboard3?:language=en-GB&:display_count=n&:origin=viz_share_link
- **Sheet Name :** Task 3

Task 3 : Regression Analysis on Various Attributes



As observed in the trend line, there is a positive correlation existing between the car price with Engine HP and Cylinders.

Hence, they are **directly correlated**.

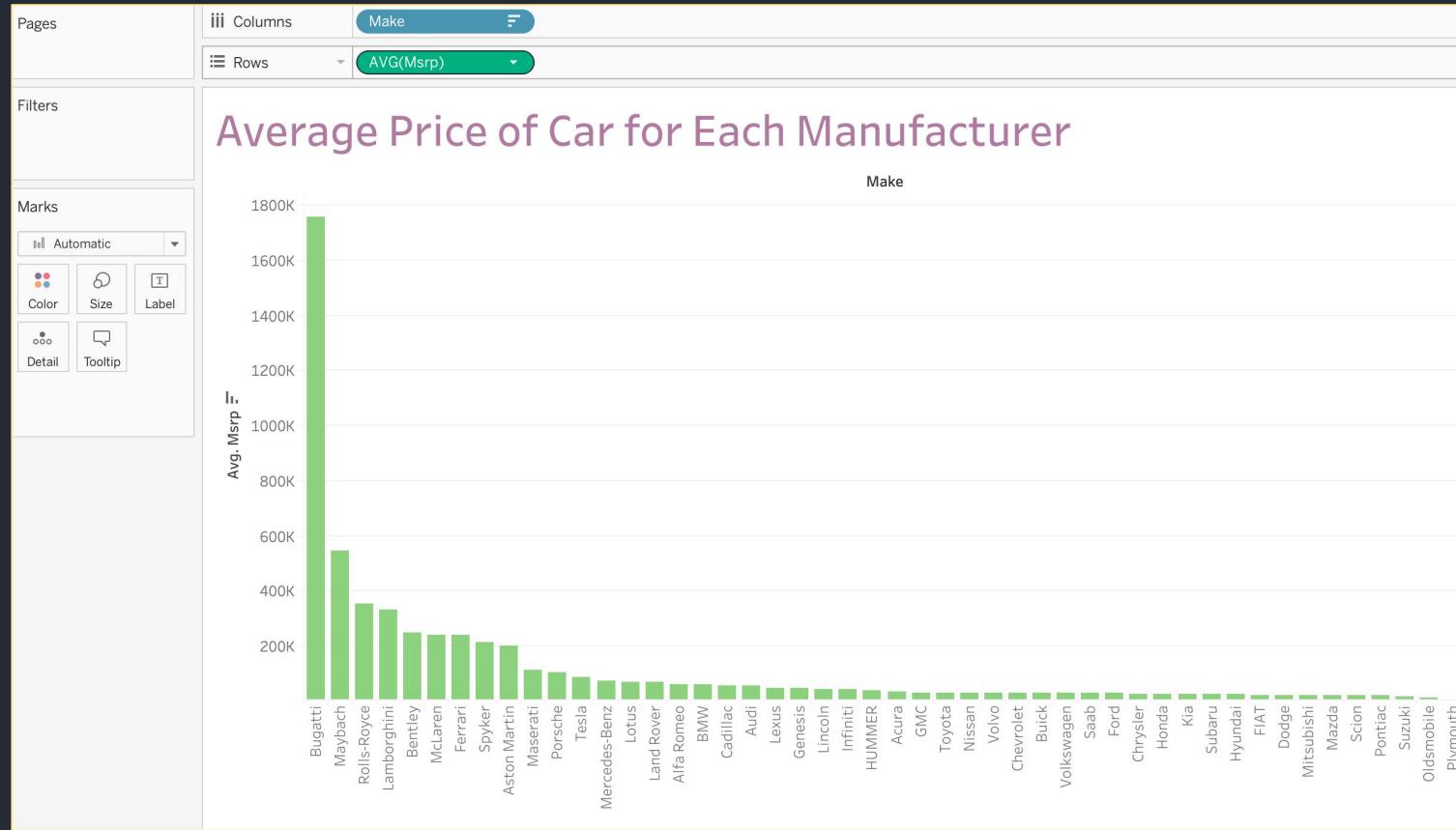
As the trendline is downline with Highway and City MPG - they are **Negatively correlated** with price.

