PROJECT: ANALYZING THE IMPACT OF CAR FEATURES ON PRICE AND PROFITABILITY

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Description:

This project is all about carry out the in-depth analysis of important underlying insights of analyzing the impact of car features on price and profitability. This project is about, how can a car manufacturer optimize pricing and product development decisions to maximize profitability while meeting consumer demand. EDA using excel was performed to draw insights.

Approach:

First, I have done data cleaning, dealt with blank cell / null values, removed duplicates and removed outliers. Then I have done the EDA part using excel with the help of data analysis tool pack. And this analysis was done with the help of various functions, formula and tools.

Tech-Stack: Microsoft Excel 2019

Used: Microsoft Excel 2019 was used in this project execution. The ease of access and set up with convenient user interface made it a good tool for the project.

Insights:

In this project, I learned about advanced EXCEL and statistics. And how to analyse the problem statement and the functions that I can use in EXCEL to solve the problem statement. All the questions asked has been answered or solved through Excel and statistics.

Result: In this project, I have achieved and gained knowledge how to deal and analyse the data with help of EXCEL and apply statistics logic and function. And how to interact and run different functions to get desired output from data.

ExcelWorkbook-

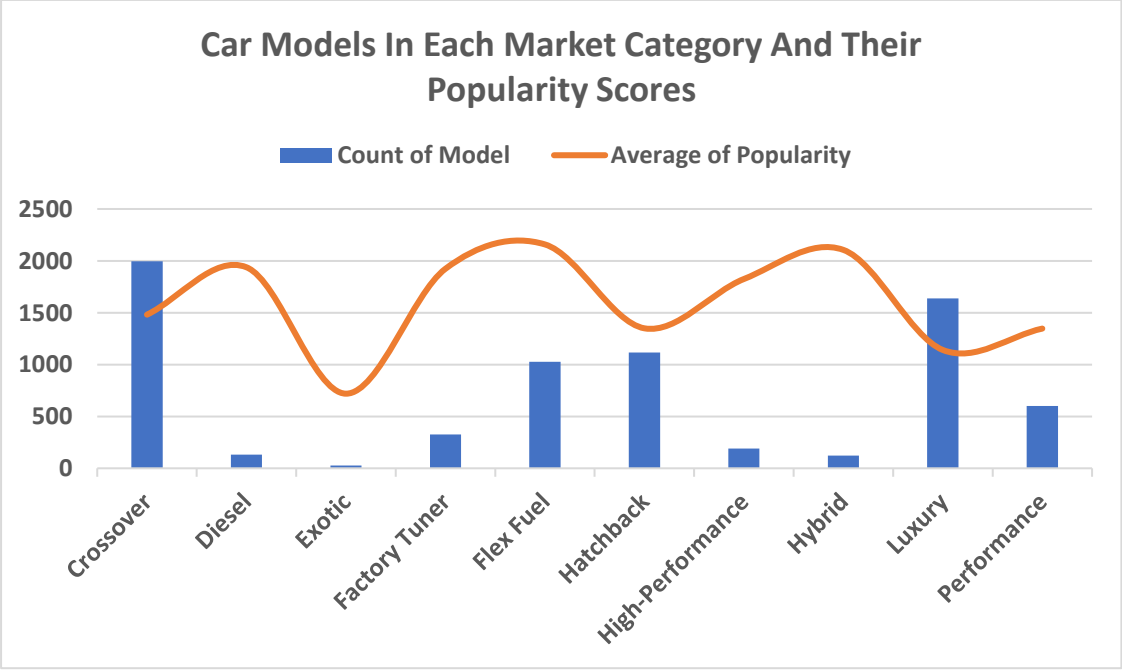
https://docs.google.com/spreadsheets/d/12T_r0LU471hjXimcCmaW4NanC0an1Ttv/edit?usp=sharing&ouid=110645243858390813184&rtpof=true&sd=true

