Predicting Used Car Resale Prices

Objective and Scope of the Study

- The goal of this project is to predict the resale price of used cars based on various features such as year of manufacture, brand, transmission type, odometer reading, engine capacity, fuel type, and more.
- This aims to help buyers, sellers, and car dealerships make informed and data-driven pricing decisions.
- Perform Exploratory Data Analysis (EDA) to understand trends, distributions, and relationships in the dataset.
- Analyze how different car features impact pricing using visual and statistical methods.
- Generate actionable insights to assist in inventory valuation, fair pricing, and business strategy.
- Lay the groundwork for building a machine learning model to predict used car prices accurately.

Analytics Approach

- Checked the data for missing values, duplicate records, and basic statistical details.
- Analyzed individual columns like price, year of production, and odometer reading to understand their distributions.
- Studied how different features such as brand, fuel type, transmission, and engine capacity affect the car price.
- Identified outliers in key columns like price and mileage and handled them appropriately.
- Examined the correlation between variables and extracted useful insights for predicting car prices.

Tools and Techniques

- We used Python as our analytics tools.
- Python have many libraries like Pandas, NumPy, Matplotlib, and Seaborn for data analysis and visualization.
- We applied techniques like data cleaning, exploratory data analysis (EDA), outlier detection, and correlation analysis to understand the factors affecting used car prices.

Column description

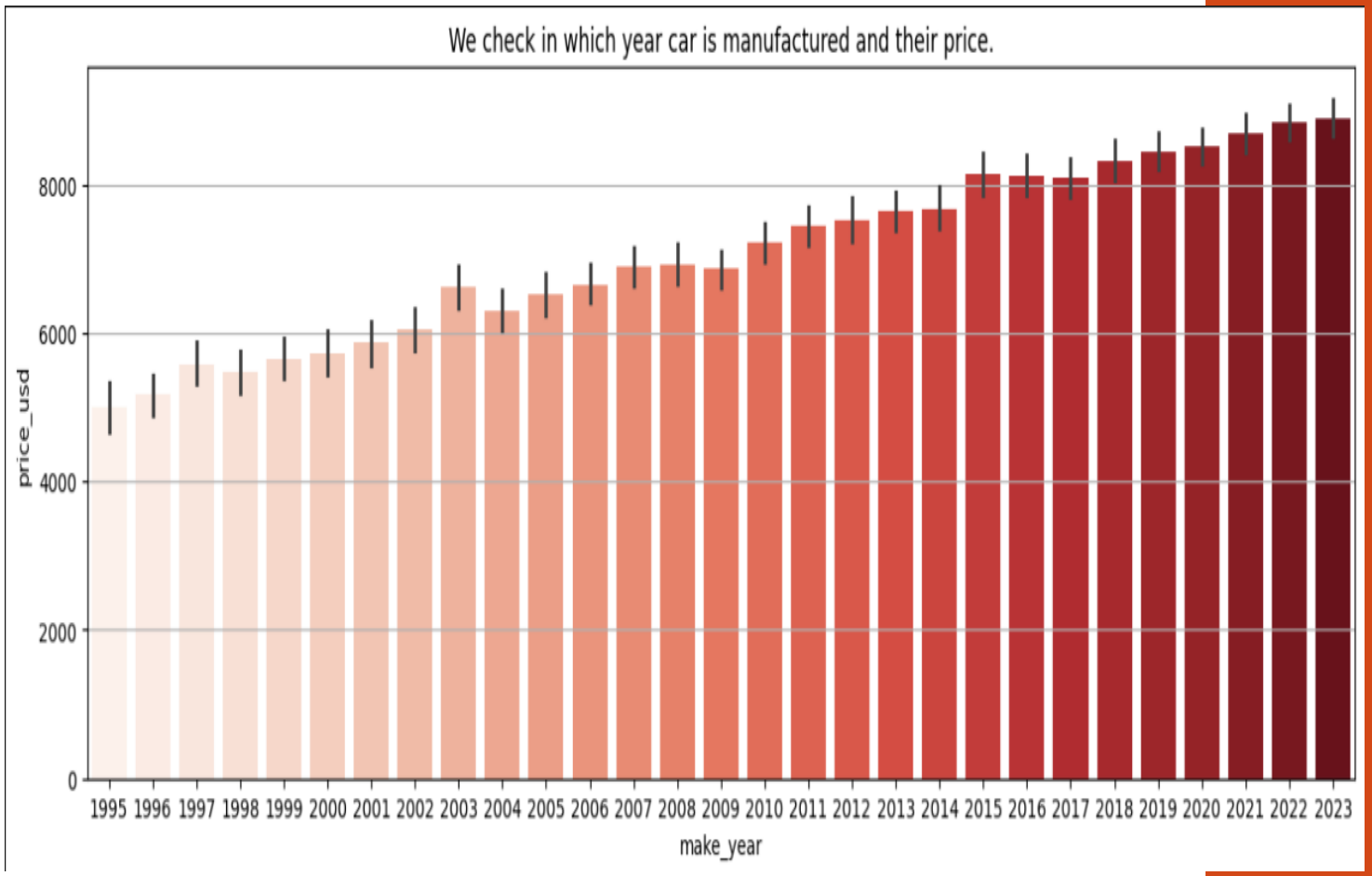
- Make year: Year the car was manufactured.
- Mileage kmpl: Mileage of the car in kilometers per liter (kmpl).
- Engine cc: Engine capacity in cubic centimeters (cc).
- Fuel type: Type of fuel used (Petrol, Diesel, etc.).
- Owner count: Number of previous owners.
- Price used: Resale price of the car in USD (target variable).
- Brand: Brand or manufacturer of the car (e.g., Honda, BMW).
- transmission :Type of transmission (Manual or Automatic).
- Color: Exterior color of the car.
- Service history: Service history status (Full, None, etc.).
- Accidents reported : Number of accidents reported.
- Insurance valid :Whether the car has valid insurance (Yes or No).

