DATA ANALYSIS

# Yearly Report

DAS AUTO

# MISSION & VISION

"To become the world's leading provider of premium products and services for individual mobility."


DAS AUTO

# INTRODUCTION

This is the report file analyzing the production of the particular year, to help the customers to purchase the car of their choice. In the automotive industry, all those corporations and actions involved in the manufacturing of motor vehicles, including most elements, such as, e.g., engines and bodies, and fuel. The industry's principal products are passenger automobiles and light trucks, including pickups, vans, and sport utility vehicles. Commercial vehicles, though significant to the industry, are secondary.

DAS AUTO

# CONTENTS



DAS AUTO

# ABSTRACT

This document discusses the findings during the course of investigating the dataset.
During the exploration, I used Python and its libraries like Pandas, Numpy, Matplotlib, and seaborn.
The dataset used is the given dataset by Microsoft Engage.
Moreover, I created one more dataset which comprises sample images of cars and logos of the companies .

DAS AUTO

# PROBLEM STATEMENT

Develop an application to demonstrate how the Automotive Industry could harness data to make informed decisions

DAS AUTO

# DATASET

Brief Discription of Datasets

## DATASET 1: cars_engage_2022.csv

The **dataset** contains **1276 rows** and **141 columns**. We have then filtered some of the columns, the parameters useful for buyers to get a car.

**Make**: Car's company

**Model**: Car's Model

**Variant**: a label that is used to describe a particular vehicle

**Car Type**: Automatic or Manual

**Ex-showroom price**: it is the price tag at which vehicles are usually advertised.

**cylinders**: the more cylinders your engine has, the more power is produced

**Emission Norm**: chemicals in exhaust gases that are harmful to air quality

**Fuel_Type**: vehicles worldwide are powered by gasoline or diesel

DAS AUTO

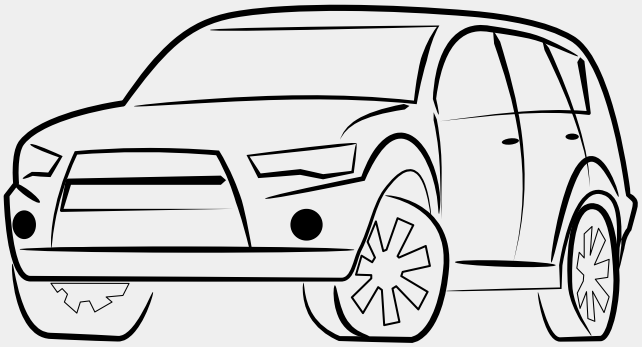
After getting relevant columns,  the shape of the new dataset is:

```
cars_new.shape
```

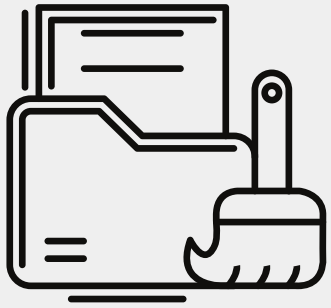
```
(1276, 23)
```

## DATASET 2:  Automobile.csv

This dataset contains car information along with the image URL of sample cars from the brand and its logo. This has been used to make a dashboard in Power Bi with dynamic images



