# Audi Used Car Analysis

Nandini Jaiswal

## Introduction

The automotive industry has witnessed a significant shift in recent years, with an increasing number of consumers opting for used cars as a cost-effective and sustainable alternative to brand-new vehicles. Understanding the factors that influence the pricing of used cars is crucial for both buyers and sellers.

Why Audi Used Cars?:

Audi is renowned for producing high-quality vehicles that blend performance, style, and innovation. Analyzing the used Audi car market allows us to explore how these attributes hold value over time and the factors that impact their resale prices. This project provides valuable insights not only for car enthusiasts but also for individuals looking to make informed decisions in the used car market.

As we embark on this data-driven journey through the world of Audi used cars, we anticipate uncovering intriguing patterns, price determinants, and market insights that will enrich our understanding of the dynamics within this niche sector of the automotive market.

Let's rev up our engines and delve into the dataset to uncover the stories it holds! In this data-driven project, we delve into the fascinating world of Audi used cars, leveraging a comprehensive dataset sourced from Kaggle.

### Dataset Description

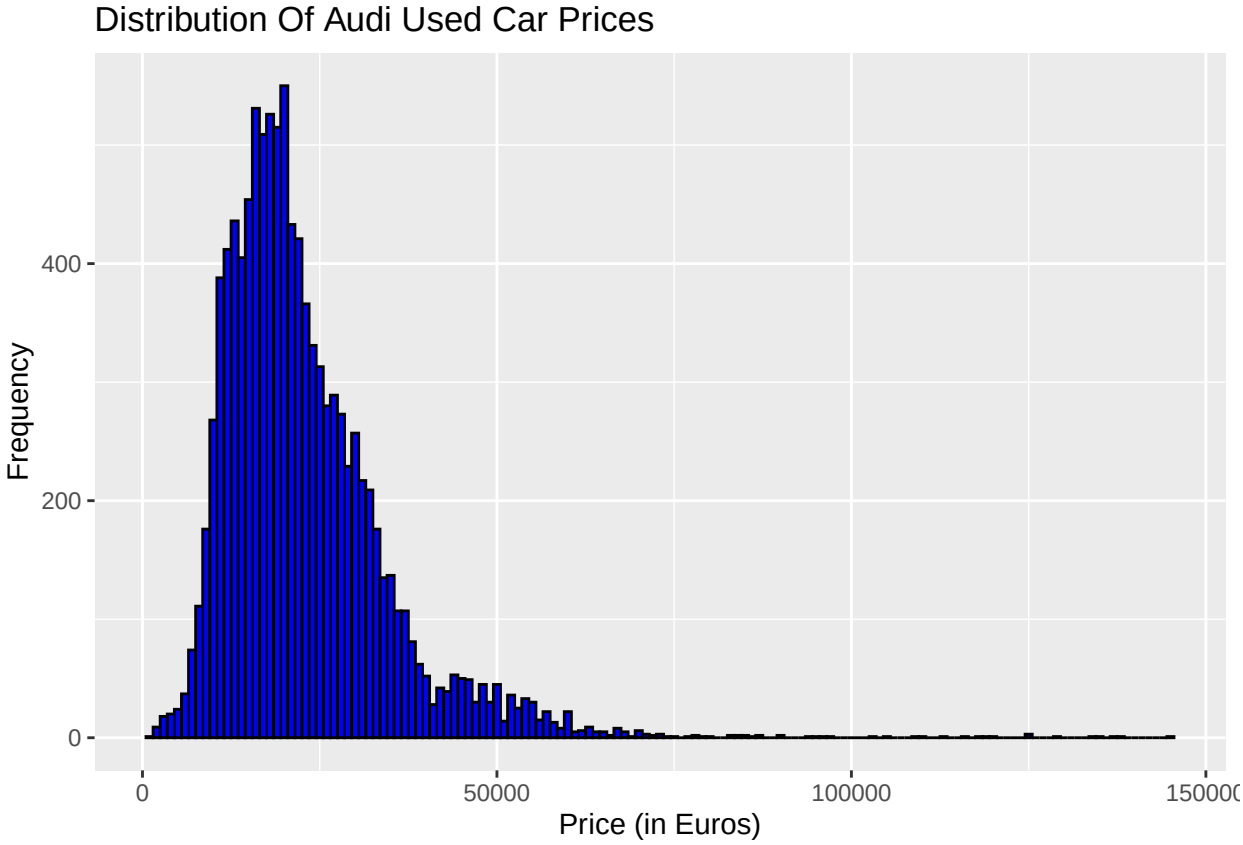
The dataset in focus, procured from Kaggle, contains a wealth of information about Audi used cars, spanning multiple model years, trim levels, and regions. It encompasses both numerical and categorical attributes, offering a rich source of insights into the used Audi car market. Some of the key variables at our disposal include:

