

CAR FEATURE ANALYTICS REPORT

Project Description

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, the client has asked How can a car manufacturer optimize pricing and product development decisions to maximize profitability while meeting consumer demand?

By using data analysis techniques such as regression analysis and market segmentation, the manufacturer could develop a pricing strategy that balances consumer demand with profitability, and identify which product features to focus on in future product development efforts. This could help the manufacturer improve its competitiveness in the market and increase its profitability over time.

Approach

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).

Analyzing trends in car features and pricing over time: By examining the variables in the dataset, a data analyst could identify how car features and prices have changed over time, which 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, a data analyst could compare the fuel efficiency of different types of cars and identify which types are the most efficient. 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, a data analyst could identify which features are most popular among consumers and how they affect a car's popularity. This could help manufacturers make informed decisions about product development and marketing.

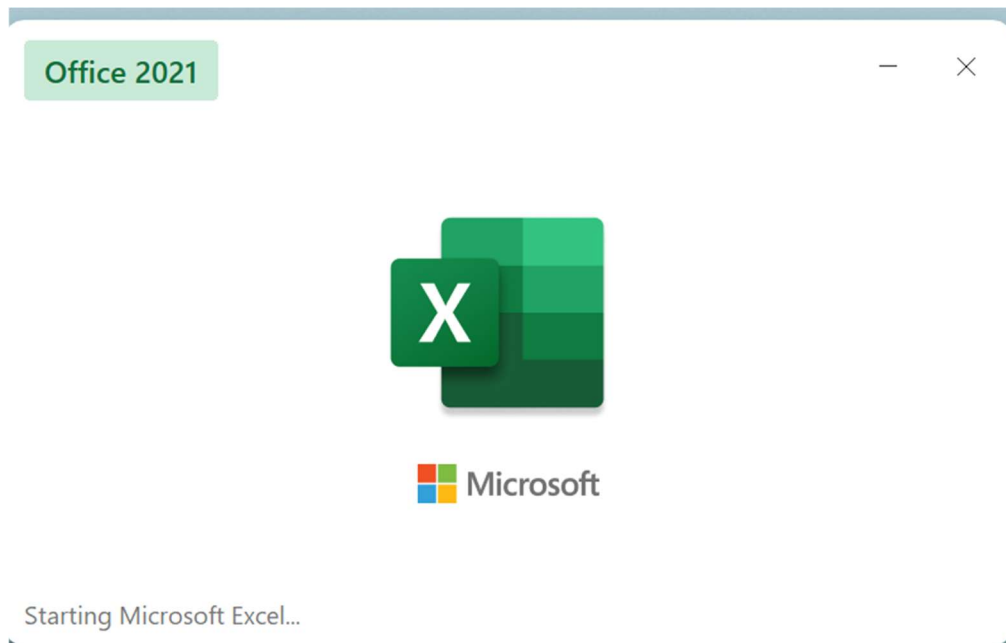
Predicting the price of a car based on its features and market category: By using the various features and market category variables in the dataset, a data analyst could develop a model to predict the price of a car. This could help manufacturers and consumers understand how different features affect the price of a car and make informed decisions about pricing and purchasing.

For detecting null and empty cells Special select is used. Pivot tables will also be used and pivot charts will be used for visualising the insights.

Regression analysis and Correlation functionality of Excel data analysis is also used.

Tech Stack Used

Microsoft Excel 2021. Pivot tables, Excel Analytics, Pivot Charts etc.



Insight and Results

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.