Analysis

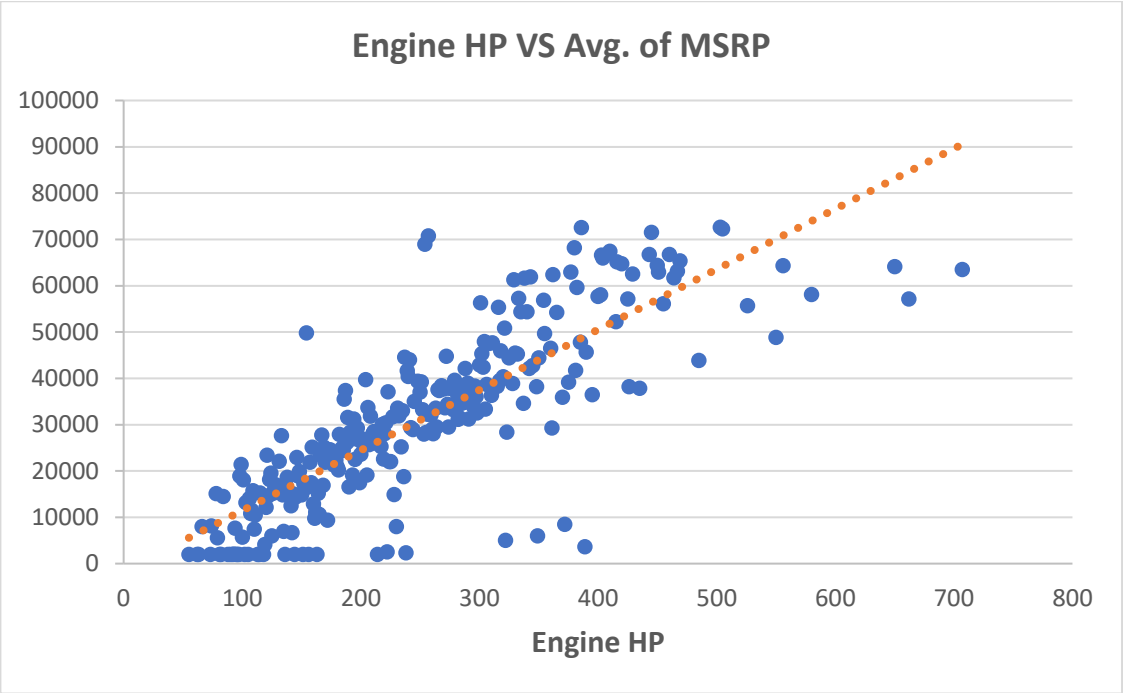
Task 1.A: Create a pivot table that shows the number of car models in each market category and their corresponding popularity scores.

Market Category	Count of Model	Average of Popularity
Crossover	1995	1481
Diesel	131	1938
Exotic	26	719
Factory Tuner	326	1923
Flex Fuel	1028	2158
Hatchback	1117	1350
High-Performance	189	1825
Hybrid	123	2106
Luxury	1639	1141
Performance	602	1347
Grand Total	7176	1514

Task 1.B: Create a combo chart that visualizes the relationship between market category and popularity.



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.



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.