Visualization(EDA)

- ❑ Make year vs Price usd
- ❑ Mileage Kmpl vs Price usd
- ❑ Engine CC vs Price usd
- ❑ Fuel Type vs Price usd
- ❑ Owner Count vs Price usd
- ❑ Brand vs Price usd
- ❑ Transmission vs Price usd
- ❑ Color vs Price usd
- ❑ Service History vs Price usd
- ❑ Accidents Reported vs Price usd
- ❑ Insurance Valid vs Price usd

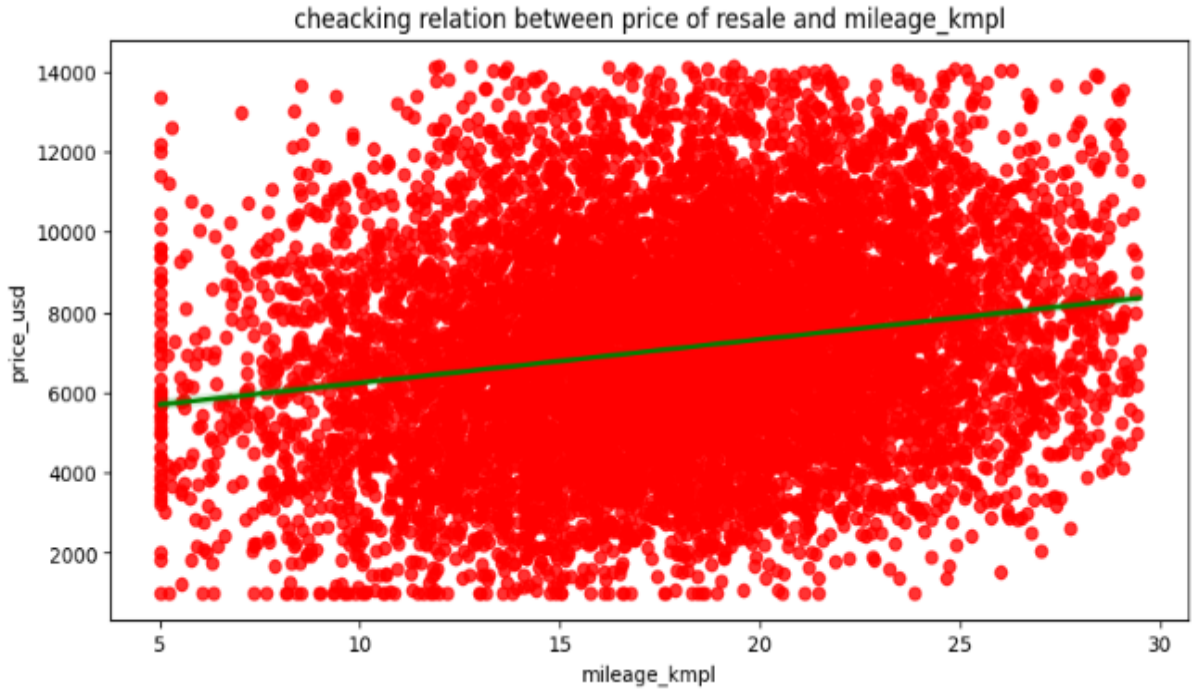
Make year vs Price usd

- we can clearly see that the distribution of our dependent variable is left skewed.
- Most the car have highest price which are manufactured in year between 2021 and 2023