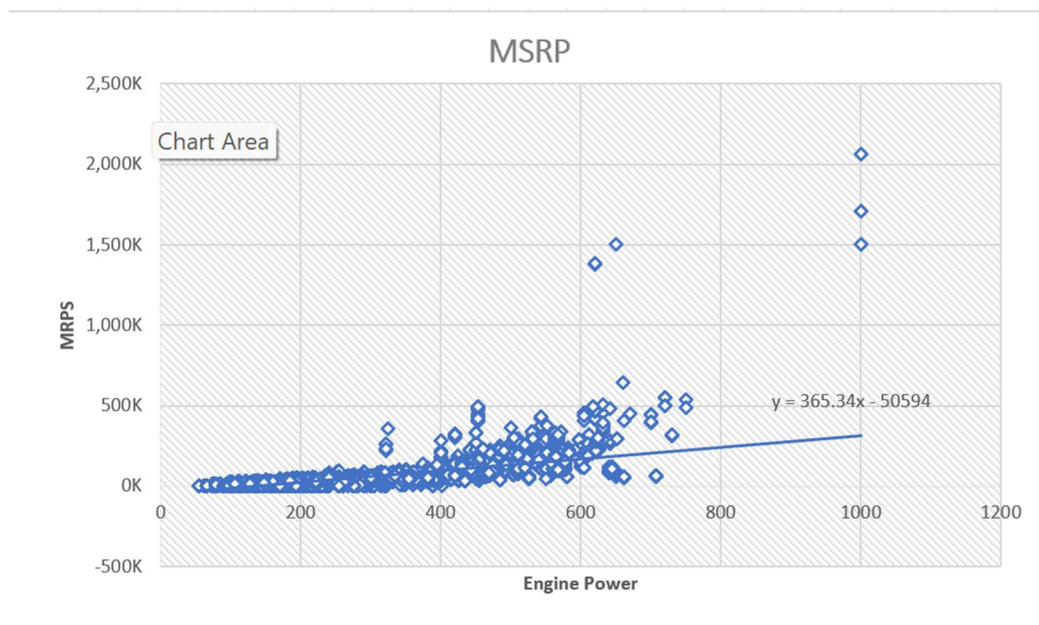
Pivot Table:

3	Car Models	Average of Popularity	Count of Model
4	Crossover	1529.030825	1103
5	Crossover,Diesel	873	7
6	Crossover,Exotic,Luxury,High-Performance	238	1
7	Crossover,Exotic,Luxury,Performance	238	1
8	Crossover,Factory Tuner,Luxury,High-Performance	1823.461538	26
9	Crossover,Factory Tuner,Luxury,Performance	2607.4	5
10	Crossover,Factory Tuner,Performance	210	4
11	Crossover,Flex Fuel	2073.75	64
12	Crossover,Flex Fuel,Luxury	1173.2	10
13	Crossover,Flex Fuel,Luxury,Performance	1624	6
14	Crossover,Flex Fuel,Performance	5657	6
15	Crossover,Hatchback	1675.694444	72
16	Crossover,Hatchback,Factory Tuner,Performance	2009	6
17	Crossover,Hatchback,Luxury	204	7
18	Crossover,Hatchback,Performance	2009	6
19	Crossover,Hybrid	2563.380952	42
20	Crossover,Luxury	884.5487805	410
21	Crossover,Luxury,Diesel	2195.848485	33
22	Crossover,Luxury,High-Performance	1037.222222	9
23	Crossover,Luxury,Hybrid	630.9166667	24
24	Crossover,Luxury,Performance	1344.849558	113
25	Crossover,Luxury,Performance,Hybrid	3916	2
26	Crossover,Performance	2585.956522	69
27	Diesel	1730.904762	84
28	Diesel,Luxury	2275	51
29	Exotic,Factory Tuner,High-Performance	1046.380952	21
30	Exotic,Factory Tuner,Luxury,High-Performance	517.5384615	52

[illegible]

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.

Scatter Plot:

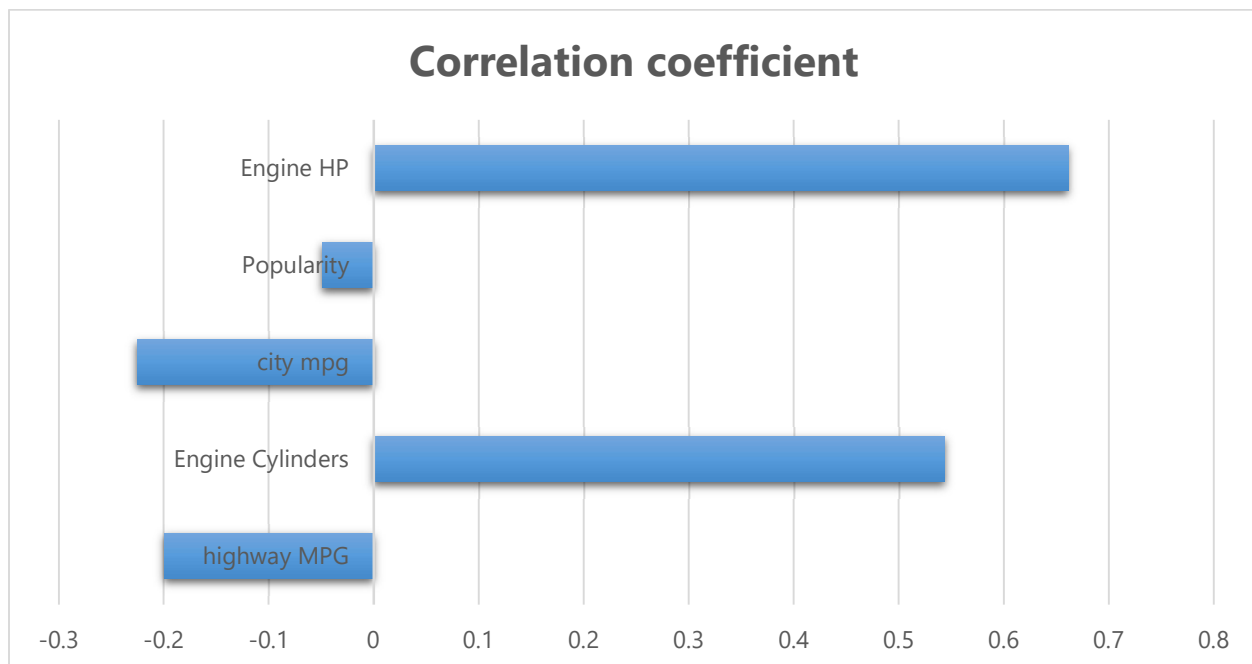


As it emits the relationship between Engine HP and price.

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.

Correlation between these variables.

	<i>highway MPG</i>	<i>Engine Cylinders</i>	<i>city mpg</i>	<i>Popularity</i>	<i>MSRP</i>	<i>Engine HP</i>
highway MPG	1					
Engine Cylinders	-0.62031	1				
city mpg	0.847023	-0.63787	1			
Popularity	-0.02924	0.045042	-0.01079	1		
MSRP	-0.19896	0.544002	-0.22532	-0.04861	1	
Engine HP	-0.41426	0.779862	-0.46603	0.036522	0.661827	1



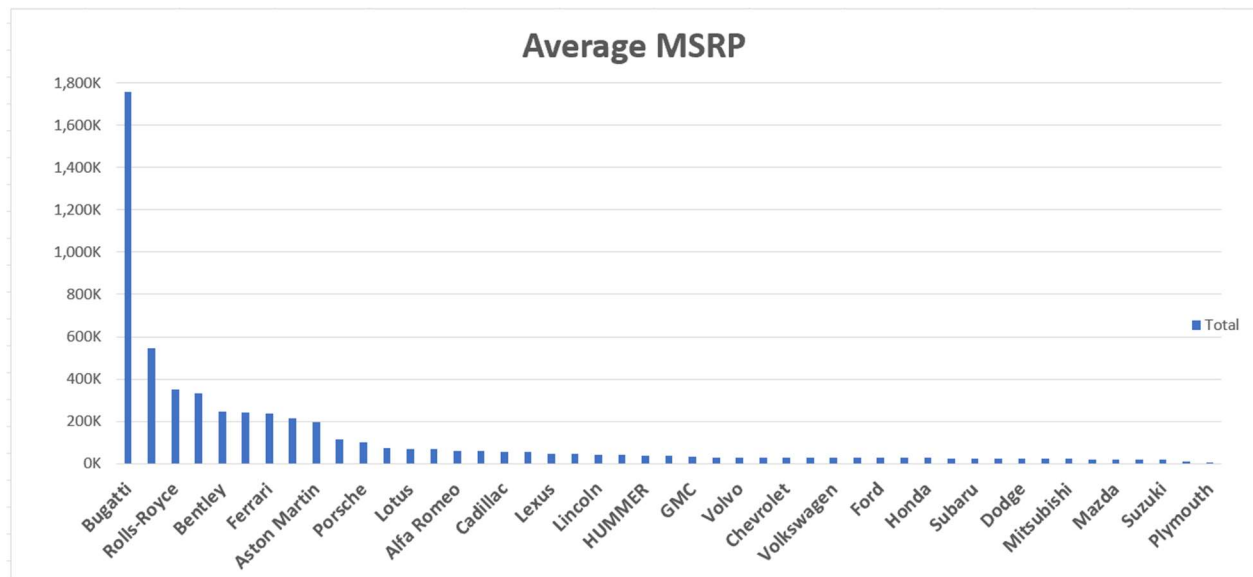
Engine Cylinder and Engine HP is highly positively correlated. City MPG and Highway MPG is negatively correlated.