There doesn't exist any correlation between price and popularity. Hence, they are **not correlated**.

Task 4 : Average Price of Car for Various Manufacturers

- **Insight Required :** To understand how the average price of a car vary across different manufacturers.
- **Approach:**
 - To create a chart that shows the average price of cars for each manufacturer.
 - To visualizes the relationship between car manufacturer and average price.
- **Tableau Link :** https://public.tableau.com/views/Project_7_16973847952860/Dashboard3?:language=en-GB&:display_count=n&:origin=viz_share_link
- **Sheet Name :** Task 4

Task 4 : Average Price of Car for Various Manufacturers

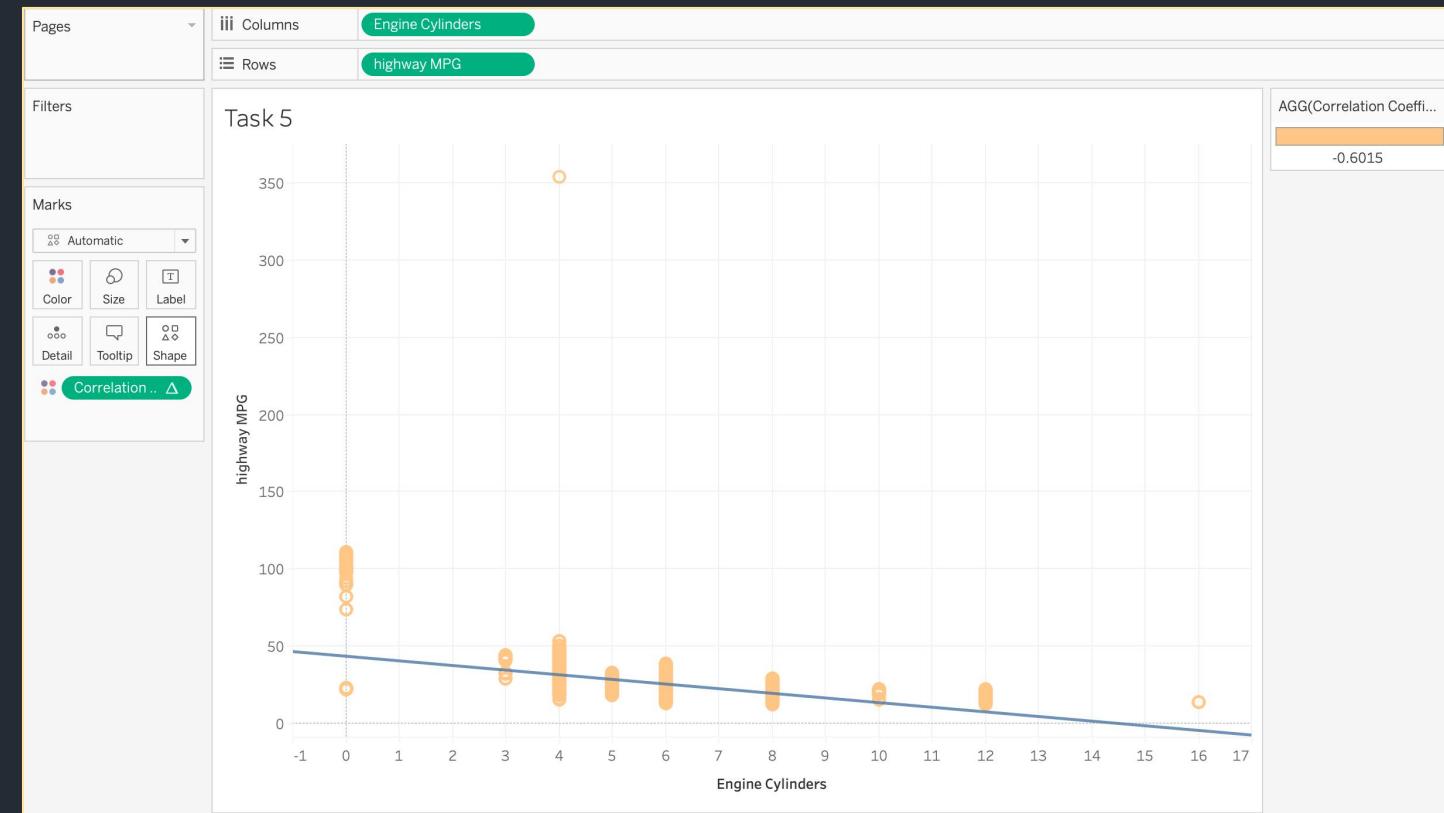
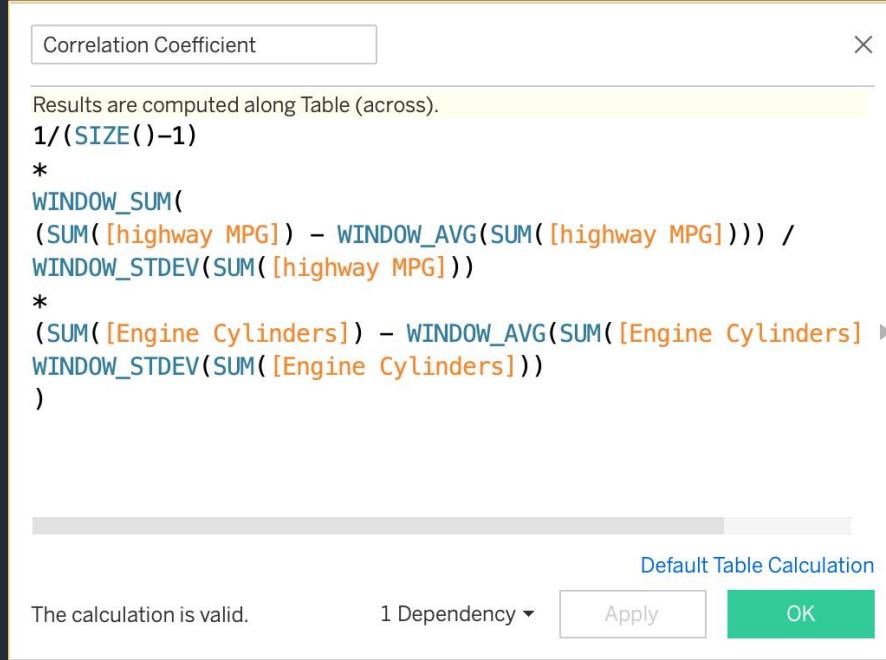