**1)Price**: The selling price of the used Audi car in Euros.
**2)Year**: The model year of the car.
**3)Mileage**: The number of miles the car has been driven.
**4)Fuel Type**: The type of fuel the car uses (e.g., Diesel, Petrol).
**5)Transmission**: The type of transmission (e.g., Manual, Automatic).
**6)Tax**: The road tax cost for the car.
**7)MPG (Miles Per Gallon)**: The fuel efficiency of the car.
**8)Engine Size**: The engine size in liters.
**9)Model**: The specific model name of the Audi car.

**Brand**: The manufacturer (Audi).

## Exploratory Data Analysis

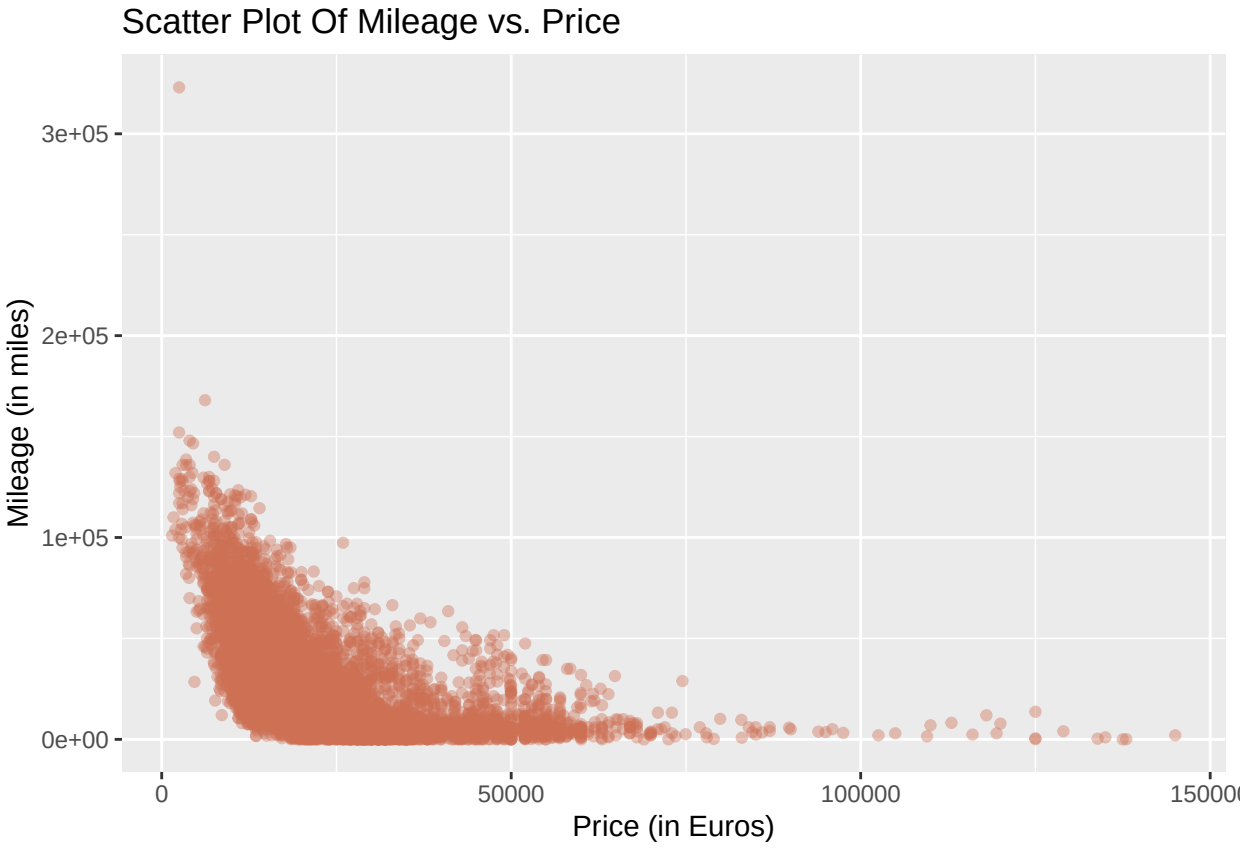
Below is a graph depicting the distribution of Audi used car prices.