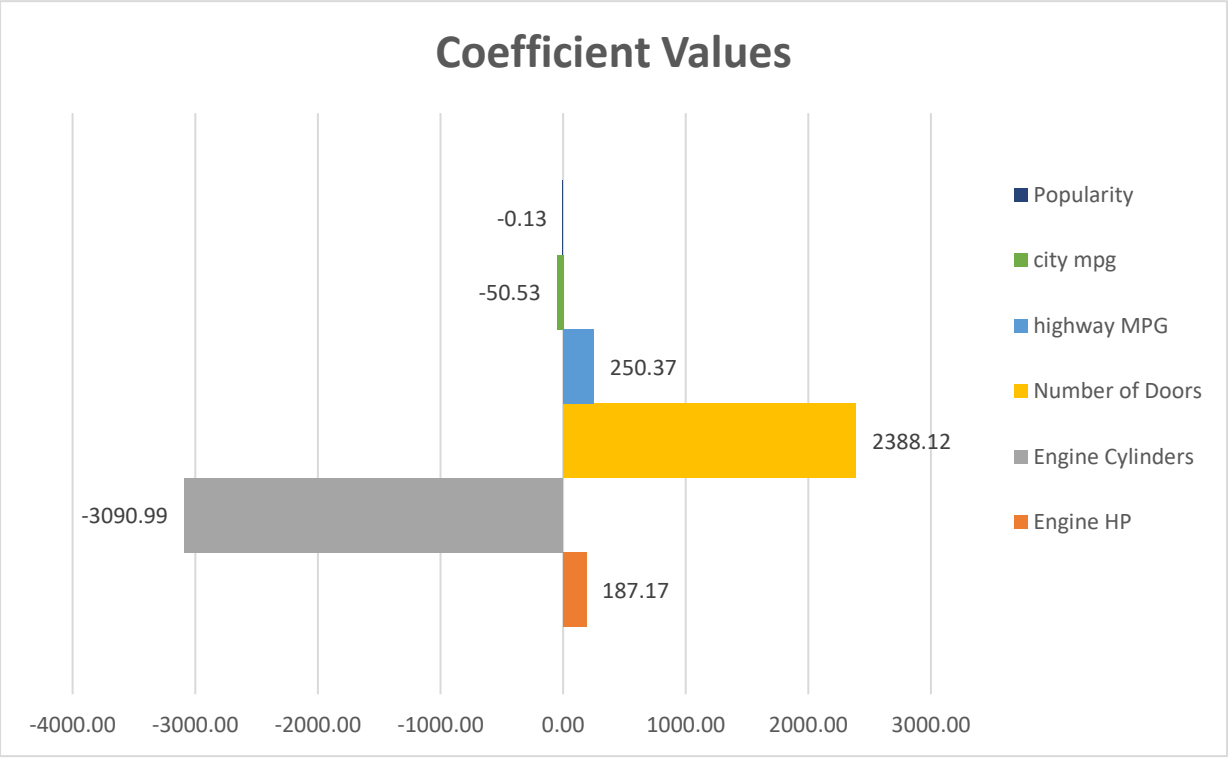
Regression Statistics	
Multiple R	0.8005
R Square	0.6408
Adjusted R Square	0.6406
Standard Error	9558.3915
Observations	10918

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	6	1.77852E+12	2.96E+11	3244.423	0
Residual	10911	9.9686E+11	91362849		
Total	10917	2.77538E+12			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-11329.53	799.7458919	-14.1664	3.71E-45	-12897.18	-9761.88	-12897.2	-9761.88
Engine HP	187.17	1.561761331	119.8445	0	184.10723	190.2299	184.1072	190.2299
Engine Cylinders	-3090.99	104.2501333	-29.6497	7.1E-186	-3295.337	-2886.64	-3295.34	-2886.64
Number of Doors	2388.12	108.8187958	21.94584	1.7E-104	2174.8155	2601.425	2174.815	2601.425
highway MPG	250.37	22.81553679	10.97358	7.16E-28	205.64554	295.0907	205.6455	295.0907
city mpg	-50.53	21.39972058	-2.36147	0.01822	-92.48222	-8.58755	-92.4822	-8.58755
Popularity	-0.13	0.063238784	-2.0332	0.042056	-0.252537	-0.00462	-0.25254	-0.00462

