FINAL PROJECT - 3

IMPACT OF CAR FEATURES

ON PRICE AND PROFITABILITY

PROJECT DISCRIPTION

- 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.

- The given tasks below based on the business problem would require advanced Excel skills and knowledge of data analysis techniques such as regression analysis, pivot tables, sensitivity analysis, optimization, and time series analysis
- .
- The dataset contains information on over 11,000 car models and their specifications, including details on the car's 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).

- The dataset contain 11,914 records along 16 dimensions. We remove duplicate rows. There are 715 duplicate rows. Find some blank rows then I apply some statistical function to fill the blank rows.

APPROCH

- This problem could be approached by analyzing the relationship between a car's features, market category, and pricing, and identifying which features and categories are most popular among consumers and most profitable for the manufacturer. By using data analysis techniques such as regression analysis , descriptive statistics and visualization.

- We use descriptive statistics to fill the missing values from the following columns:

Fuel types, hp, cylinders and doors have null values.

1) I fill null values in fuel type with mode this column is a categorical one.
2) Hp will be filled by 0 as the cars having null values electric car.
3) we know that electric cars doesn’t have any cylinders so the null values will be again filled with 0.
4) I will fill the null values in doors with mean as it’s a numerical column.

- Use regression analysis to identify the variables that have the strongest relationship with a car's price.
- Find correlation coefficient to quantify the strength and direction.

- Challenges like plot scatter chart and bubble chart and connect it with slicer in the dashboard. Its very challenging to connect normal table with pivot table to form this charts.

TECH-STACK USED

MICROSOFT EXCEL

- All the task are performed in Microsoft excel .
- This tool is used in form an interactive graphical representation of the results.
- I am very familiar with excel its function are very use full.
- The analysis file link is given below:

impact of car features woorksheet (1) (1).xlsx

MICROSOFT POWERPOINT

- I used Microsoft Powerpoint for presentation.

INSIGHTS

TASK 1
- How does the popularity of a car model vary across different market categories?

TASK 2
- What is the relationship between a car's engine power and its price?

TASK 3
- Which car features are most important in determining a car's price?

TASK 4
- How does the average price of a car vary across different manufacturers?

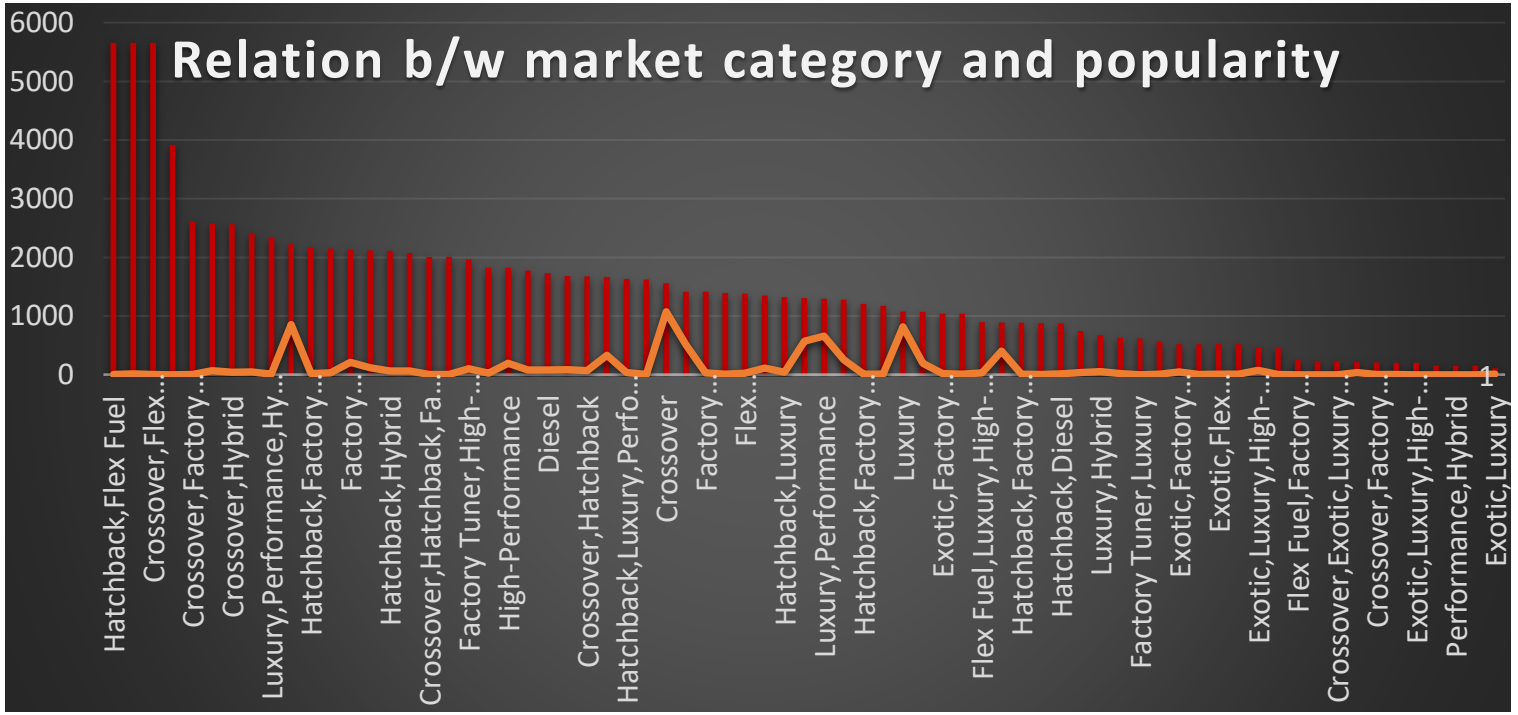
TASK 5
- What is the relationship between fuel efficiency and the number of cylinders in a car's engine?