### Comment

From the graph we observe that the distribution of car prices is positively skewed The primary reason for positive skewness in used car prices is the depreciation of vehicles. Cars tend to depreciate rapidly in their initial years, which means that their value decreases significantly during this period. As cars age, their depreciation rate may slow down, leading to a positively skewed distribution. Also the majority of Audi used cars are concentrated in a specific price range (approximately around 15000 to 30000 Euros).We also observe a lot of outliers in the dataset which indicates the used audi cars with such high price are fewer in number.

Next we make a scatter plot of mileage(in miles) vs. price(in Euros) to check the dependency between the two variables.




## Comment

From the above scatter plot we observe that as the price of the cars increases, its mileage decreases, i.e., there is a negative correlation between Mileage and Price.A negative correlation between mileage and price in a dataset of used cars is a common observation and can be explained by several factors:

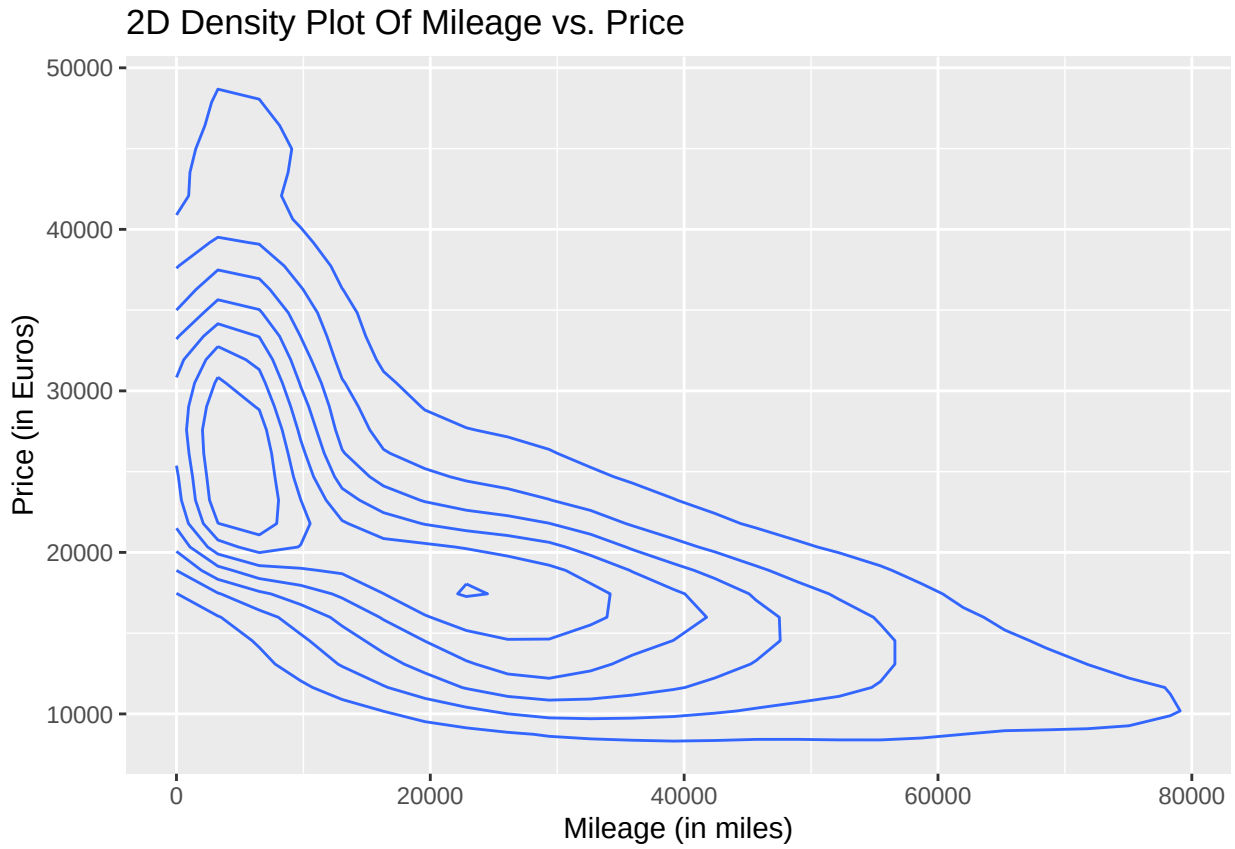
Depreciation: One of the most significant factors is the concept of depreciation. As a car is driven, it accumulates wear and tear, which decreases its value over time. Higher mileage typically indicates more use and a greater degree of wear and tear, leading to a lower resale value.

