Car Features Analysis Project

# Introduction

The owner of a car showroom handles a variety of car types and models. This dataset includes a range of features for each car, corresponding to the models present in the showroom. The price of each car is determined by its unique attributes. Our objective is to examine these various car features and understand how they influence the car's pricing.

# Q1. Perform EDA on the Given Dataset

## First Few Rows of the Dataset:

Make Fuel Type Aspiration Number of Doors Body Style Drive Wheels \  
0 Toyota Diesel Std Two Convertible Fwd   
1 Mitsubishi Diesel Std Four Convertible Fwd   
2 Chevrolet Gas Turbo Four Hatchback Rwd   
3 Mitsubishi Gas Turbo Four Hatchback Fwd   
4 Mercedes Gas Std Four Sedan Rwd   
  
 Engine Location Number of Cylinders Wheel Base Length Width Height \  
0 Front Twelve 95.1 175.9 60.6 59.4   
1 Rear Four 91.7 153.9 60.5 55.1   
2 Front Two 116.2 203.5 65.3 58.5   
3 Front Three 112.8 154.3 64.9 51.4   
4 Rear Two 115.1 143.4 62.6 49.6   
  
 Curb Weight Engine Size Horsepower City MPG Highway MPG Price   
0 1758 252 279 40 41 5272   
1 1887 95 150 32 42 31393   
2 3815 231 129 13 41 40450   
3 3367 106 230 39 21 37881   
4 3433 294 96 46 52 18087

## Summary of the Dataset:

None

## Descriptive Statistics:

Wheel Base Length Width Height Curb Weight Engine Size \  
count 25.000000 25.000000 25.000000 25.000000 25.000000 25.000000   
mean 105.736000 173.928000 65.868000 52.680000 2907.720000 192.360000   
std 9.046403 18.508523 3.632804 3.623534 777.650924 79.342548   
min 91.700000 143.400000 60.500000 47.800000 1488.000000 79.000000   
25% 96.000000 161.400000 62.500000 50.000000 2108.000000 106.000000   
50% 106.800000 172.400000 66.300000 51.800000 3231.000000 199.000000   
75% 113.900000 187.800000 68.500000 55.100000 3433.000000 252.000000   
max 119.600000 207.600000 71.500000 59.800000 3922.000000 319.000000   
  
 Horsepower City MPG Highway MPG Price   
count 25.000000 25.000000 25.000000 25.000000   
mean 168.760000 29.720000 37.640000 22684.920000   
std 73.189981 10.659581 10.664896 10684.205266   
min 50.000000 13.000000 16.000000 5272.000000   
25% 100.000000 24.000000 30.000000 14838.000000   
50% 168.000000 29.000000 41.000000 18524.000000   
75% 231.000000 38.000000 45.000000 31393.000000   
max 288.000000 49.000000 53.000000 40466.000000

## Unique Values in Categorical Columns:

Make: ['Toyota' 'Mitsubishi' 'Chevrolet' 'Mercedes' 'Audi' 'Mazda' 'BMW'  
 'Nissan' 'Honda' 'Ford']

Fuel Type: ['Diesel' 'Gas']

Aspiration: ['Std' 'Turbo']

Number of Doors: ['Two' 'Four']

Body Style: ['Convertible' 'Hatchback' 'Sedan' 'Wagon' 'Hardtop']

Drive Wheels: ['Fwd' 'Rwd' '4wd']

Engine Location: ['Front' 'Rear']

Number of Cylinders: ['Twelve' 'Four' 'Two' 'Three' 'Eight' 'Five' 'Six']

# Q2. Summarize the Data Using Descriptive Statistics

Wheel Base Length Width Height Curb Weight Engine Size \  
count 25.000000 25.000000 25.000000 25.000000 25.000000 25.000000   
mean 105.736000 173.928000 65.868000 52.680000 2907.720000 192.360000   
std 9.046403 18.508523 3.632804 3.623534 777.650924 79.342548   
min 91.700000 143.400000 60.500000 47.800000 1488.000000 79.000000   
25% 96.000000 161.400000 62.500000 50.000000 2108.000000 106.000000   
50% 106.800000 172.400000 66.300000 51.800000 3231.000000 199.000000   
75% 113.900000 187.800000 68.500000 55.100000 3433.000000 252.000000   
max 119.600000 207.600000 71.500000 59.800000 3922.000000 319.000000   
  
 Horsepower City MPG Highway MPG Price   
count 25.000000 25.000000 25.000000 25.000000   
mean 168.760000 29.720000 37.640000 22684.920000   
std 73.189981 10.659581 10.664896 10684.205266   
min 50.000000 13.000000 16.000000 5272.000000   
25% 100.000000 24.000000 30.000000 14838.000000   
50% 168.000000 29.000000 41.000000 18524.000000   
75% 231.000000 38.000000 45.000000 31393.000000   
max 288.000000 49.000000 53.000000 40466.000000

# Q3. Identify the Costliest and Cheapest Car by Average Price

## Costliest Car:

Make Fuel Type Aspiration Number of Doors Body Style Drive Wheels \  
6 Toyota Gas Std Two Sedan Fwd   
  
 Engine Location Number of Cylinders Wheel Base Length Width Height \  
6 Front Two 99.1 165.9 66.3 50.1   
  
 Curb Weight Engine Size Horsepower City MPG Highway MPG Price   
6 1488 280 103 49 51 40466

## Cheapest Car:

Make Fuel Type Aspiration Number of Doors Body Style Drive Wheels \  
0 Toyota Diesel Std Two Convertible Fwd   
  
 Engine Location Number of Cylinders Wheel Base Length Width Height \  
0 Front Twelve 95.1 175.9 60.6 59.4   
  
 Curb Weight Engine Size Horsepower City MPG Highway MPG Price   
0 1758 252 279 40 41 5272

# Q4. Which Fuel Type Car Has the Highest Average Price?

The fuel type with the highest average price is Gas

# Q5. Construct a Contingency Table (Using "make" as the Row Variable)

Fuel Type Diesel Gas  
Make   
Audi 2 1  
BMW 4 0  
Chevrolet 0 1  
Ford 0 2  
Honda 0 1  
Mazda 2 1  
Mercedes 1 2  
Mitsubishi 1 2  
Nissan 0 1  
Toyota 2 2

# Q6. Probability that a Randomly Selected Car Will be a BMW

Probability of selecting a BMW: 0.16

# Q7. Probability that a Randomly Selected Car Will be an Audi

Probability of selecting an Audi: 0.12

# Q8. Hypothesis Testing for Price of Gas Cars vs Diesel Cars

H0: There is no significant difference in the price of Gas cars and Diesel cars  
H1: There is a significant difference in the price of Gas cars and Diesel cars

T-statistic: 1.1236308256408953, P-value: 0.27276131360711153

Cannot reject the null hypothesis: The price of Gas cars is not significantly different from that of Diesel cars.

# Q9. Probability that a Randomly Selected Car is a "Luxury Car"

Probability of selecting a luxury car: 0.4

# Q10. Number of Different Ways to Arrange Three Unique Cars in a Race

Number of different ways to arrange three unique cars in a race: 720

# Q11. Probability that a Car with 8 Cylinders is a BMW

There are no cars with 8 cylinders in the dataset.

# Q12. Probability of Selecting Exactly 3 Turbo Cars out of 7

Probability of selecting exactly 3 Turbo cars out of 7: 0.29320959754240045