As observed in the bar chart, we can see that Bugatti has higher average price than other manufacturers.

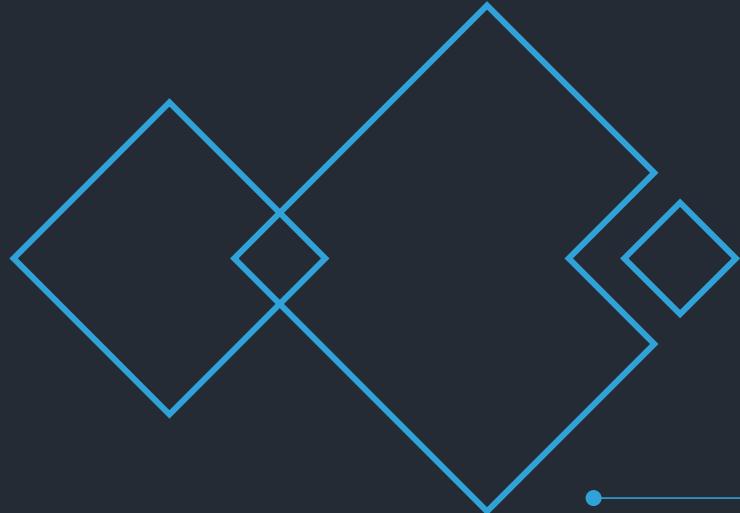
Task 5 : Relationship between Fuel Efficiency and No. of Cylinders