Maintenance Costs: Cars with higher mileage often require more maintenance and repairs, which can increase the total cost of ownership. Buyers are aware of these potential future expenses, which may make them hesitant to pay a premium for a high-mileage vehicle.

Perceived Reliability: Buyers often perceive low-mileage cars as more reliable because they haven't been subjected to as much wear and tear. Higher mileage may raise concerns about the car's reliability and longevity.

Fuel Efficiency: Cars with lower mileage tend to be more fuel-efficient, which can be a significant cost-saving factor for buyers. This can make lower-mileage cars more appealing and command higher prices.

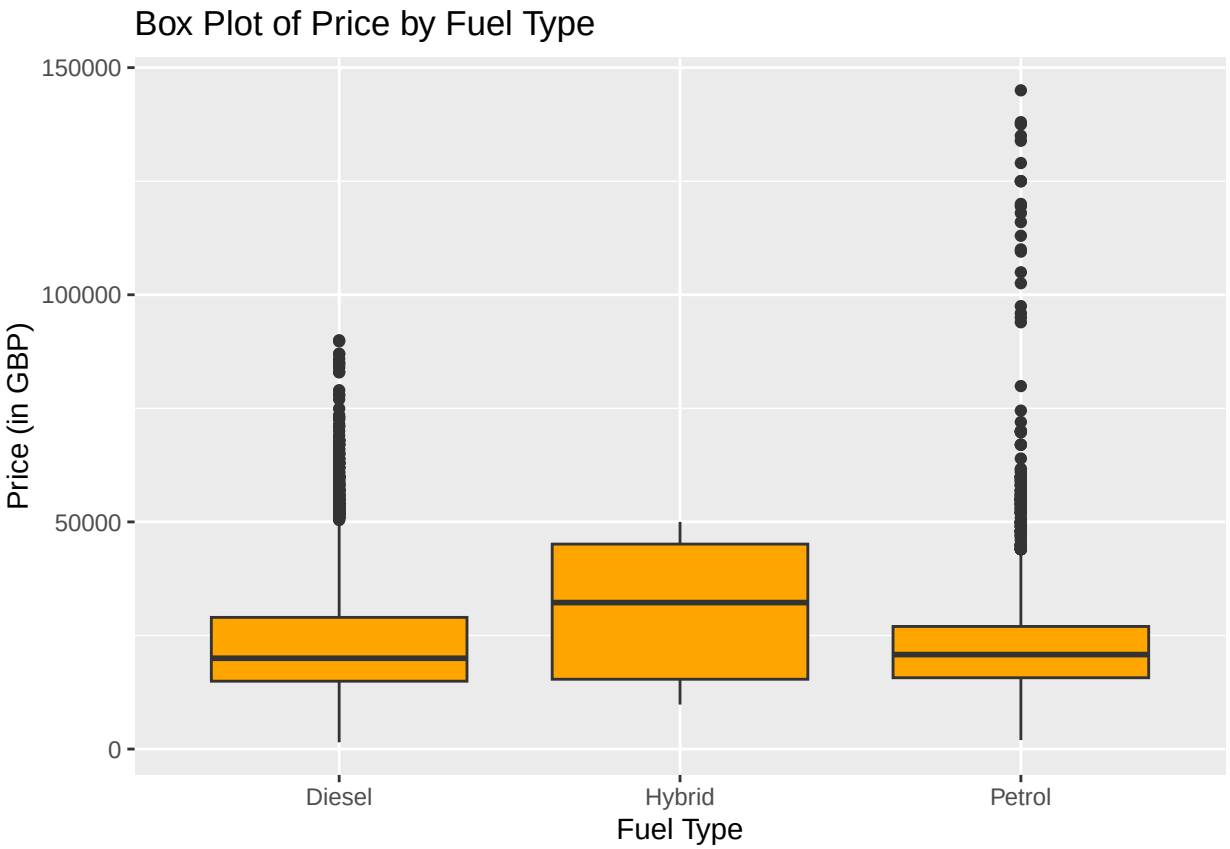
A similar conclusion can be drawn from the density plot of Mileage vs. Price(given below)