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 manufacturer and average price.

Pivot Table:

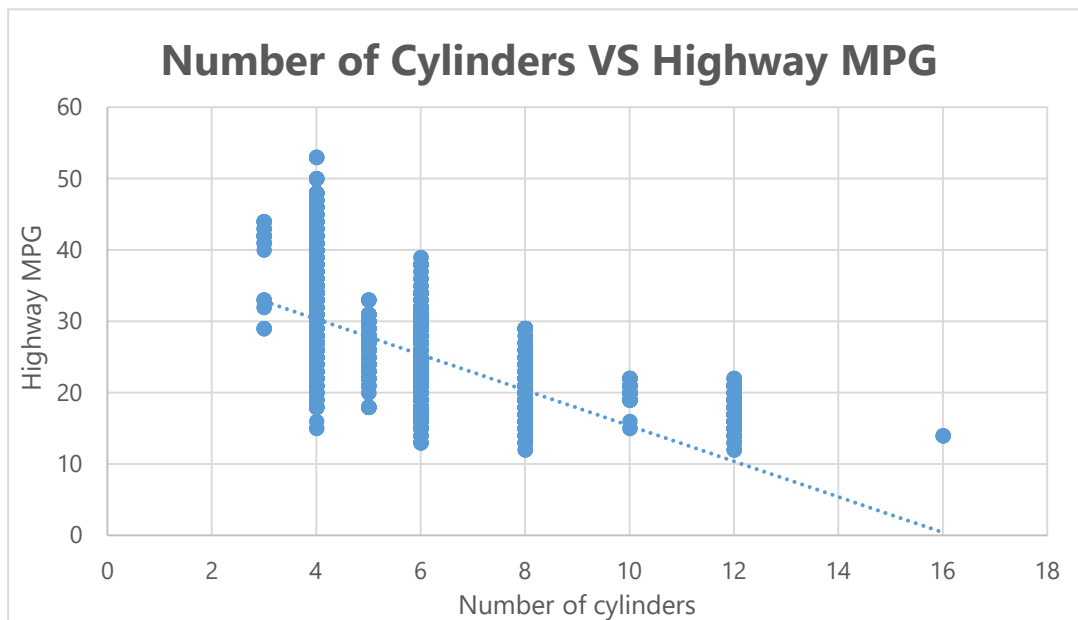
3	Row Labels	Average of MSRP
4	Bugatti	1757223.667
5	Maybach	546221.875
6	Rolls-Royce	351130.6452
7	Lamborghini	331567.3077
8	Bentley	247169.3243
9	McLaren	239805
10	Ferrari	237383.8235
11	Spyker	213323.3333
12	Aston Martin	197910.3763
13	Maserati	114207.7069
14	Porsche	101622.3971
15	Mercedes-Benz	71537.80966
16	Lotus	69188.27586
17	Land Rover	67823.21678
18	Alfa Romeo	61600
19	BMW	61546.76347
20	Cadillac	56231.31738
21	Audi	53452.1128
22	Lexus	47549.06931
23	Genesis	46616.66667
24	Lincoln	42494.37179
25	Infiniti	42394.21212

Bar Chart for Average MSRP:

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.