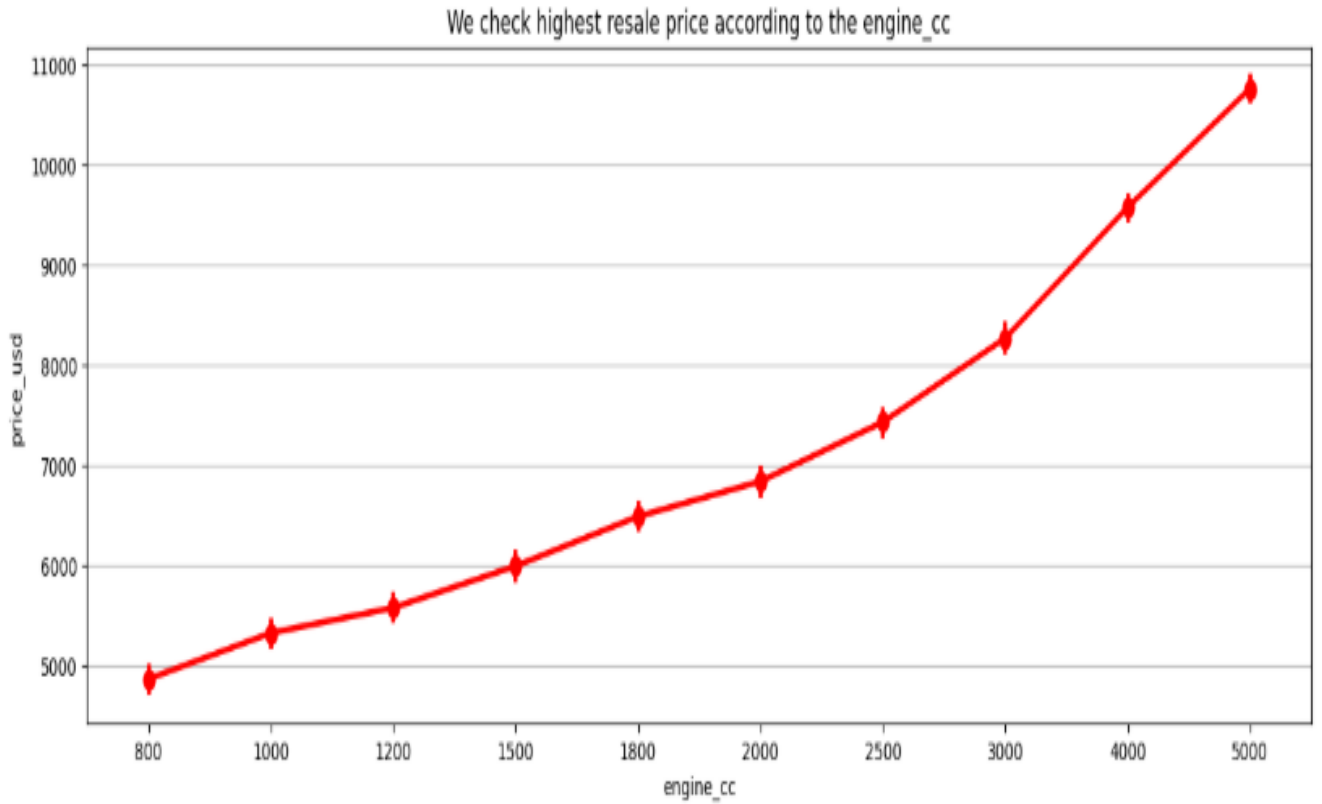
Mileage Kmpl vs Price usd

- The mileage_kmpl and price of resale have positive realtion.
- Resale price slightly increases with mileage.
- Prices are widely spread at all mileage levels.
- Most cars have 10–25 kmpl mileage and $4,000–$10,000 price.