TASK 6
- you need to create the Interactive Dashboard. Use filters and slicers to make the chart interactive. The client has requested these questions given below:

TASK 1

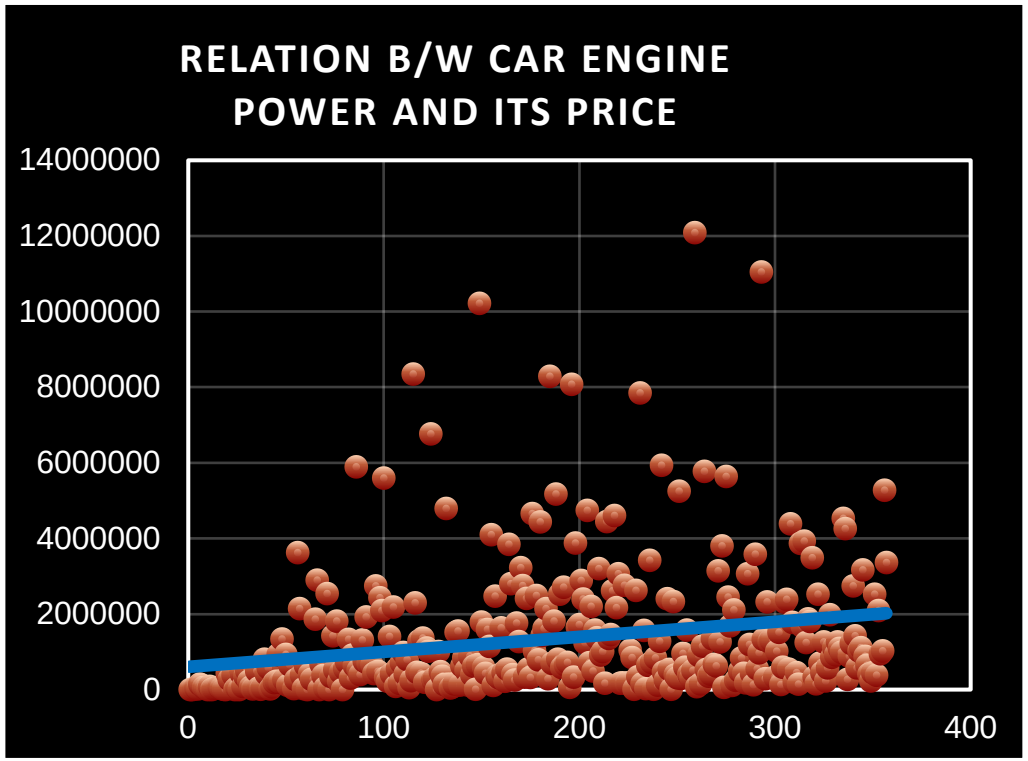
Row Labels	Average of Popularity	Count of Model
Hatchback,Flex Fuel	5657	7
Flex Fuel,Diesel	5657	16
Crossover,Flex Fuel,Performance	5657	6
Crossover,Luxury,Performance,Hybrid	3916	2
Crossover,Factory Tuner,Luxury,Performance	2607	5
Crossover,Performance	2586	69
Crossover,Hybrid	2563	42
Diesel,Luxury	2416	47
Luxury,Performance,Hybrid	2333	11
Flex Fuel	2226	855
Hatchback,Factory Tuner,Performance	2174	21
Crossover,Luxury,Diesel	2149	34
Factory Tuner,Luxury,High-Performance	2133	215
Hybrid	2117	121
Hatchback,Hybrid	2111	64
Crossover,Flex Fuel	2074	64