	<i>highway MPG</i>	<i>Engine Cylinders2</i>
highway MPG	1	
Engine Cylinders2	-0.689531182	1



As clearly we can see there is negative correlation between Number of cylinders and Milage.

As the number of Cylinder increases the MPG decreases.

Dashboard

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

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

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

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

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

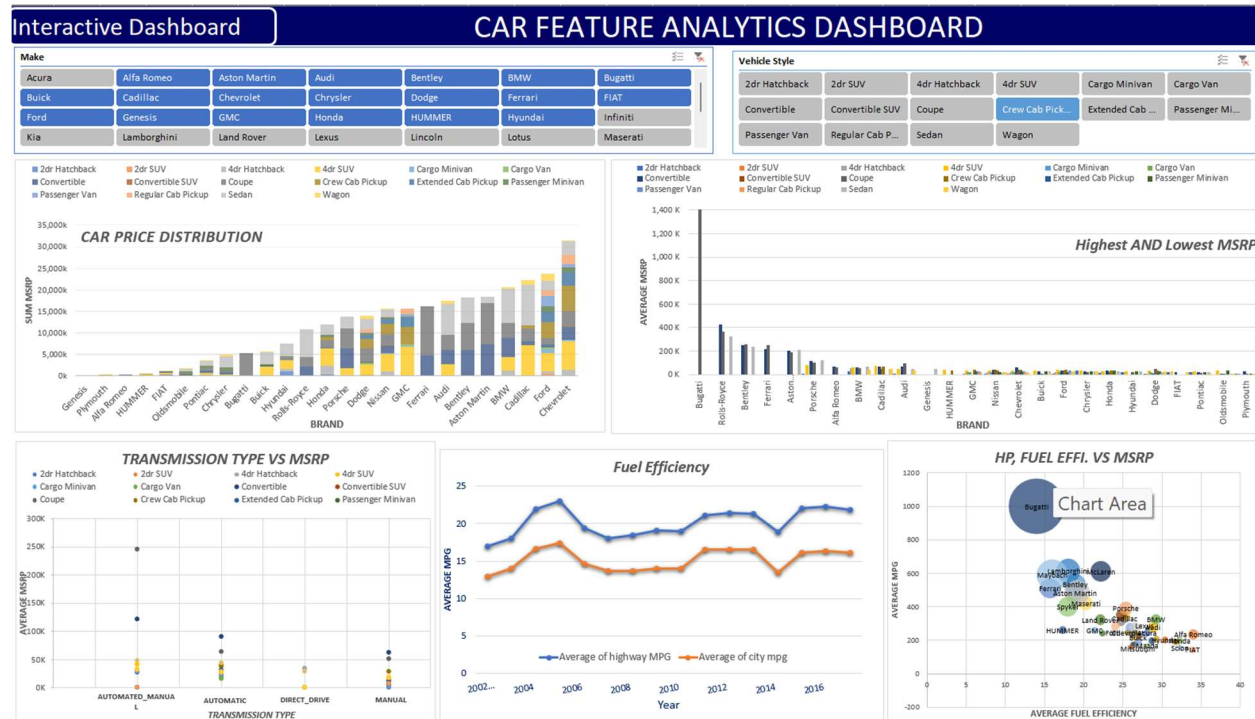
Understanding:

For each of the tasks above separate pivot table has been made in different sheet. According to the purpose slices are then connected to particular pivot table.

Using slicer 'Make' we can easily interact with first two charts. "Vehicle Style" slicer is used to interact with other two charts.

Another pivot table is connected with "Make" Slicer. Data of that pivot table is displayed in the cards at the top of the dashboard.

Dashboard:



Link for the spreadsheet: [Project 7](#)

If Some of the functionalities doesn't work then spreadsheet is provided in drive.

~~~~~The End~~~~~