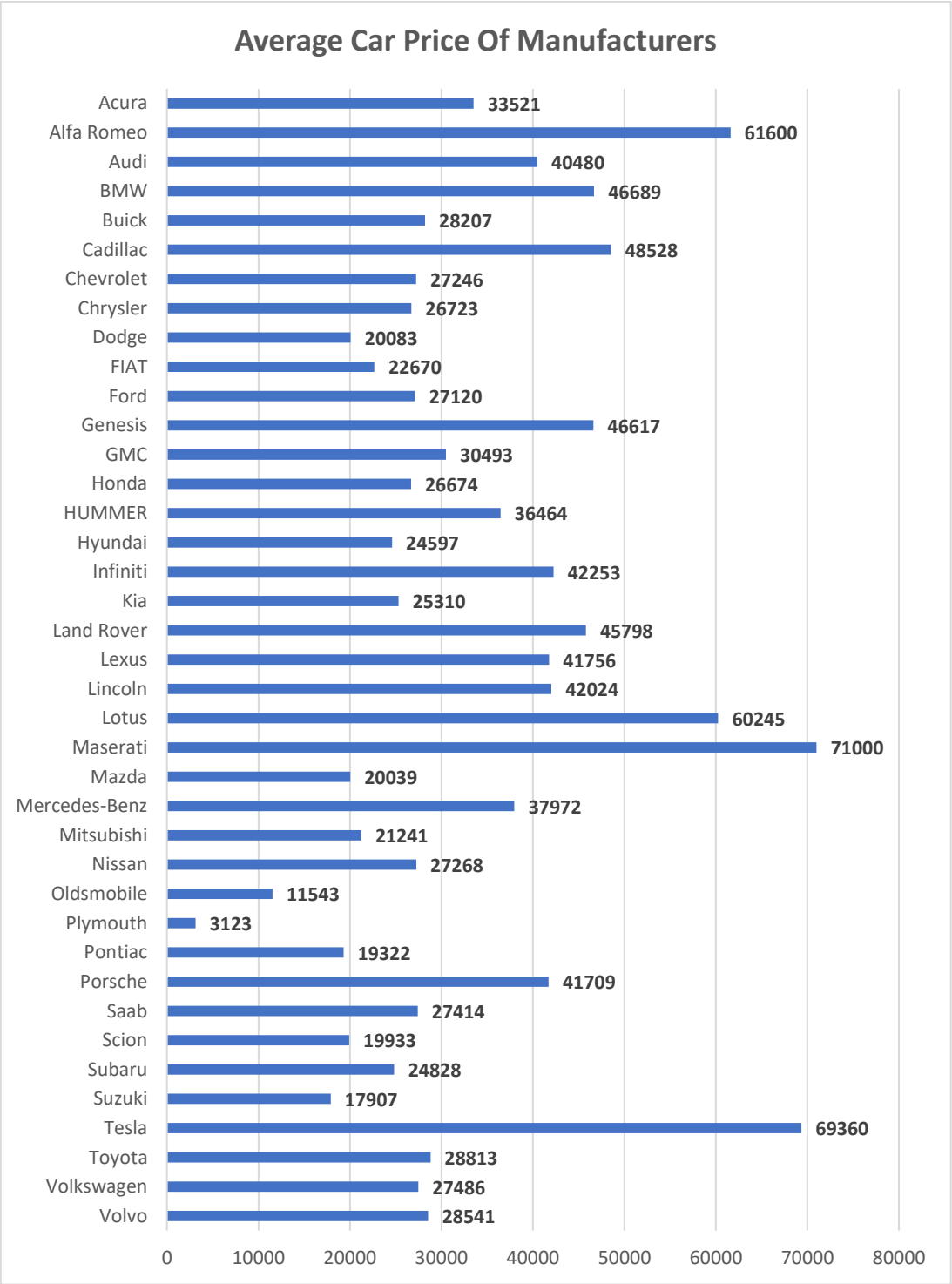
Bar Chat-



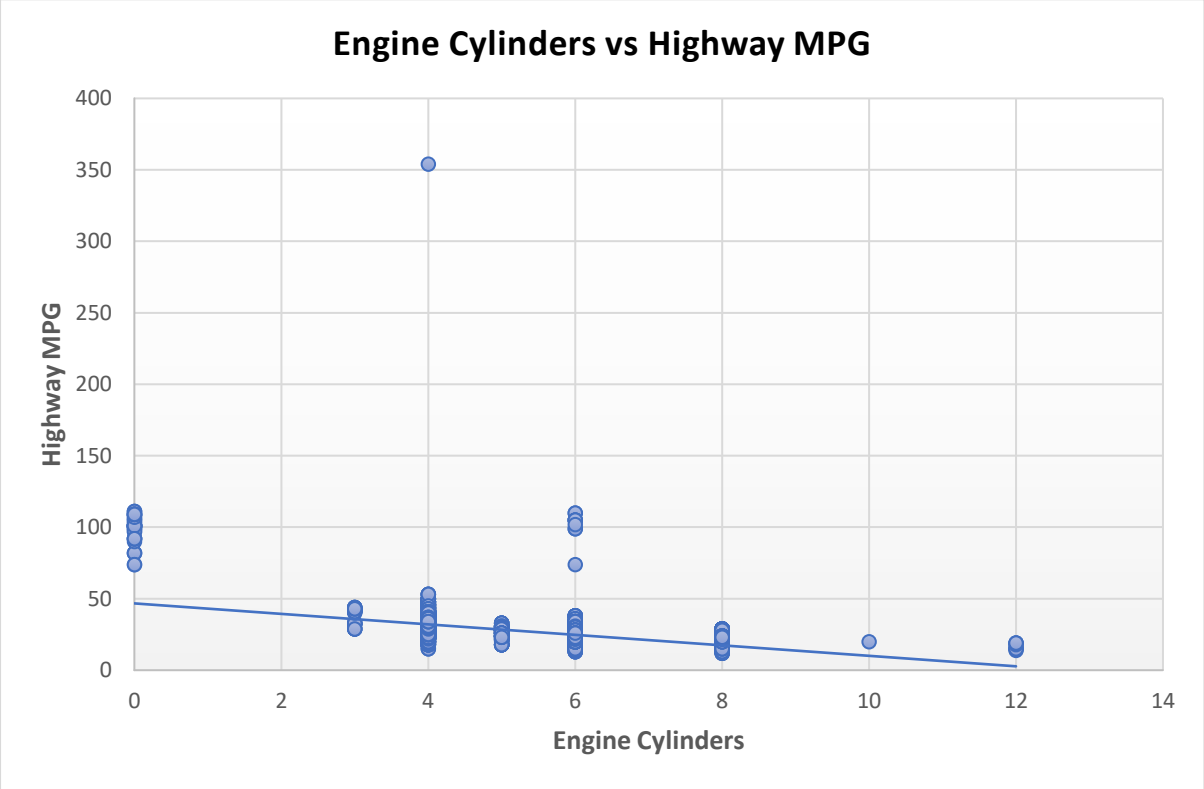
Task 4.A: Create a pivot table that shows the average price of cars for each manufacturer.