**Comment**

The high density areas of the 2D plot suggest that there are many cars with similar mileage and price values in those ranges.There is a dense cluster of data points with low mileage and high prices, indicating a group of relatively new and expensive cars.

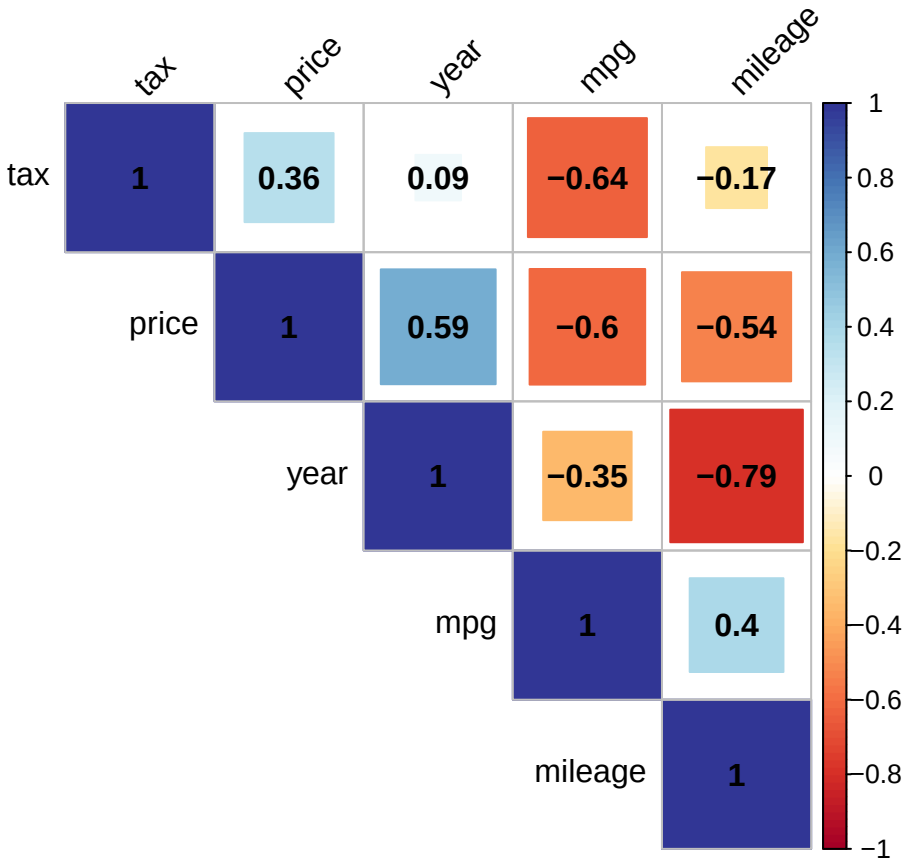
The following boxplot of price by fuel type provides valuable insights into how the price of used cars varies based on the type of fuel they use.