# CLEANING

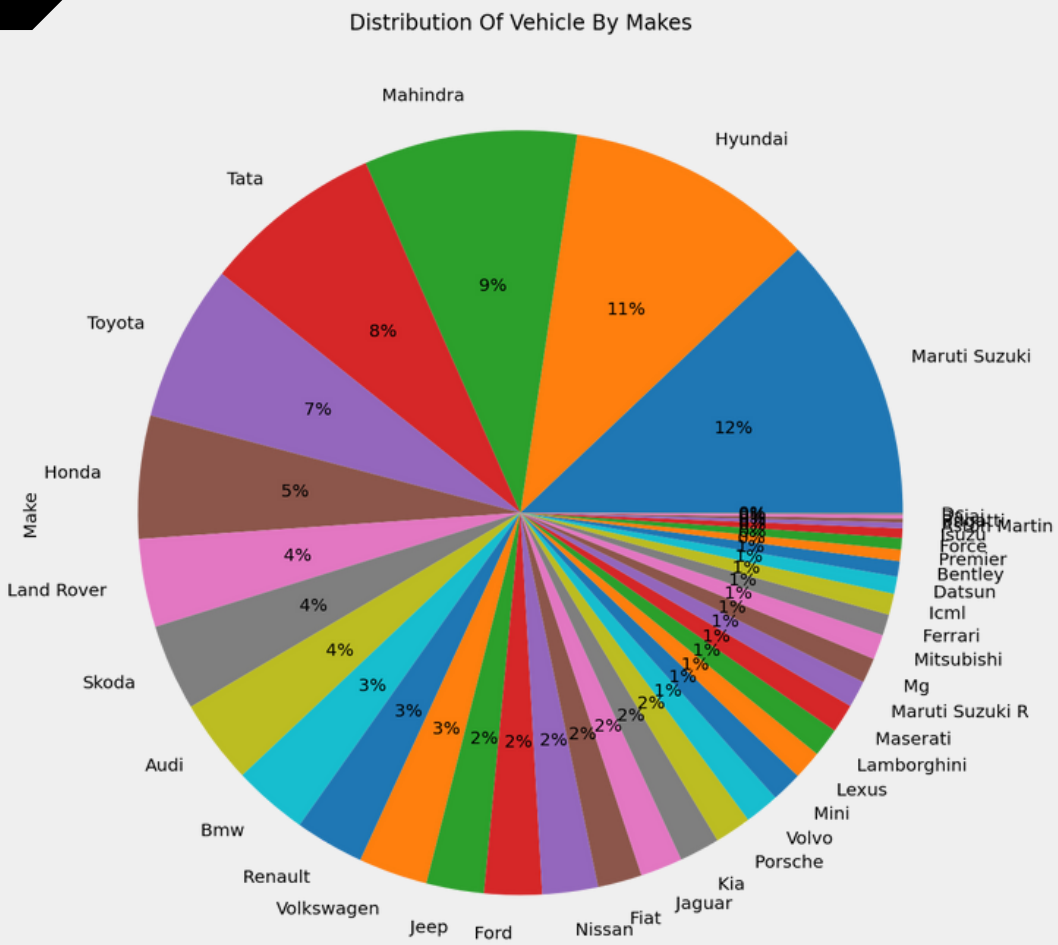


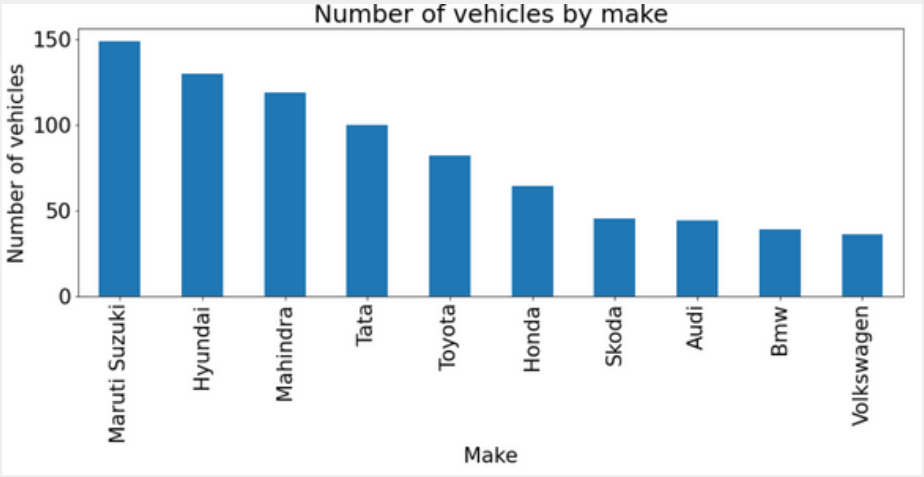
In this process, I check if the dataset contains the null values or missing values. There were some duplicate values too that could hinder analysis.

Moreover, I sum up all the null values in a particular column. Later cleaned the column to have similar values.

DAS AUTO

# ANALYSIS




Maruti Suzuki is the company which has the most number of vehicles with more than 40% than the 2nd highest Hyundai. Maruti Suzuki and Hyundai produce frequently while Dc, Aston Martin, Bugatti etc don't.

```
(cars_new['Make'] == 'Maruti Suzuki').sum()
```

```
149
```

```
(cars_new['Make'] == 'Bugatti').sum()
```

```
2
```

DAS AUTO

| Doors<br>Make | 2.0 | 3.0 | 4.0 | 5.0 | Total |
|---|---|---|---|---|---|
| Aston Martin | 2 | 0 | 1 | 0 | 3 |
| Audi | 5 | 0 | 17 | 22 | 44 |
| Bajaj | 0 | 0 | 2 | 0 | 2 |
| Bentley | 2 | 0 | 3 | 3 | 8 |
| Bmw | 4 | 0 | 13 | 22 | 39 |
| Bugatti | 2 | 0 | 0 | 0 | 2 |
| Datsun | 0 | 0 | 0 | 9 | 9 |
| Dc | 1 | 0 | 0 | 0 | 1 |
| Ferrari | 9 | 0 | 2 | 0 | 11 |
| Fiat | 0 | 0 | 7 | 16 | 23 |
| Force | 0 | 3 | 0 | 3 | 6 |
| Ford | 0 | 1 | 0 | 29 | 30 |
| Honda | 0 | 0 | 36 | 28 | 64 |
| Hyundai | 0 | 0 | 40 | 90 | 130 |
| Icml | 0 | 0 | 0 | 11 | 11 |
| Isuzu | 0 | 0 | 3 | 2 | 5 |
| Jaguar | 7 | 0 | 13 | 2 | 22 |
| Jeep | 2 | 0 | 0 | 28 | 30 |
| Kia | 0 | 0 | 0 | 21 | 21 |
| Lamborghini | 14 | 0 | 0 | 1 | 15 |
| Land Rover | 0 | 0 | 10 | 36 | 46 |
| Lexus | 2 | 0 | 13 | 0 | 15 |
| Mahindra | 0 | 3 | 8 | 100 | 111 |
| Maruti Suzuki | 0 | 2 | 31 | 116 | 149 |
| Maruti Suzuki R | 0 | 0 | 0 | 14 | 14 |
| Maserati | 5 | 0 | 6 | 4 | 15 |
| Mg | 0 | 0 | 0 | 13 | 13 |
| Mini | 1 | 3 | 7 | 5 | 16 |
| Mitsubishi | 0 | 0 | 0 | 13 | 13 |
| Nissan | 1 | 0 | 7 | 21 | 29 |
| Porsche | 4 | 0 | 8 | 7 | 19 |
| Premier | 0 | 0 | 0 | 6 | 6 |
| Renault | 0 | 0 | 7 | 29 | 36 |
| Skoda | 0 | 0 | 42 | 3 | 45 |
| Tata | 0 | 0 | 15 | 79 | 94 |
| Toyota | 0 | 0 | 32 | 50 | 82 |
| Volkswagen | 0 | 0 | 21 | 15 | 36 |
| Volvo | 0 | 0 | 4 | 14 | 18 |
| Total | 61 | 12 | 348 | 812 | 1233 |

# DOORS

Cars have various types of doors. The swinging doors which are the most common are almost the most complicated parts in a car since they not only determine the general guidelines of car style but also are vital for passengers' safety by protecting humans from side crashes. Comparison between FEA results and targets led to the necessity to split the lower opening of the front door into two parts to increase stiffness. Also, the thickness of window regulator engine fixing in both front and rear doors is increased. Predetermined values from previous works conducted on a similar existing SUV, vehicle were used as targets to be achieved by Finite Element Analysis (FEA) of car doors. Mobile hinge fixing is duplicated for both front and rear doors Inner panel opening in the front door window lower mechanism is also decreased.