Manufacturers	Average of MSRP
Volvo	28541
Volkswagen	27486
Toyota	28813
Tesla	69360
Suzuki	17907
Subaru	24828
Scion	19933
Saab	27414
Porsche	41709
Pontiac	19322
Plymouth	3123
Oldsmobile	11543
Nissan	27268
Mitsubishi	21241
Mercedes-Benz	37972
Mazda	20039
Maserati	71000
Lotus	60245
Lincoln	42024
Lexus	41756
Land Rover	45798
Kia	25310
Infiniti	42253
Hyundai	24597
HUMMER	36464
Honda	26674
GMC	30493
Genesis	46617
Ford	27120
FIAT	22670
Dodge	20083
Chrysler	26723
Chevrolet	27246
Cadillac	48528
Buick	28207
BMW	46689
Audi	40480
Alfa Romeo	61600
Acura	33521
Grand Total	**28672**

Task 4.B: Create a bar chart or a horizontal stacked bar chart that visualizes the relationship between manufacturer and average price.



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.

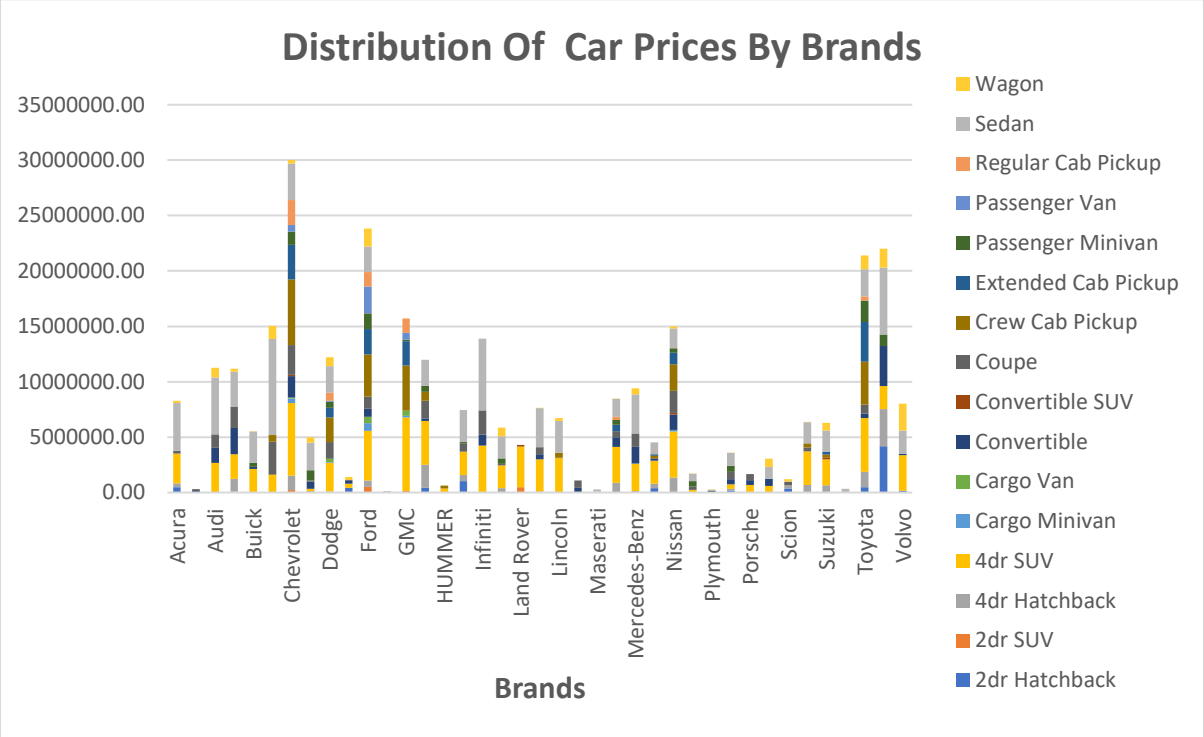
Correlation = -0.613860121 (With Formula)