***It contains other 55 rows**



- **'Market Category' value 'Flex Fuel, Diesel' has highest average 'Popularity' at 5.7K with model count 16.**
- **' Flex Fuel, diesel', 'Hatchback, Flex Fuel', 'Crossover, Flex Fuel, Performance' these values has average 'Popularity' at 5.7K.**
- **'Exotic, Luxury' has lowest average 'Popularity' at 113 with model count 12.**

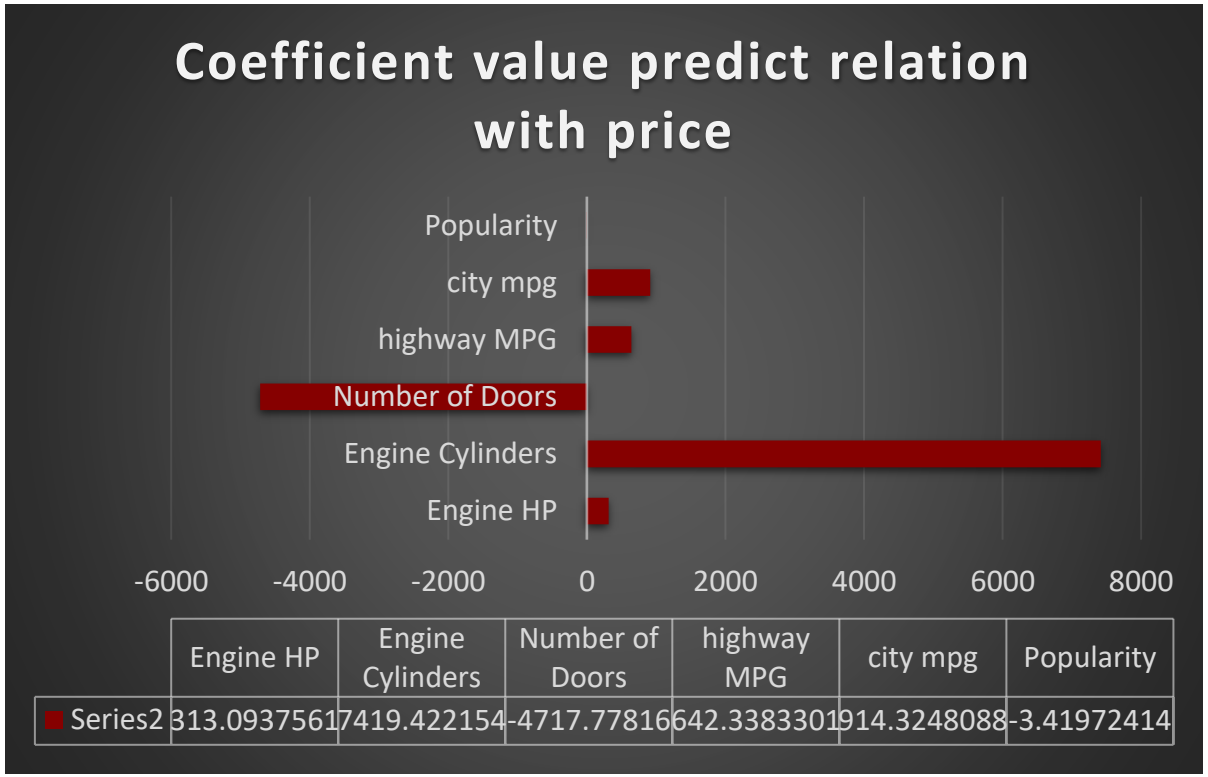
TASK 2



- **Used scatter plot to understand how car engine & price are related to each other & what is the impact on car price to determine its relationship.**

- **As one value increases, there is no tendency for the other value to change in a specific direction but here we can see that there is barely any relationship between these two variables.**