The cars which have wing doors generally produce 2 doors. SUV contains four or five doors.

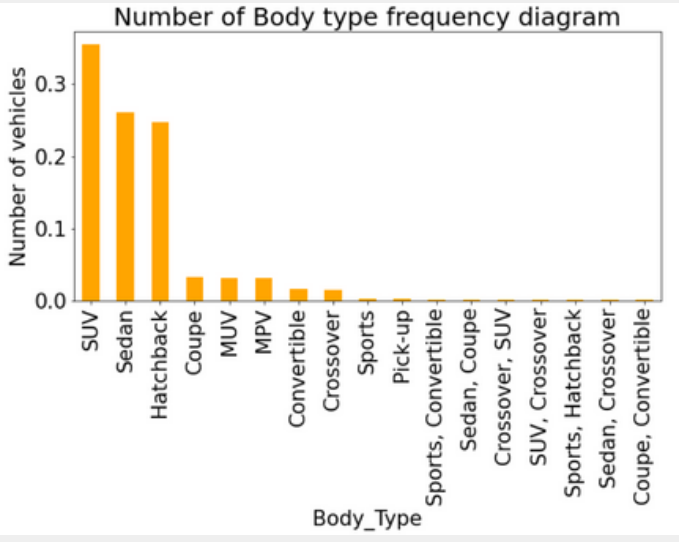
Here, Buggati produces cars with 2 doors, while Hyundai has 4 and 5 doors.

DAS AUTO

# BODY TYPE

| Body_Type<br>Make | Convertible | Coupe | Coupe, Convertible | Crossover | Crossover, SUV | Hatchback | MPV | MUV | Pick-up | SUV | SUV, Crossover | Sedan | Sedan, Coupe | Sedan, Crossover | Sports | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aston Martin | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | |
| Audi | 2 | 3 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 17 | 0 | 17 | 1 | 0 | 0 | |
| Bajaj | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Bentley | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 0 | 0 | 0 | |
| Bmw | 0 | 2 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 12 | 2 | 16 | 0 | 0 | 0 | |
| Bugatti | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | |
| Datsun | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Dc | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Ferrari | 1 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | |
| Fiat | 0 | 0 | 0 | 8 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | |
| Force | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | |
| Ford | 0 | 0 | 0 | 3 | 0 | 11 | 0 | 0 | 0 | 15 | 0 | 0 | 1 | 0 | 0 | |
| Honda | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 20 | 0 | 36 | 0 | 0 | 0 | |
| Hyundai | 0 | 0 | 0 | 0 | 0 | 46 | 0 | 0 | 0 | 40 | 0 | 44 | 0 | 0 | 0 | |
| Icml | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | |
| Isuzu | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | |
| Jaguar | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 12 | 0 | 0 | 0 | |
| Jeep | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28 | 0 | 0 | 0 | 0 | 0 | |
| Kia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | |
| Lamborghini | 5 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | |

Talking about  Body-Type, people think of the outward appearance of the car.
Some, such as hatchbacks, describe a key form or function of the car. Others, such as sedans, have their roots in earlier forms of transportation that predate motor vehicles.
Car body types make it easier to choose what kind of car to buy rather than evaluating every individual model. Someone living in a crowded city, for example, might immediately rule out all pickup trucks.




Company produces more SUV than Sedan and Hatchback. This means people choose more SUV.

DAS AUTO

## SEDAN

At some point, most drivers will own a sedan in their lifetime, simply because of its diversity. It's perfect for families, commuters, travelers, and business people alike. Popular options include the effortlessly affordable Nissan Versa to the best-selling Toyota Camry. At the upper end of the scale, the BMW 4-Series sedan is an excellent option.

## Coupes

Because a coupe usually has two doors and a shortened cabin area, it's a car that centers around the driver rather than families. They're great for commuters in many cases and over the years have been popular among the business class as well. The Honda Civic Coupe is a popular and affordable model, while the Audi A5 Coupe classes it up. But the most popular coupe crosses over with sports cars, too—the Ford Mustang.

## Convertibles

Convertibles aren't considered the most practical cars, since the top usually cuts into trunk storage space. Still, convertibles are popular for fun-loving drivers that tend to be singles or couples. Empty-nesters tend to be the highest-volume consumers. The Mazda MX-5 Miata is one of the highest-acclaimed and popular convertibles over the past few decades, and the VW Beetle convertible is among the most iconic. The Porsche 718 Boxster is a great choice for a premium convertible.

DAS AUTO

## SPORTS CAR

Generally, there's little focus on storage or passenger space, so sports cars aren't the ideal family car. They tend to be more popular among single guys, people with money to spare, and those going through a midlife crisis. Exuberant youths love sports cars like the Dodge Challenger and the Subaru Impreza WRX, and an iconic model that's been around since the '50s is the Chevy Corvette.

## HATCHBACKS

Since they're usually smaller cars, hatchbacks tend to make excellent vehicles for commuters and students. However, they're so versatile that almost anyone can find a use for a hatchback. Among the most popular hatchback models worldwide is the Toyota Prius, followed closely by the Ford Focus. The Audi A3 Sportback e-Tron pushes the limits of the hatchback style as well.

## SUVs

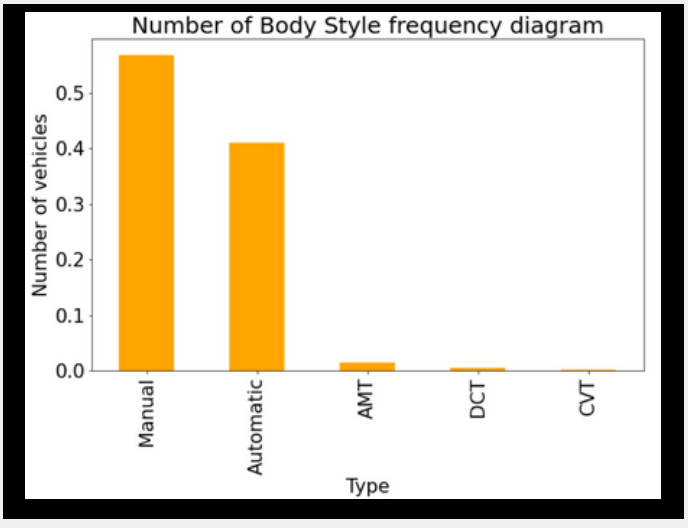
True SUVs are on the pricey end of the scale. You'll find the comfort-based models make a great substitute for people who are turned off by minivans while the hardy varieties are sought after by adventure-seeking off-road enthusiasts. The iconic Jeep Wrangler continues to be one of the most popular models. The GMC Yukon and Mercedes-Benz G-Class Wagon are other SUV models that have become popular.