- **Insight Required :** To understand relationship between fuel efficiency and the number of cylinders in a car's engine.
- **Approach:**
 - To create a chart that shows the average price of cars for each manufacturer.
 - To visualize the relationship between car manufacturer and average price.
- **Tableau Link :** https://public.tableau.com/views/Project_7_16973847952860/Dashboard3?:language=en-GB&:display_count=n&:origin=viz_share_link
- **Sheet Name :** Task 5

Task 5 : Relationship between Fuel Efficiency and No. of Cylinders



Correlation Coefficient formula is added as a “Calculated Field” and is obtained between Cylinders and Highway MPG of cars. It is observed that, the trendline is downward, and hence, there exists a “Negative Correlation” between them.



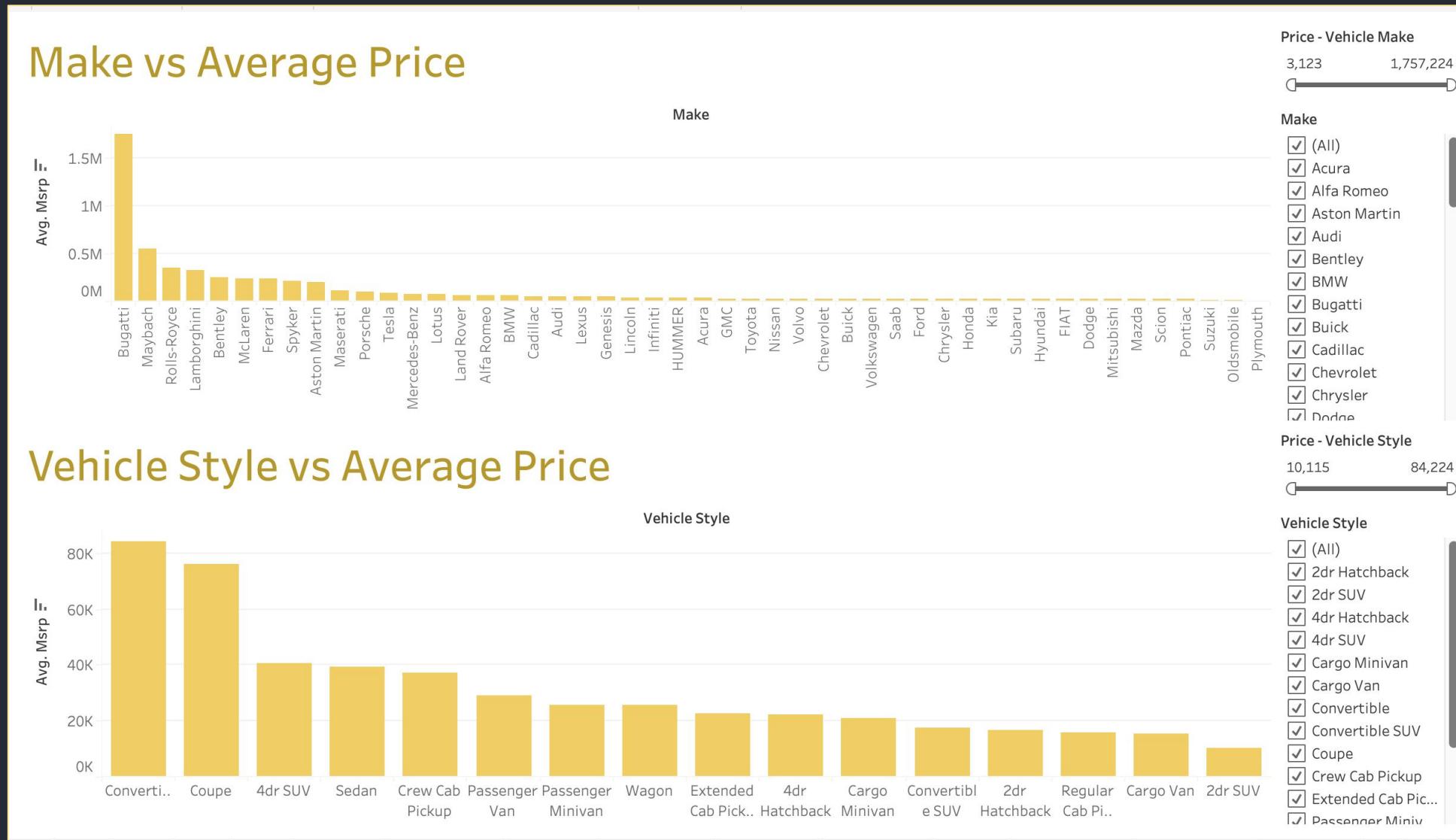
Data Analytics Tasks : Dashboard

A dashboard is an information management tool that receives data from a linked database to provide data visualizations. It typically offers high-level information in one view that end users can use to answer a single question. In many cases, they can be configured to provide specific information to the end user and how this information is visualized. E.g., Numbers, charts, or graphs. Dashboards provide users from all different businesses the ability to monitor performance, create reports, and set estimates and targets for the future.

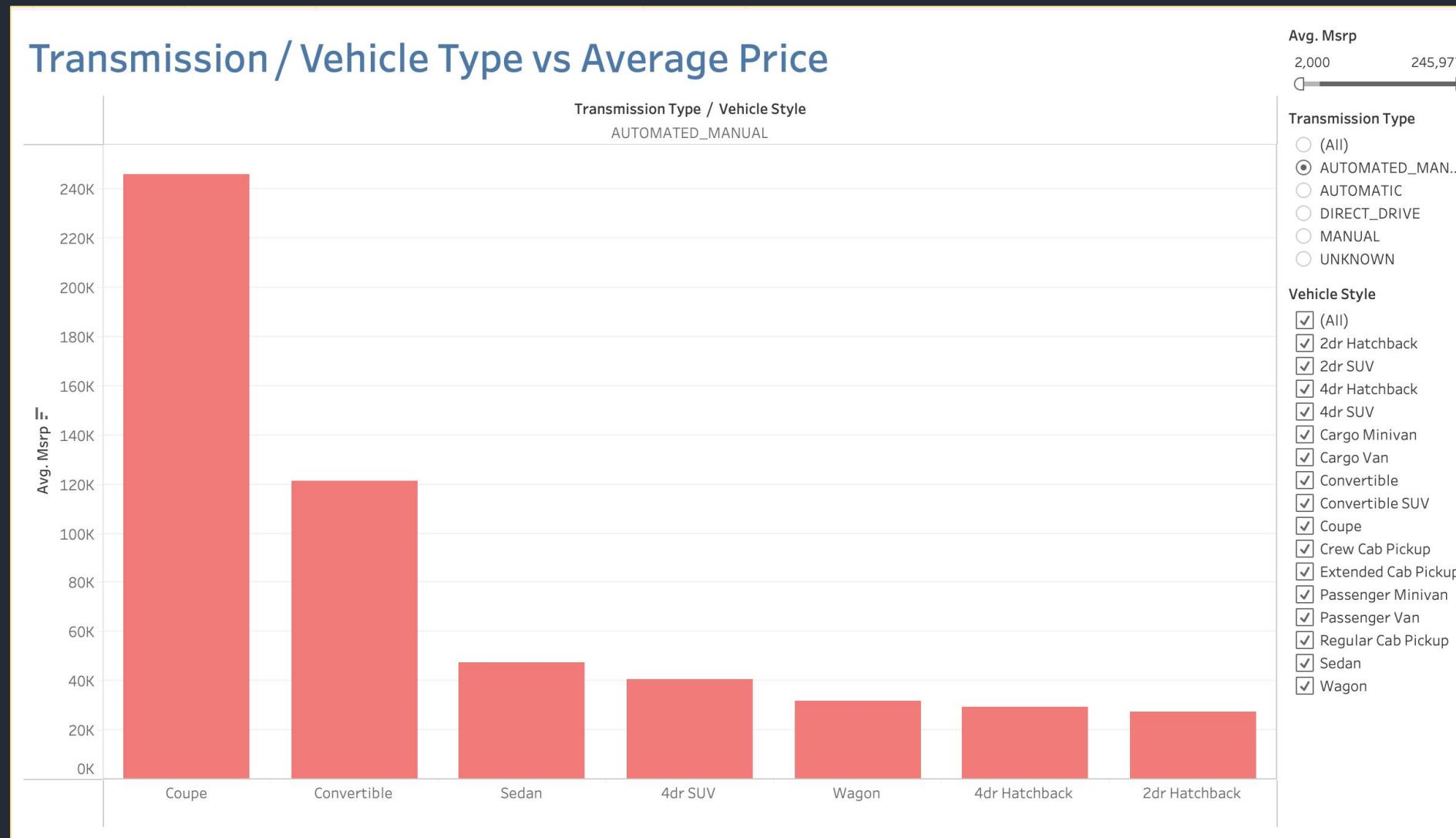
Dashboard 1 : Price vs Car Make vs Car Style