With Data Analysis Toolpack-

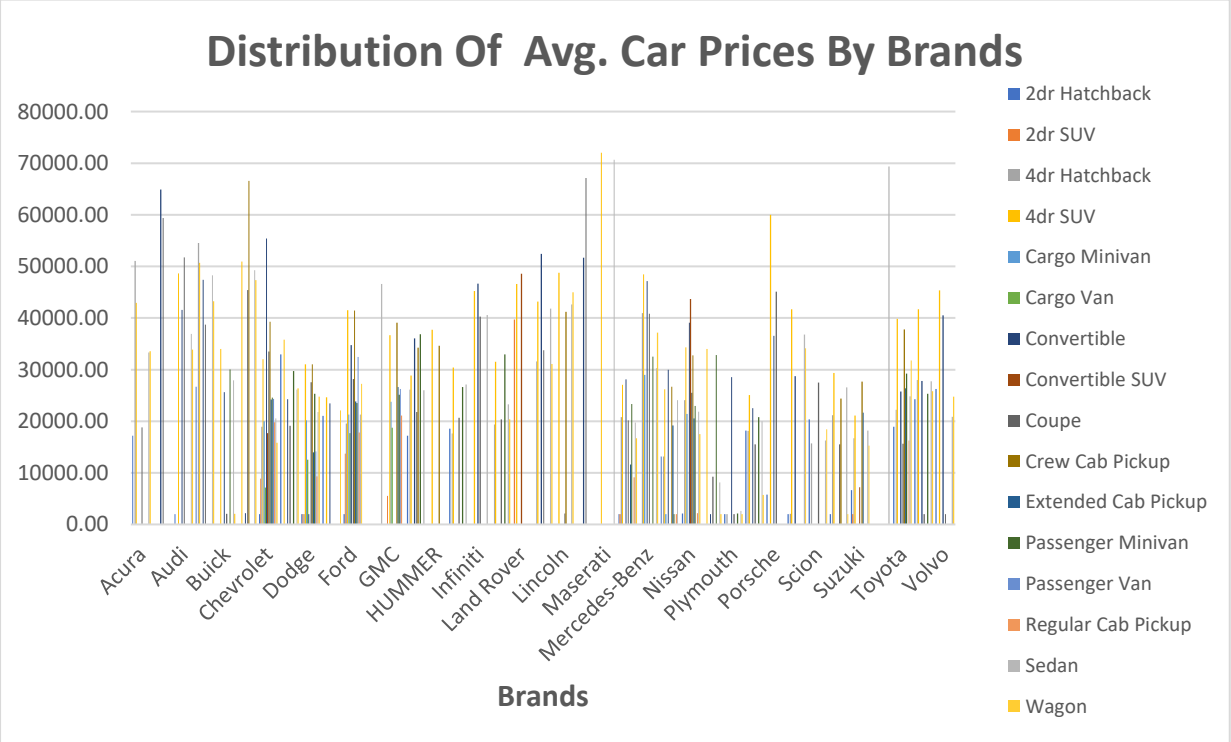
	Engine Cylinders	*highway MPG*
Engine Cylinders	1	
highway MPG	**-0.613860121**	1