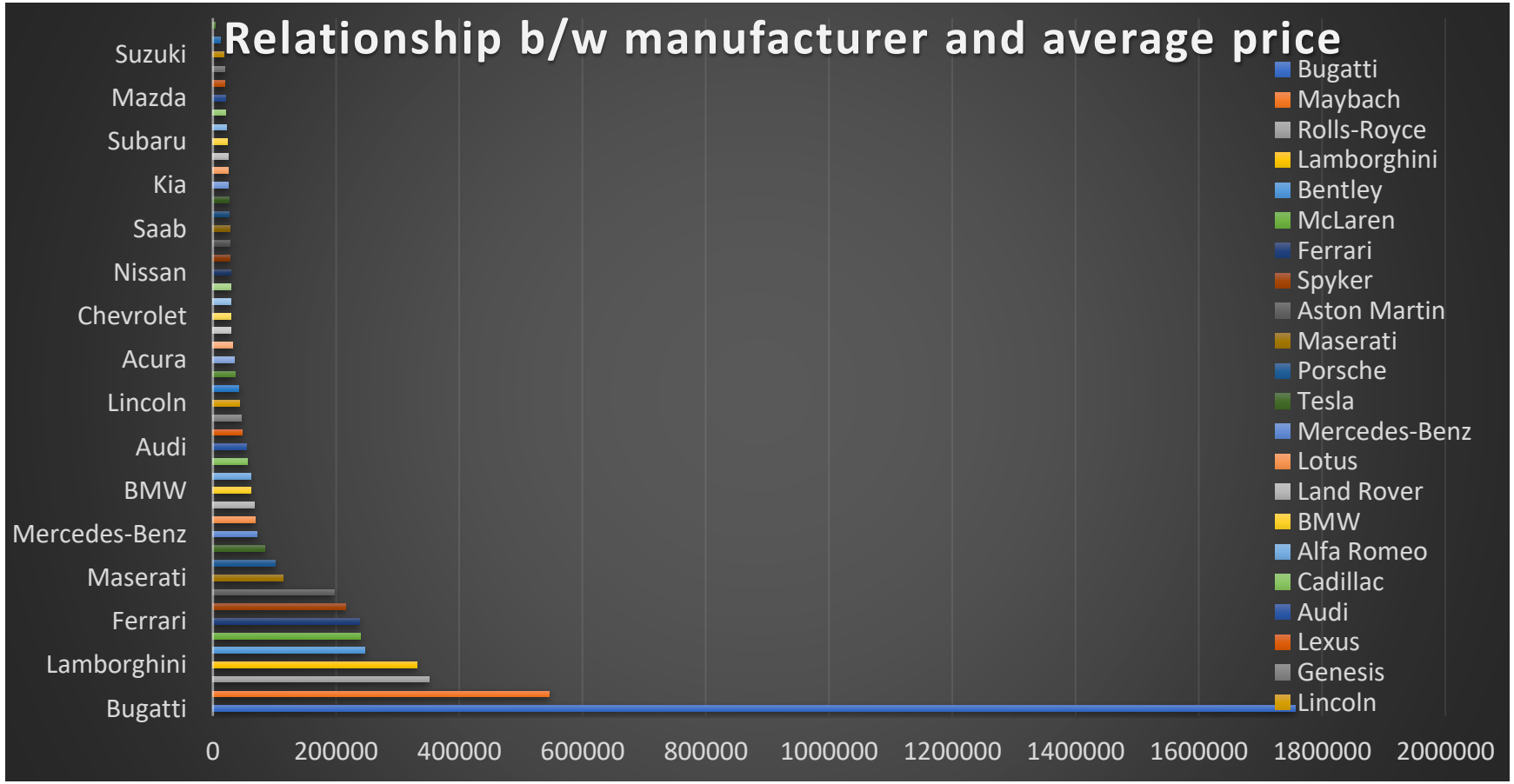
TASK 3



- **Regression analysis is a powerful statistical method that allow you to examine the relationship between tow or more variables**
- **I have used excel formula to get the coefficient value against all the mention variable & present with help of bar chart to visualize.**
- **Chart explains to us that almost all variables mentioned above are moderate positive relationships.**