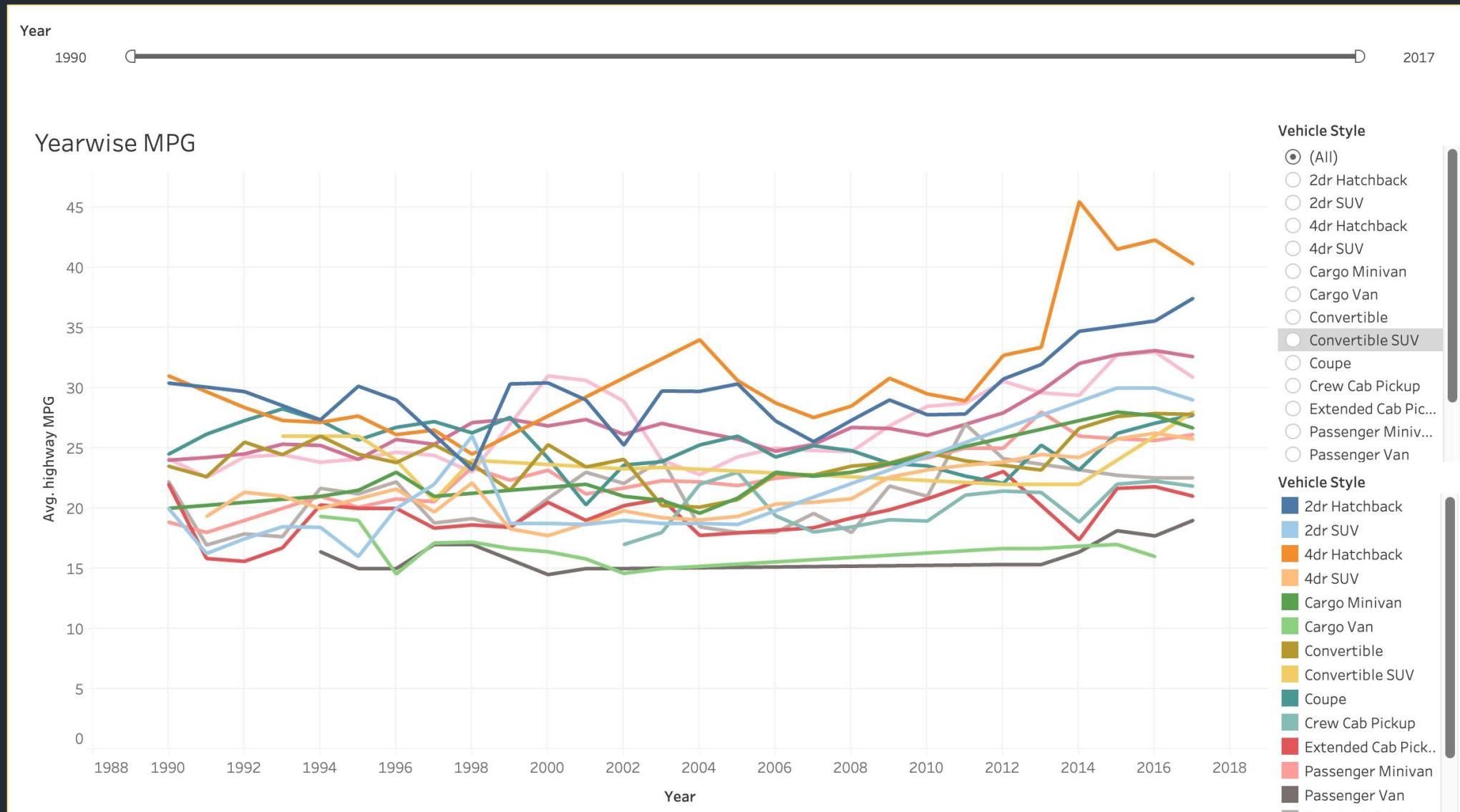
Dashboard 2 : Average Price vs Car Make vs Car Style