Building the Dashboard

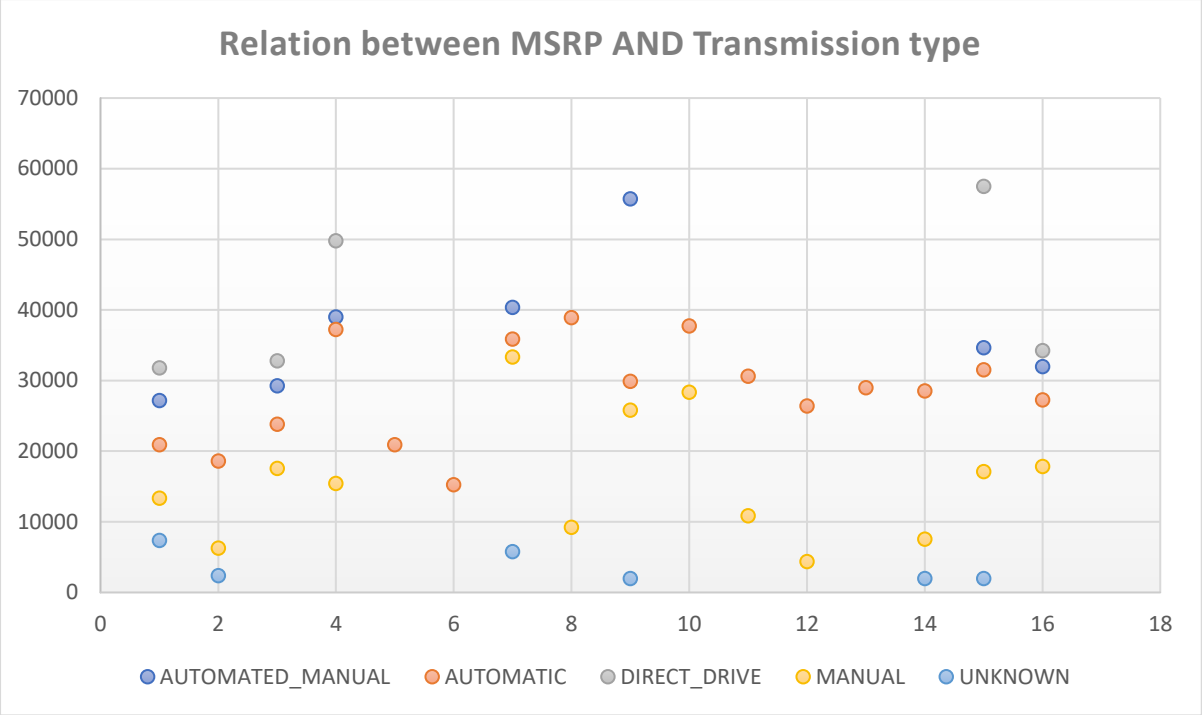
Task 1: How does the distribution of car prices vary by brand and body style?



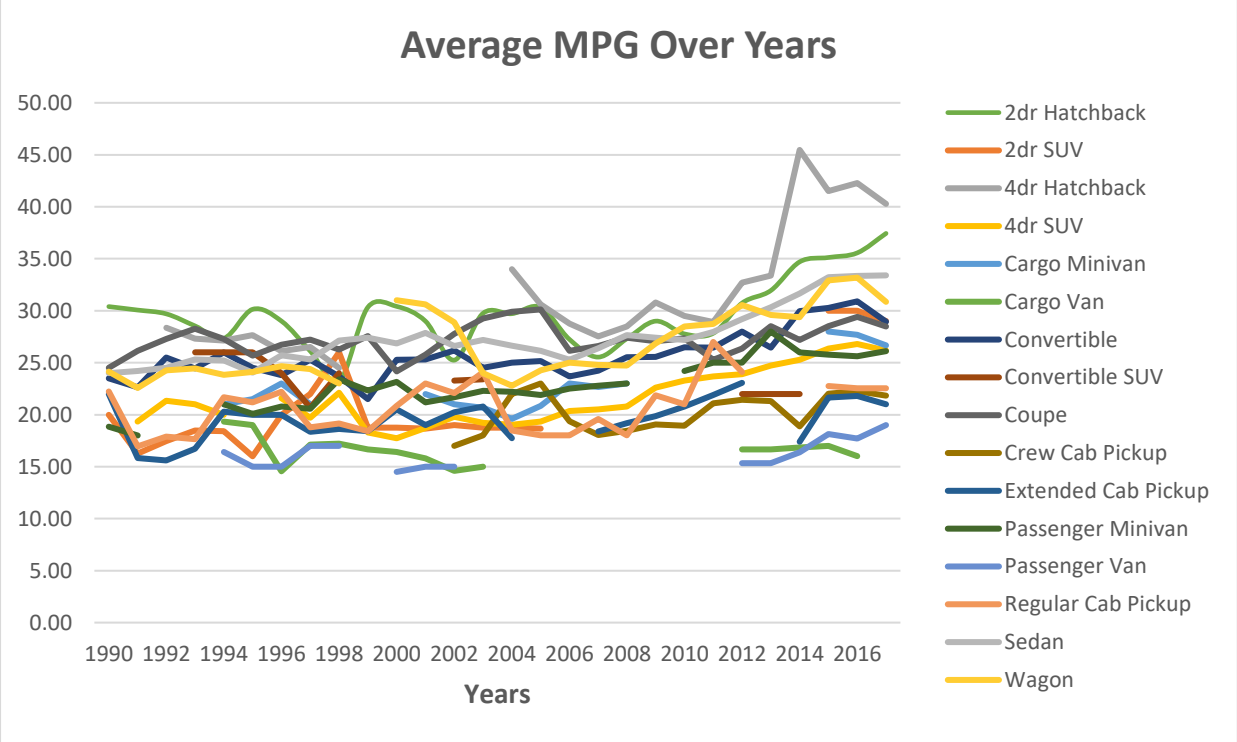
Task 2: Which car brands have the highest and lowest average MSRPs, and how does this vary by body style?