DAS AUTO

# TYPE

| Type<br>Make | AMT | Automatic | CVT | DCT | Manual |
|---|---|---|---|---|---|
| Aston Martin | 0.000000 | 0.002417 | 0.000000 | 0.000000 | 0.000000 |
| Audi | 0.000000 | 0.033038 | 0.000000 | 0.001612 | 0.000806 |
| Bajaj | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.001612 |
| Bentley | 0.000000 | 0.006446 | 0.000000 | 0.000000 | 0.000000 |
| Bmw | 0.000000 | 0.031426 | 0.000000 | 0.000000 | 0.000000 |
| Bugatti | 0.000000 | 0.001612 | 0.000000 | 0.000000 | 0.000000 |
| Datsun | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.007252 |
| Dc | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000806 |
| Ferrari | 0.000000 | 0.008864 | 0.000000 | 0.000000 | 0.000000 |
| Fiat | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.018533 |
| Force | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.004835 |
| Ford | 0.000000 | 0.003223 | 0.000000 | 0.000000 | 0.020951 |
| Honda | 0.000000 | 0.017728 | 0.000000 | 0.000000 | 0.033844 |
| Hyundai | 0.003223 | 0.020951 | 0.000000 | 0.001612 | 0.078969 |
| Icml | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.008864 |
| Isuzu | 0.000000 | 0.002417 | 0.000000 | 0.000000 | 0.001612 |
| Jaguar | 0.000000 | 0.017728 | 0.000000 | 0.000000 | 0.000000 |
| Jeep | 0.000000 | 0.012893 | 0.000000 | 0.000000 | 0.011281 |
| Kia | 0.000000 | 0.006446 | 0.000000 | 0.000806 | 0.009670 |
| Lamborghini | 0.000000 | 0.012087 | 0.000000 | 0.000000 | 0.000000 |
| Land Rover | 0.000000 | 0.008058 | 0.000000 | 0.000000 | 0.000000 |
| Land Rover Rover | 0.000000 | 0.029009 | 0.000000 | 0.000000 | 0.000000 |
| Lexus | 0.000000 | 0.012087 | 0.000000 | 0.000000 | 0.000000 |
| Mahindra | 0.000806 | 0.017728 | 0.000000 | 0.000000 | 0.077357 |
| Maruti Suzuki | 0.004835 | 0.025786 | 0.000000 | 0.000000 | 0.089444 |
| Maruti Suzuki R | 0.000000 | 0.004029 | 0.000000 | 0.000000 | 0.007252 |
| Maserati | 0.000000 | 0.012087 | 0.000000 | 0.000000 | 0.000000 |
| Mg | 0.000000 | 0.001612 | 0.000000 | 0.001612 | 0.007252 |
| Mini | 0.000000 | 0.012087 | 0.000000 | 0.000000 | 0.000806 |
| Mitsubishi | 0.000000 | 0.008058 | 0.000000 | 0.000000 | 0.002417 |
| Nissan | 0.000000 | 0.004029 | 0.000000 | 0.000000 | 0.019339 |
| Porsche | 0.000000 | 0.015310 | 0.000000 | 0.000000 | 0.000000 |
| Premier | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.004835 |
| Renault | 0.000000 | 0.006446 | 0.000806 | 0.000000 | 0.021757 |
| Skoda | 0.000000 | 0.022562 | 0.000000 | 0.000000 | 0.013699 |
| Tata | 0.005641 | 0.016116 | 0.000000 | 0.000000 | 0.053989 |
| Toyota | 0.000000 | 0.016922 | 0.001612 | 0.000000 | 0.047542 |
| Volkswagen | 0.000000 | 0.012893 | 0.000000 | 0.000000 | 0.016116 |
| Volvo | 0.000000 | 0.014504 | 0.000000 | 0.000000 | 0.000000 |

This table shows us that 3.3% of the total population are Audi Automatic and 7.74% are Mahindra Manual.