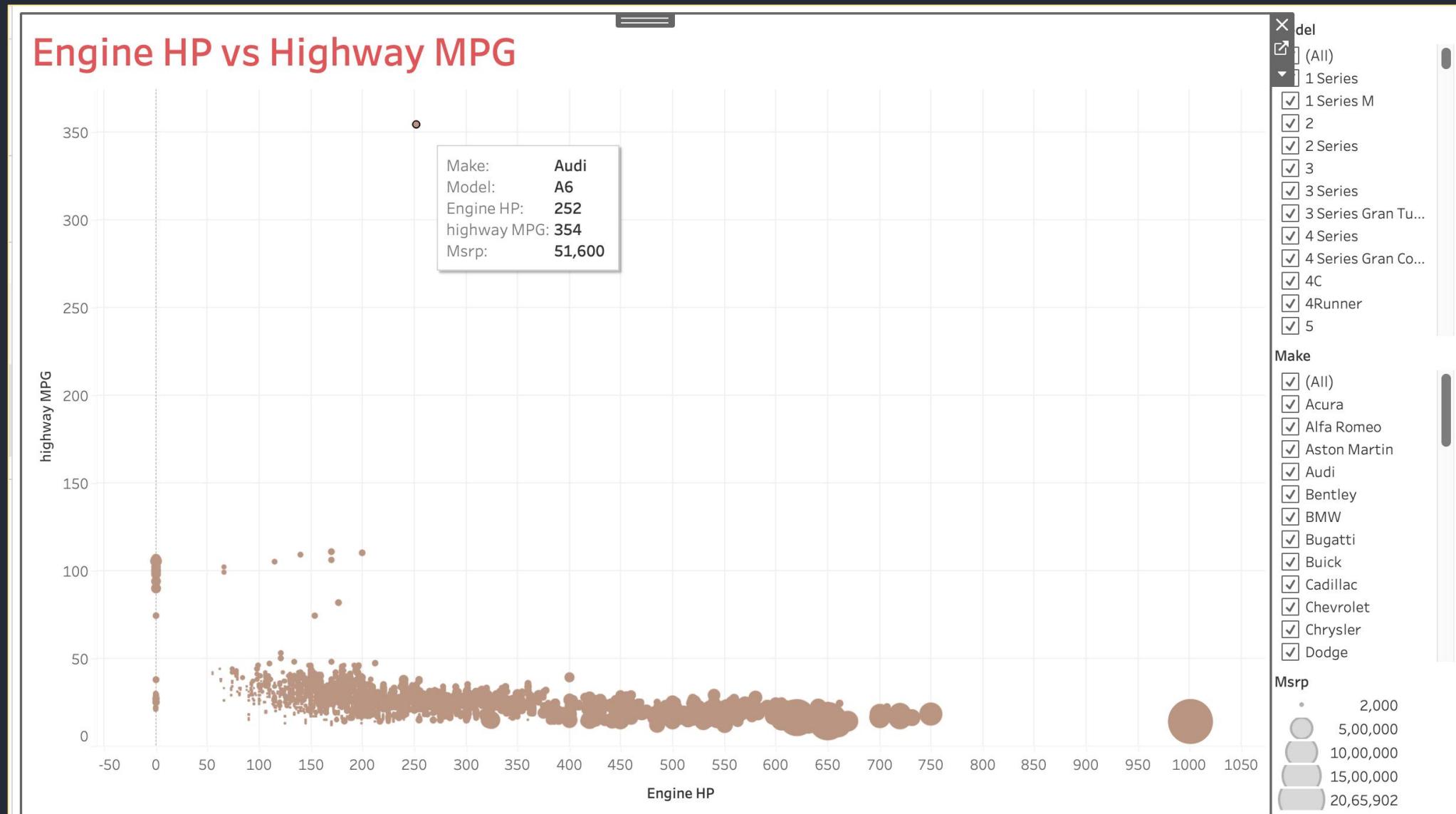
Dashboard 3 : Average Price vs Transmission / Vehicle Type