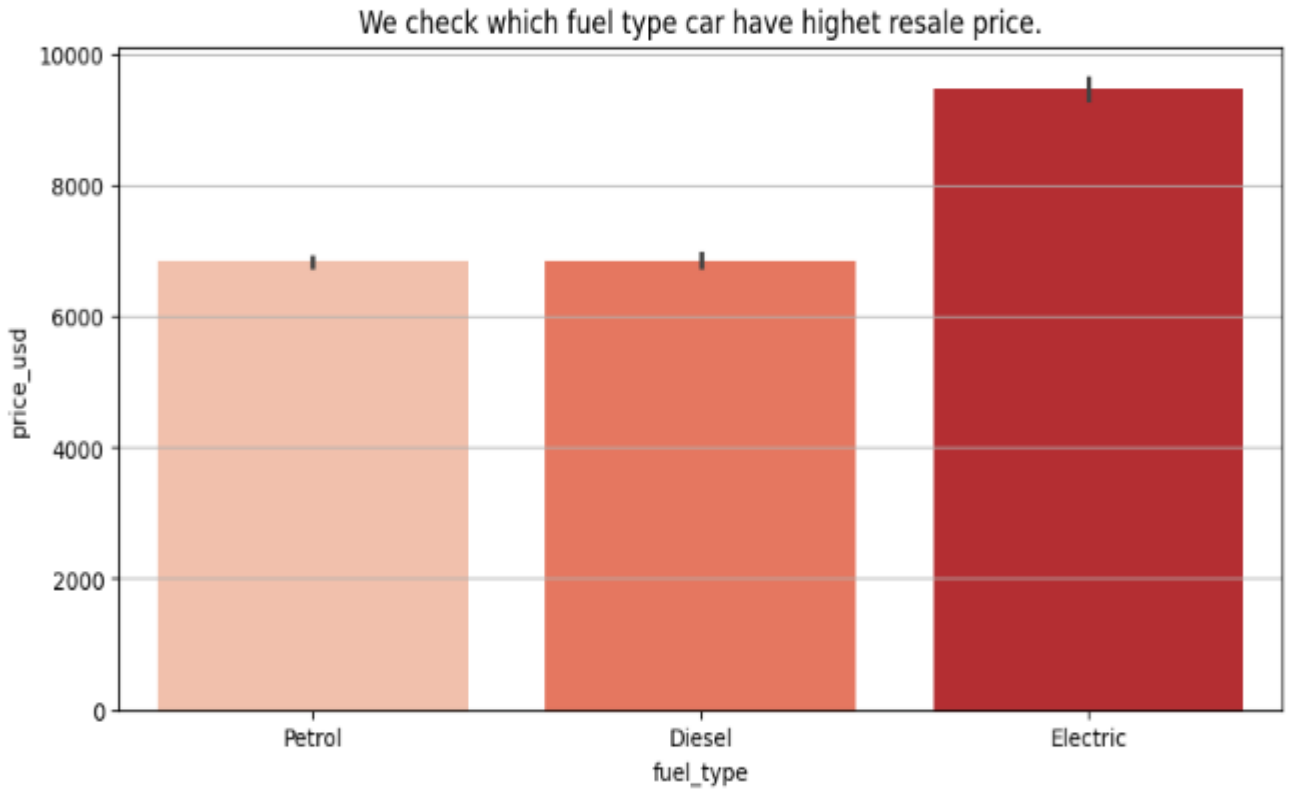
Engine CC vs Price usd

- The engine_cc and price of resale have positive relation.
- As the capacity of engine of car increase then resale price also increase.
- Highest resale price car which has engine capacity of 5000cc.