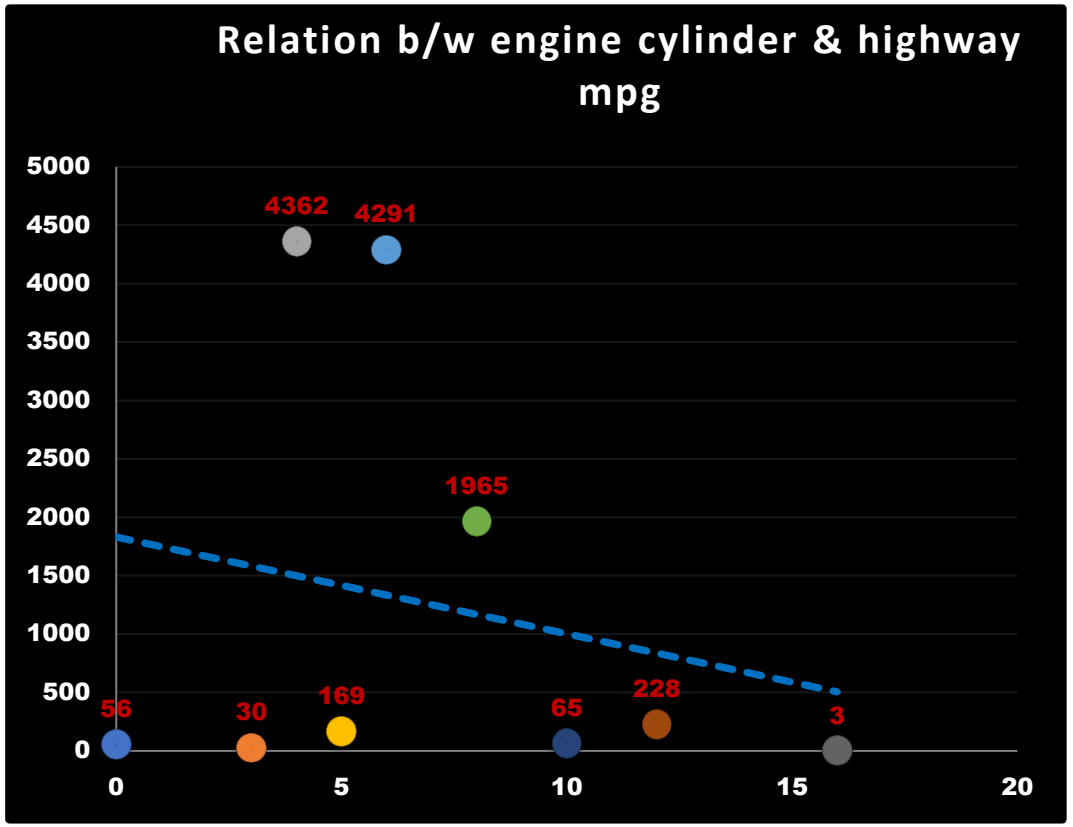
TASK 4

Row Labels	Average of MSRP
Bugatti	1757224
Maybach	546222
Rolls-Royce	351131
Lamborghini	331567
Bentley	247169
McLaren	239805
Ferrari	238219
Spyker	214990
Aston Martin	198123
Maserati	113684
Porsche	101622
Tesla	85256
Mercedes-Benz	72070
Lotus	68377
Land Rover	68067
BMW	62163
Alfa Romeo	61600
Cadillac	56368
Audi	54574
Lexus	47549
Genesis	46617
Lincoln	43861
Infiniti	42640
HUMMER	36464



Insight: Bugatti has highest average MSRP rate of 1757224.

TASK 5



- **Correlation coefficient is -0.3 (Moderate Negative value).**
- **Correlation coefficient is a number between -1 and 1 that tells you the strength and direction of a relationship between variables.**
- **In other words, it reflects how similar the measurements of two or more variables are.**

DASHBOARD

IMPACT OF CAR FEATURES

TOTAL MSRP

469528458

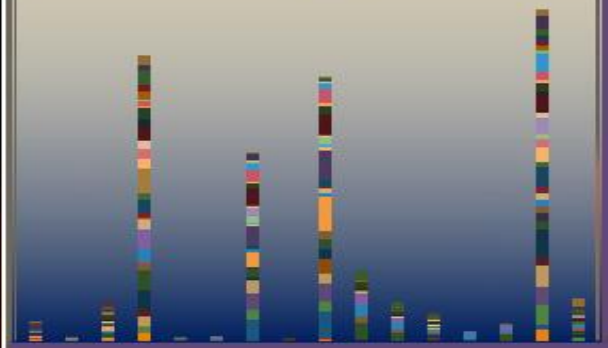
Vehicle Style

- 2dr Hatchback
- 2dr SUV
- 4dr Hatchback
- 4dr SUV
- Cargo Minivan
- Cargo Van
- Convertible
- Convertible SUV
- Coupe