## Comment

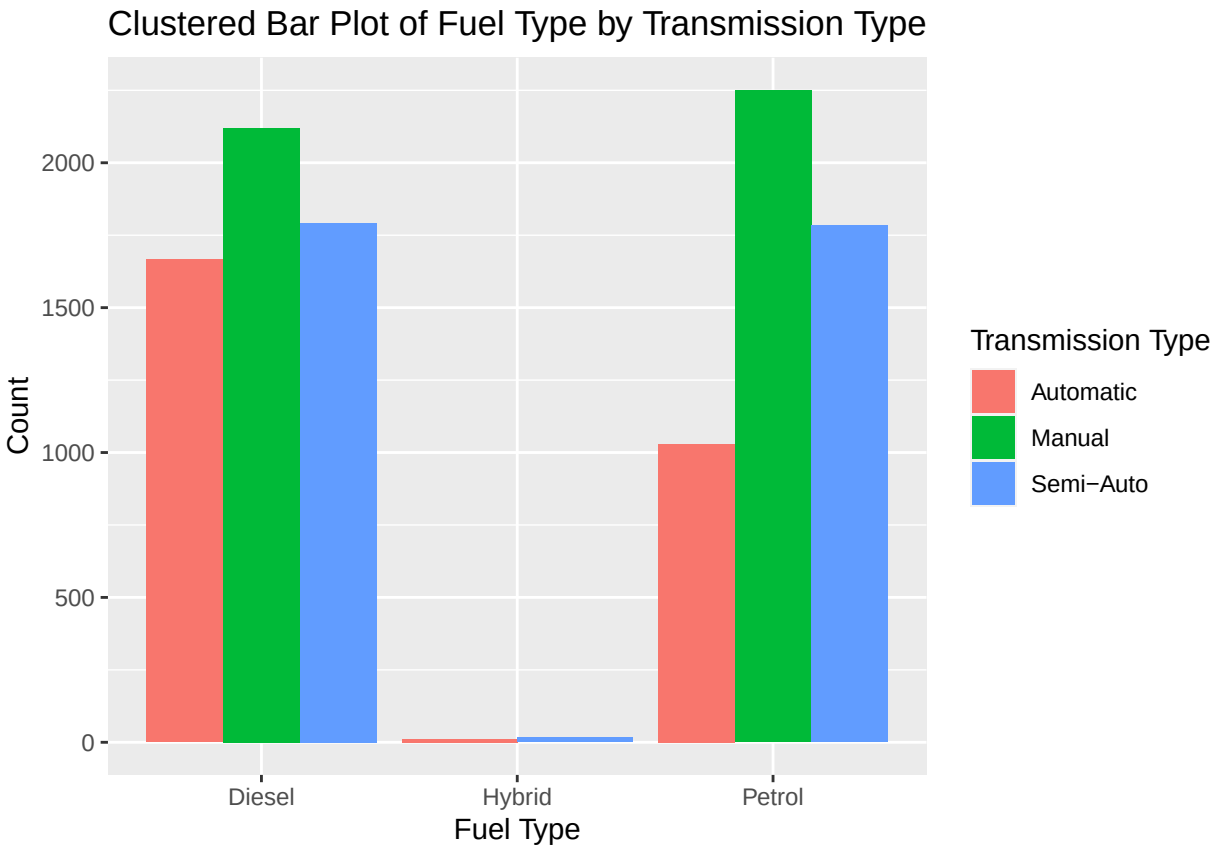
The average price of Hybrid engine cars is comparatively more than that of petrol and diesel type cars.But, the maximum price of petrol and diesel cars is much more than that of hybrid ones.Also we find various outliers for diesel and petrol cars especially for the petrol cars which are priced significantly higher.

Given below is the correlation matrix of Audi used cars dataset.