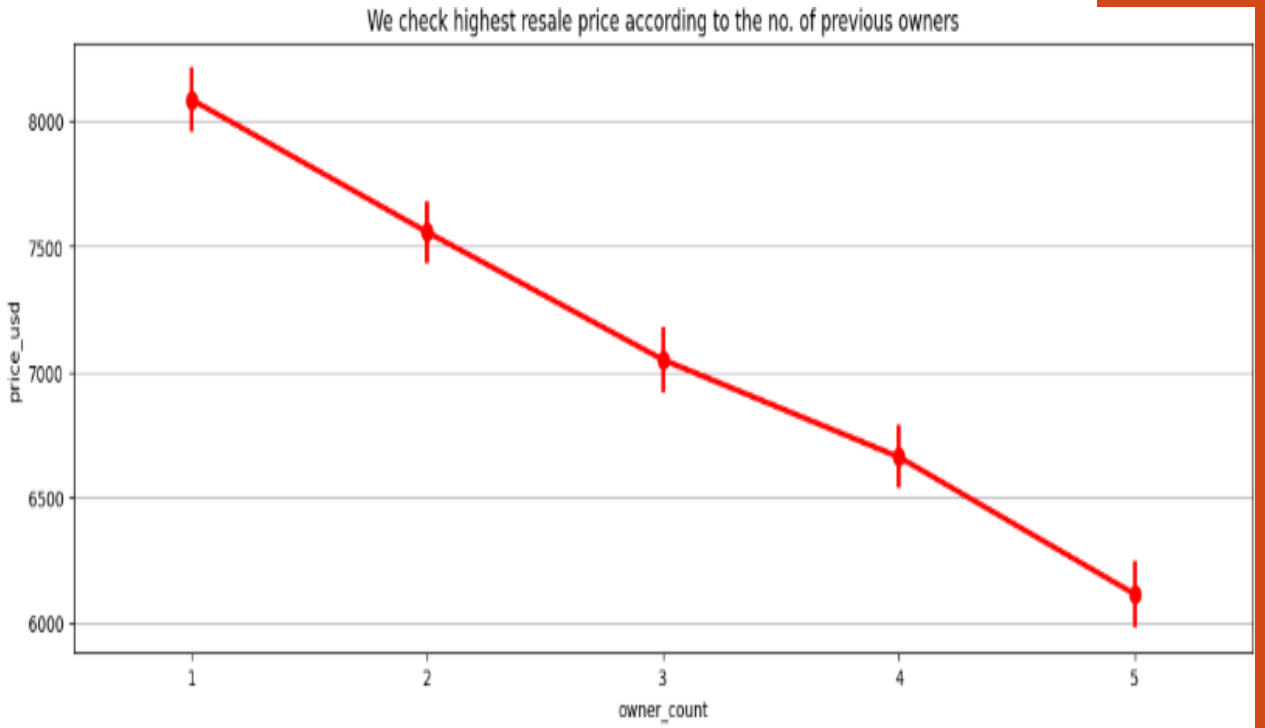
Fuel Type vs Price usd

- Electric cars have the highest average resale price.
- Petrol and Diesel cars have similar resale values.
- Resale value varies significantly by fuel type.