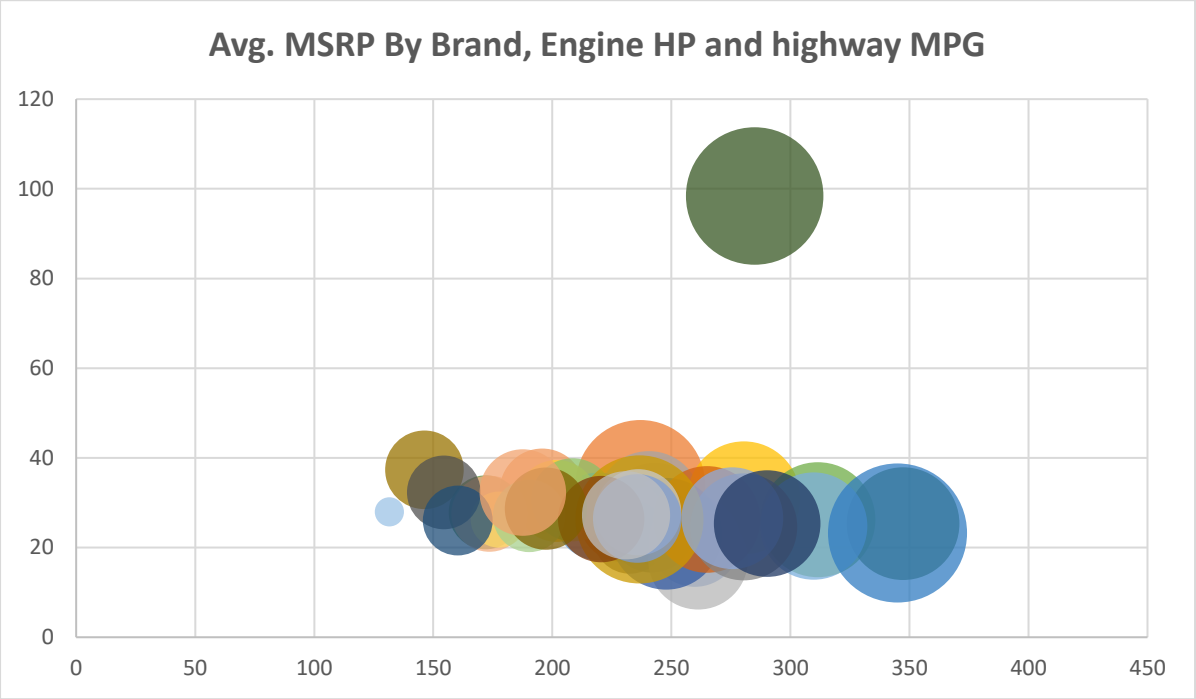
Task 3: How do the different feature such as transmission type affect the MSRP, and how does this vary by body style?



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?



Screenshot of Final Dashboard