**Comment**

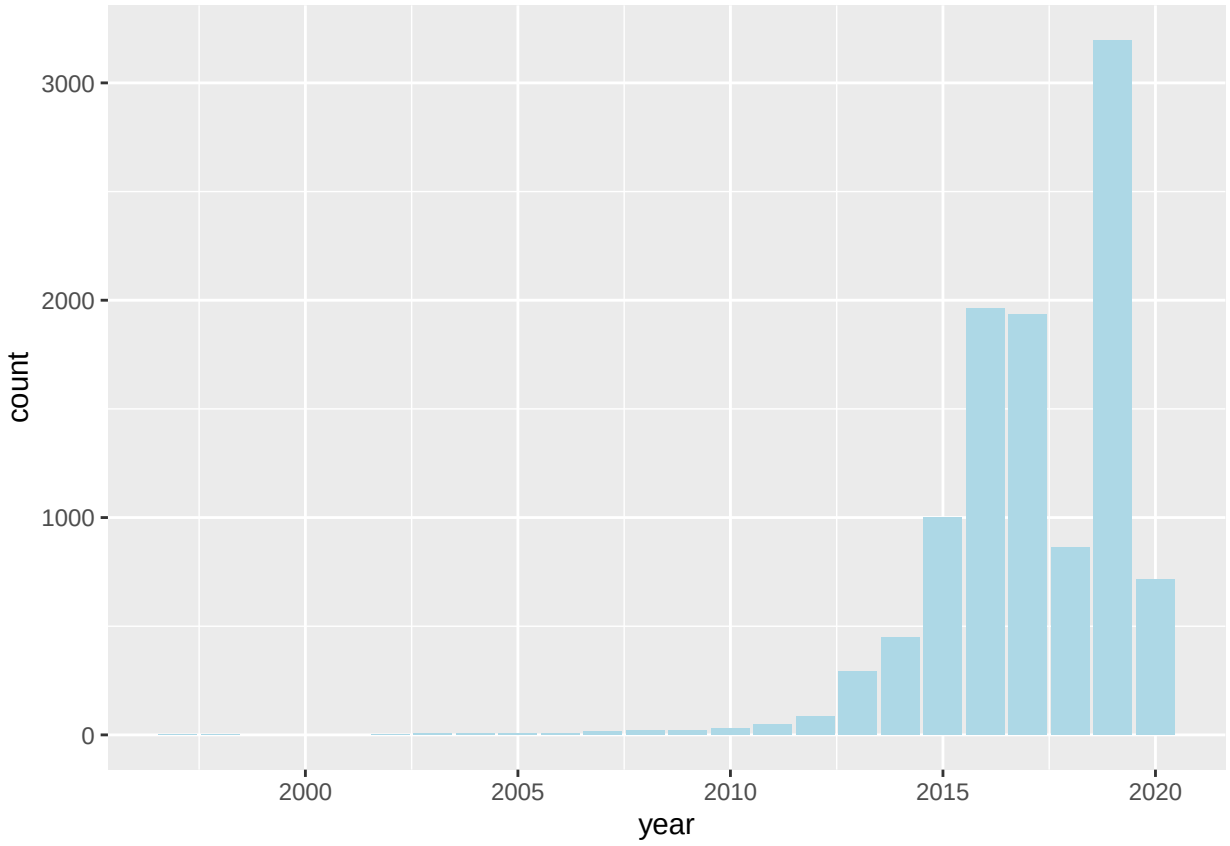
As seen earlier, there is a negative correlation between mileage and price. There is also a negative correlation between mpg and price. Milage and mpg is negatively correlated with year. There is high negative correlation between tax and mpg,price and mpg,year and mileage whereas the other variables are not so strongly correlated.




**Comment**

Clearly diesel and petrol are the most used type cars. For both these cars, manual transmission types is most popular.\

## Bar Chart Of No. Of Cars Released Each Year




**Comment**

The number of cars released by Audi gradually increased over time where most of the cars were released in the year 2019. The downfall in the number of cars released in 2020 may be due to the Covid and lockdown situation.\

## RESULT

**1**The distribution of Audi used car prices is positively skewed.
**2**There is negative correlation between mileage and prices of the cars.
**3**The average price of Hybrid engine cars is comparatively more than that of petrol and diesel type cars.
**4**From the correlation matrix we get an idea about how the various variables are correlated.
**5**Diesel and petrol are the most used type cars
**6**The number of cars released by Audi gradually increased over time where most of the cars were released in the year 2019.\

## CONCLUSION

From the exploratory data analysis of Audi used cars dataset,we can conclude that the car prices are positively skewed which is primarily due to the depreciation of vehicles. Also the mileage of the cars is negatively correlated with its price since more mileage indicates that the car has been used for a longer period of time hence it will be sold for a lesser price compared to the cars having lower mileage.Manual transmission for the diesel and petrol type cars were used the most.There was a downfall in the number of cars released in 2020 may be due to the Covid and lockdown situation.