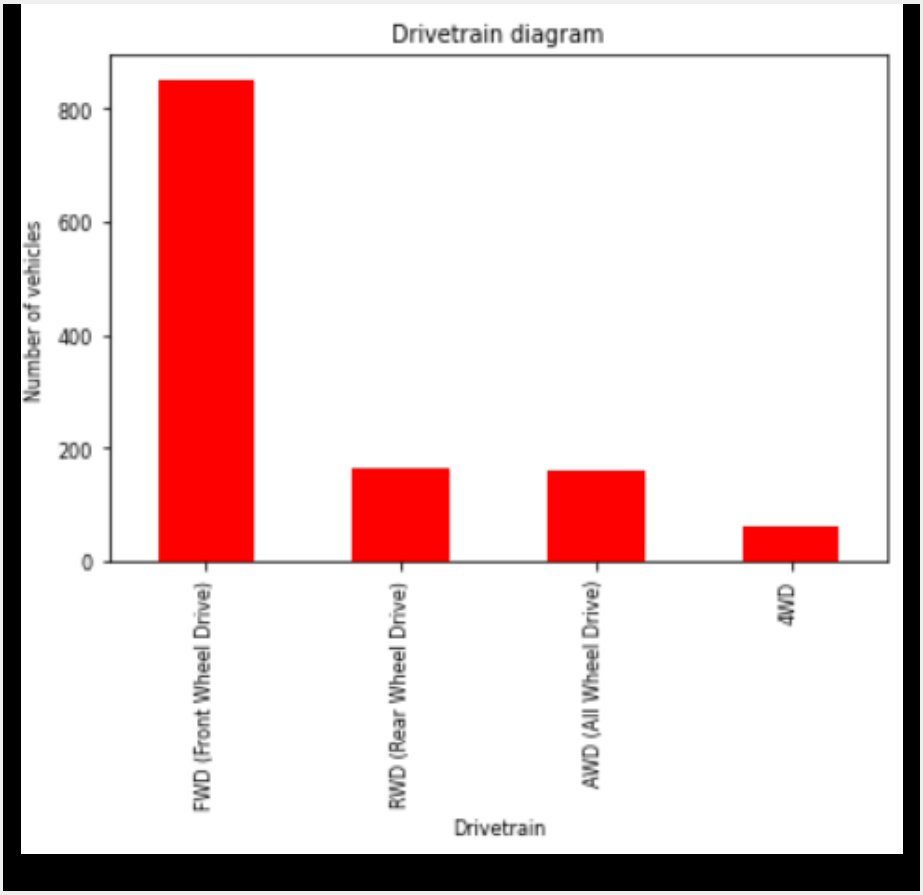



DAS AUTO

# DRIVETRAIN

| | Drivetrain | Ex-Showroom_Price |
|---|---|---|
| 0 | 4WD | 1.216533e+07 |
| 1 | AWD (All Wheel Drive) | 1.462547e+07 |
| 2 | FWD (Front Wheel Drive) | 1.228400e+06 |
| 3 | RWD (Rear Wheel Drive) | 1.064418e+07 |

For drive wheels, front wheel drive has most number of cars followed by rear wheel and all wheel. There are very less number of cars for four wheel drive.

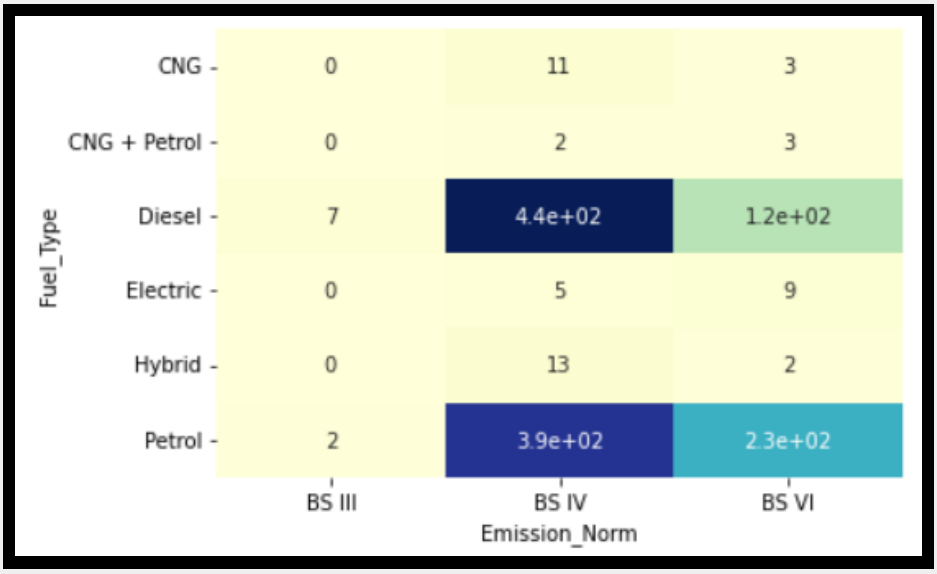



From our data, it seems All-wheel drive vehicles are, on average, the most expensive.

DAS AUTO

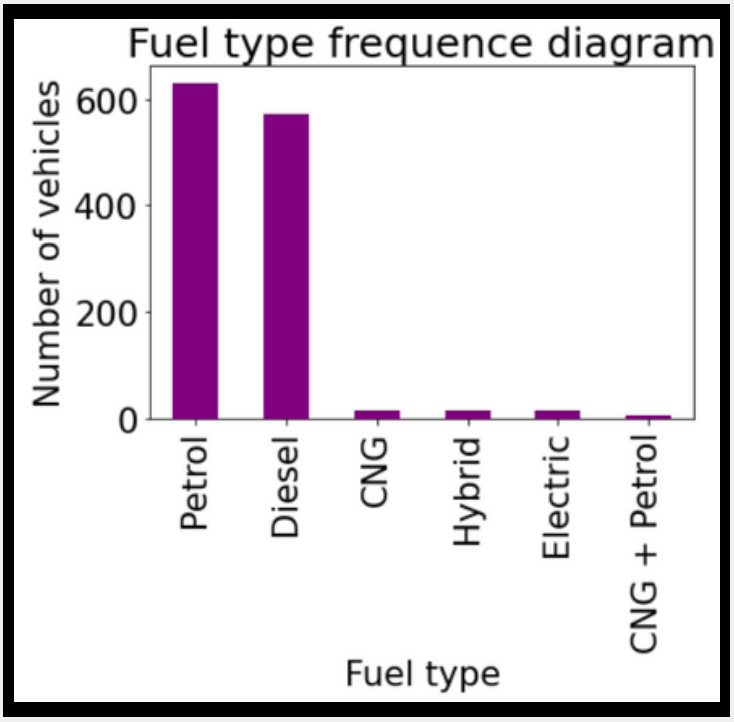
# POLLUTION

PUC is a certification mark that is provided to vehicles that undergo the PUC Test successfully. The certification indicates that the vehicle's emissions are in alignment with standard pollution norms and are not harmful to the environment. All vehicles on Indian roads are mandated to carry a valid PUC certification. Hence, Fuel type and Emission Norm is important.