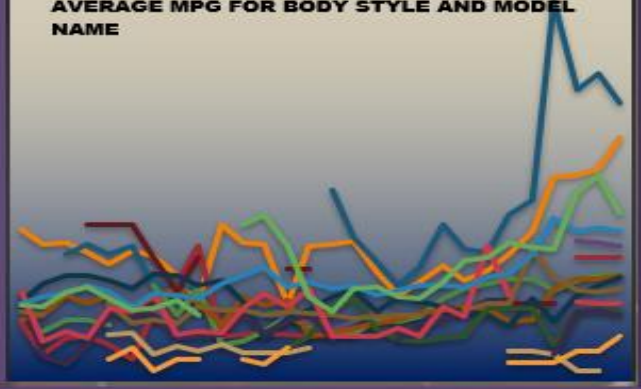
Make

- Acura
- Alfa Romeo
- Aston Martin
- Audi
- Bentley
- BMW
- Bugatti
- Buick
- Cadillac

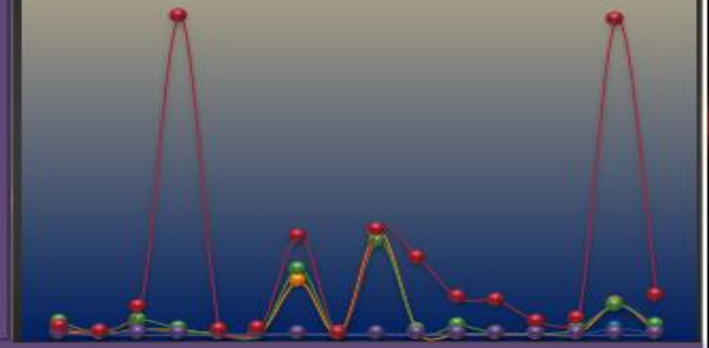
CAR PRICES BY BRAND AND BODY STYLE



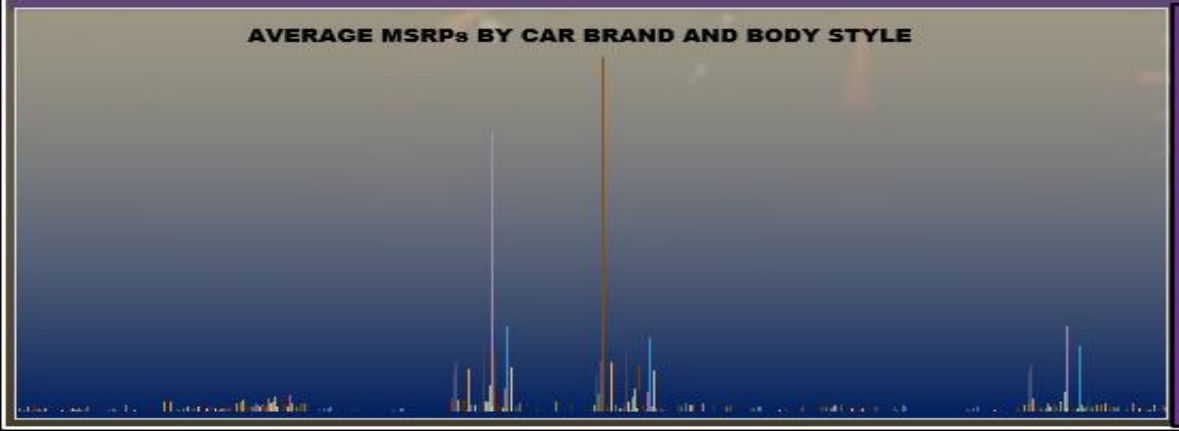
AVERAGE MPG FOR BODY STYLE AND MODEL NAME



MSRP AND TRANSMISSION TYPE BY DIFFRENT BODY STYLE



AVERAGE MSRPs BY CAR BRAND AND BODY STYLE



CAR'S MPG,HP,MSRP ACROSS DIFFERENT BRANDS

RESULT

- The higher car price has the maximum body style that indicates price plays an important role when it's come to body style, we can see that in the dashboard clearly.
- That also represents more variety for consumer demand since the value of the car required many features & style to give variety to people .
- When did the average for brand & body style with price its show that highest & lowest price does not vary by body style its remain the same no. of body style in both the category.
- Automatic transmission type has the highest no. of body style & Direct_drive is the lowest amount of car style which clearly tell us that consumers have more demand in Automatic cars.
- Average MPG & Engine does not have much different when we compare with brand they all vary between 14 to 18 MPG & 300 to 400 HP except Bugatti that has 14 to 200.
- Pivot chart helped a lot in analyzing and getting exact insights.
- I learnt that as a Data Analyst can help companies to know where to spend the money to get maximum profit.


THANK YOU