Dashboard 4 : Yearwise Highway MPG

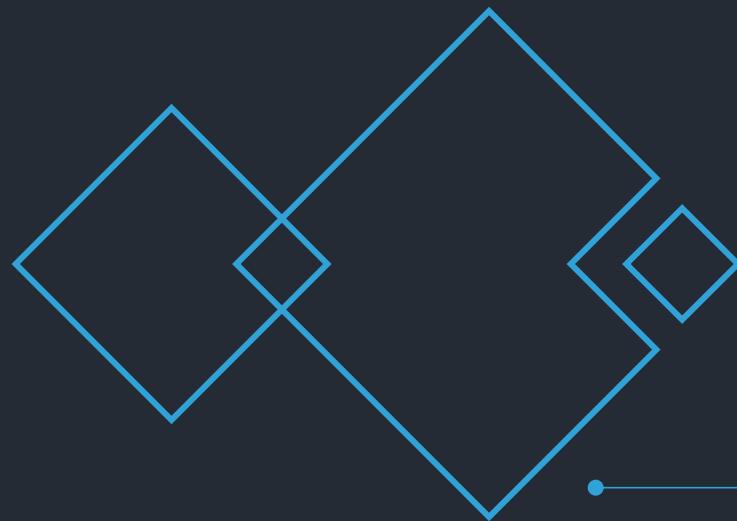


Dashboard 5 : Engine HP vs Highway MPG on Price



Project : Summary

- ✓ Analyzing trends in car features and pricing over time: By examining the variables in the dataset, car features and prices have changed over time. This could help manufacturers make informed decisions about product development and pricing.
- ✓ Comparing the fuel efficiency of different types of cars: By looking at the MPG variables in the dataset, the fuel efficiency of different types of cars are compared and the most efficient is identified. This could help consumers make informed decisions about which car to purchase.
- ✓ Investigating the relationship between a car's features and its popularity: By examining the popularity variable in the dataset, the features which are most popular among consumers are identified. This could help manufacturers make informed decisions about product development and marketing.
- ✓ Predicting the price of a car based on its features and market category: By using the various features and market category variables in the dataset, a model is developed to predict the price of a car. This could help manufacturers and consumers understand how different features affect the price of a car and make informed decisions about pricing and purchasing.
- ✓ Overall, this analysis could be a valuable resource for exploring various aspects of the automotive industry and could provide insights that could inform decisions related to product development, marketing, and pricing.



Thank You!