The darker shade shows the high value

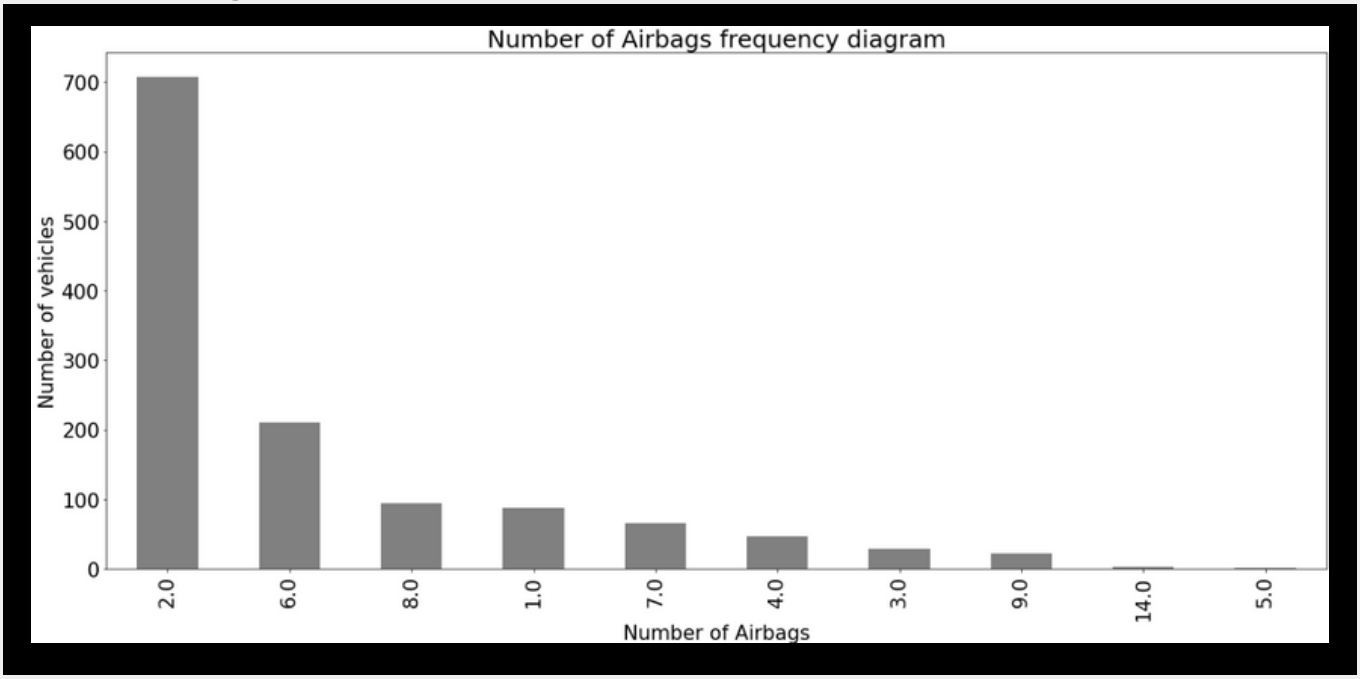
The most preferred fuel type for the customer is Petrol having more than 90% of the choice.



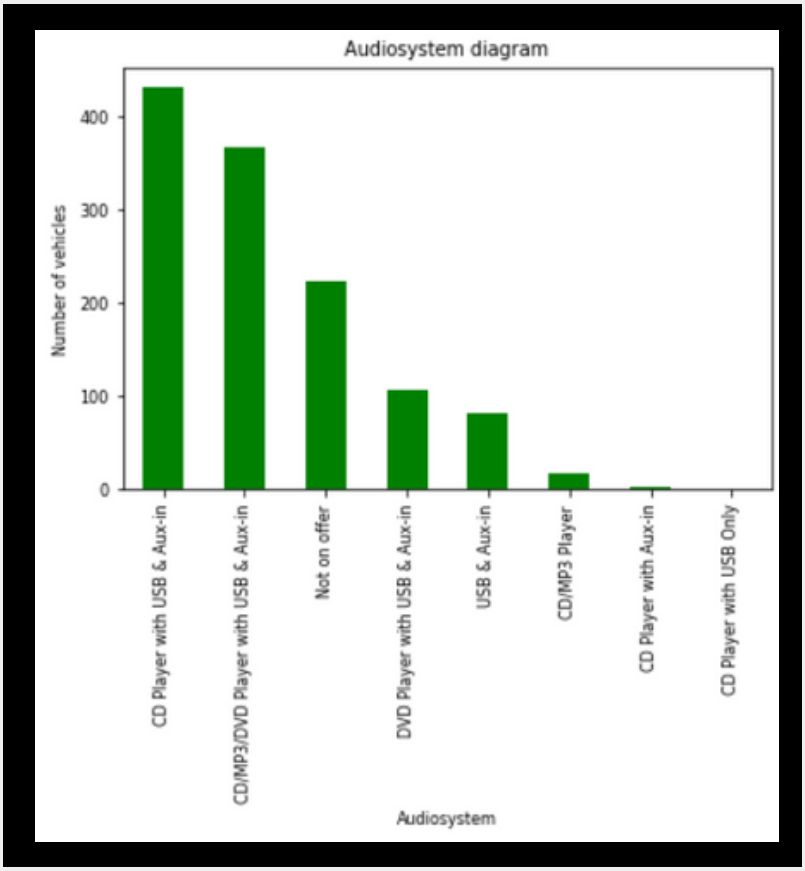

DAS AUTO

# SAFETY

Safety can be ensured by the number of airbags, which are inflated in the event of sudden brakes. More Cars consist of 2 Airbags.

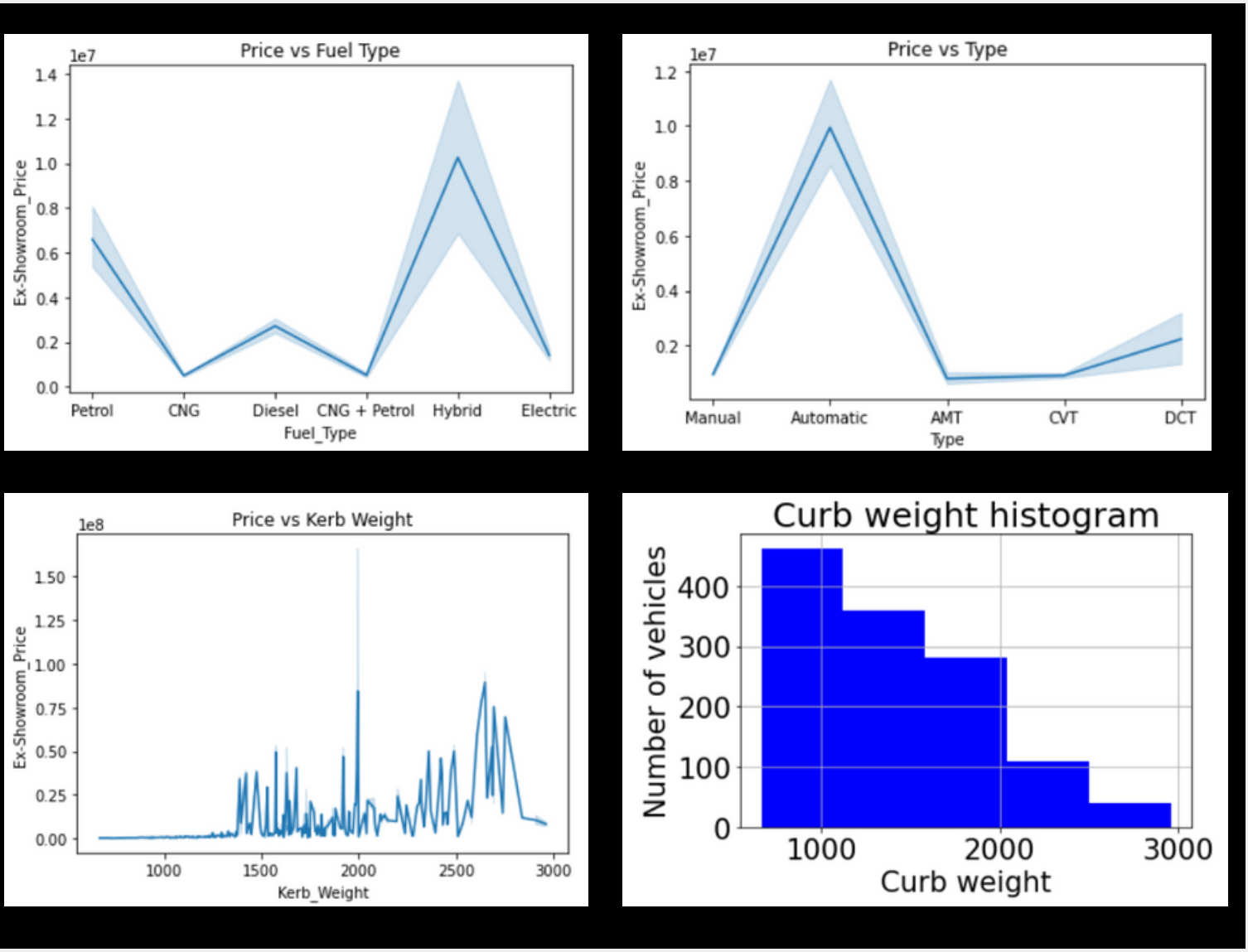



# AUDIOSYSTEM




DAS AUTO

# Important Graphs

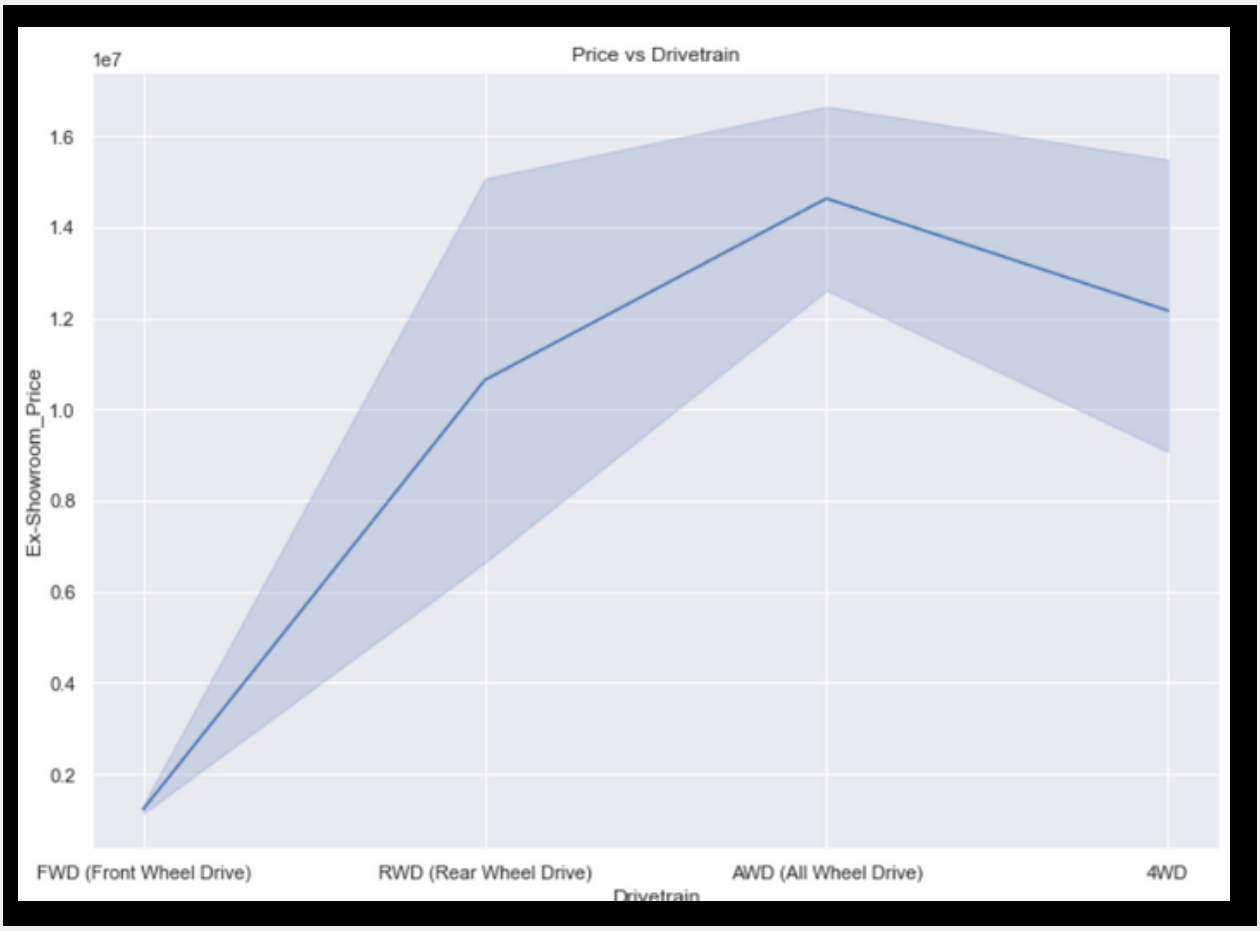


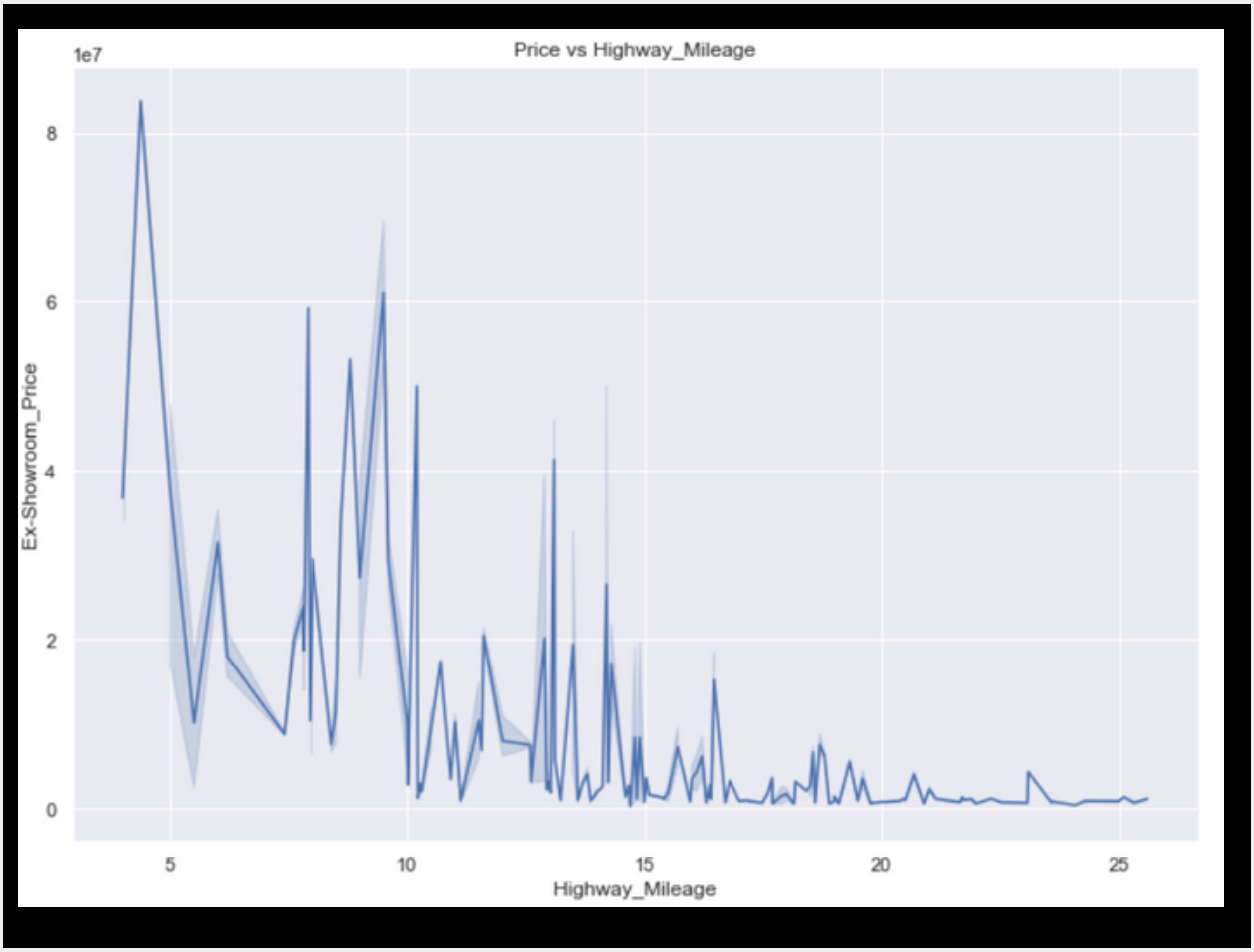

Cars having a hybrid mode of fuel is costlier than cars running on Petrol.

Automatic cars are more expensive than Manual.

The curb weight of the cars is distributed between 1000 and 3000 approximately.

DAS AUTO


Price vs Drivetrain
1e7
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
Ex-Showroom_Price
FWD (Front Wheel Drive)
RWD (Rear Wheel Drive)
AWD (All Wheel Drive)
4WD
Drivetrain


Price vs Highway_Mileage
1e7
8
6
4
2
0
Ex-Showroom_Price
5
10
15
20
25
Highway_Mileage

DAS AUTO

# CONCLUSION

We now have a better idea of what our data looks like and which variables are important to take into account when buying a car. We have narrowed it down to the following variables:

- Kerb Weight
- Highway Mileage
- Drivetrain
- Car Type(Automatic or Manual)
- Fuel Type

DAS AUTO