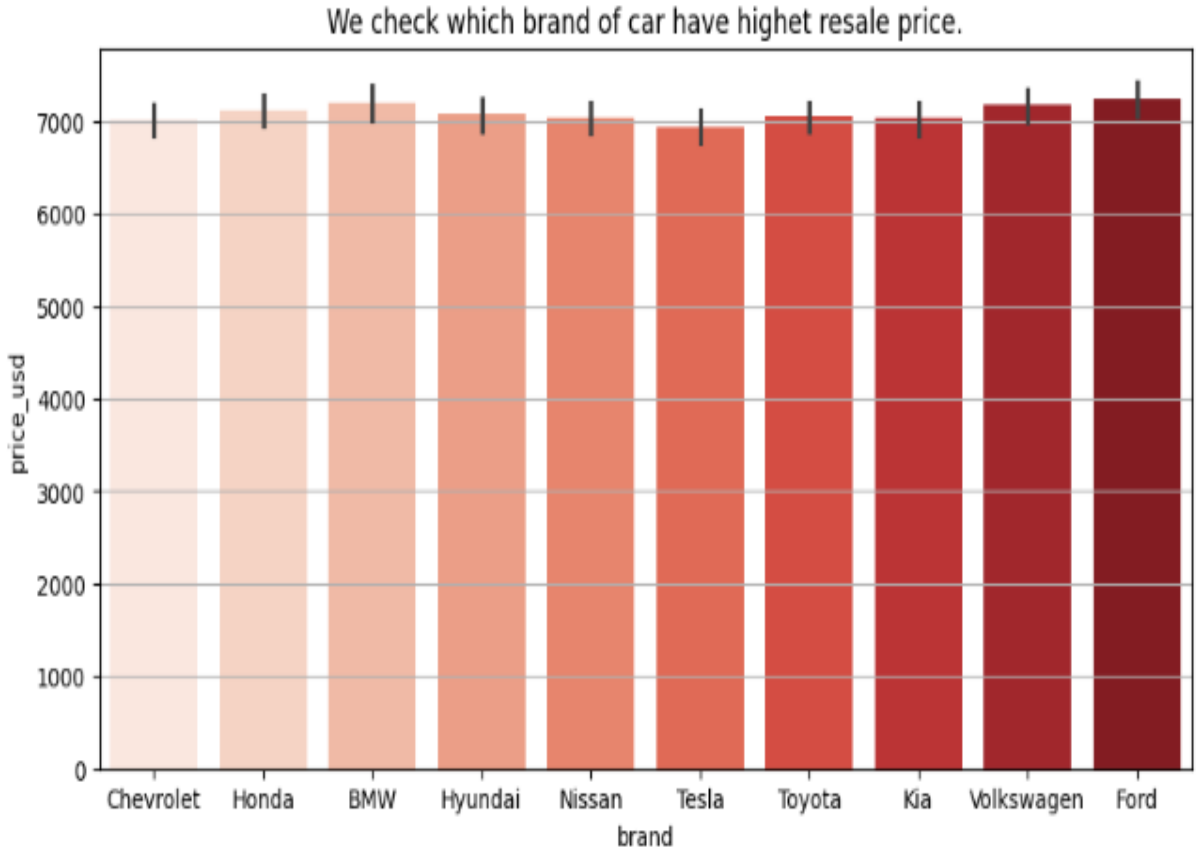
Owner Count vs Price usd

- The Owner Count and price of resale have negative realtion.
- As the no. of users of car are increase then resale price also decrease.
- Highest resale price car which has only one user previously.



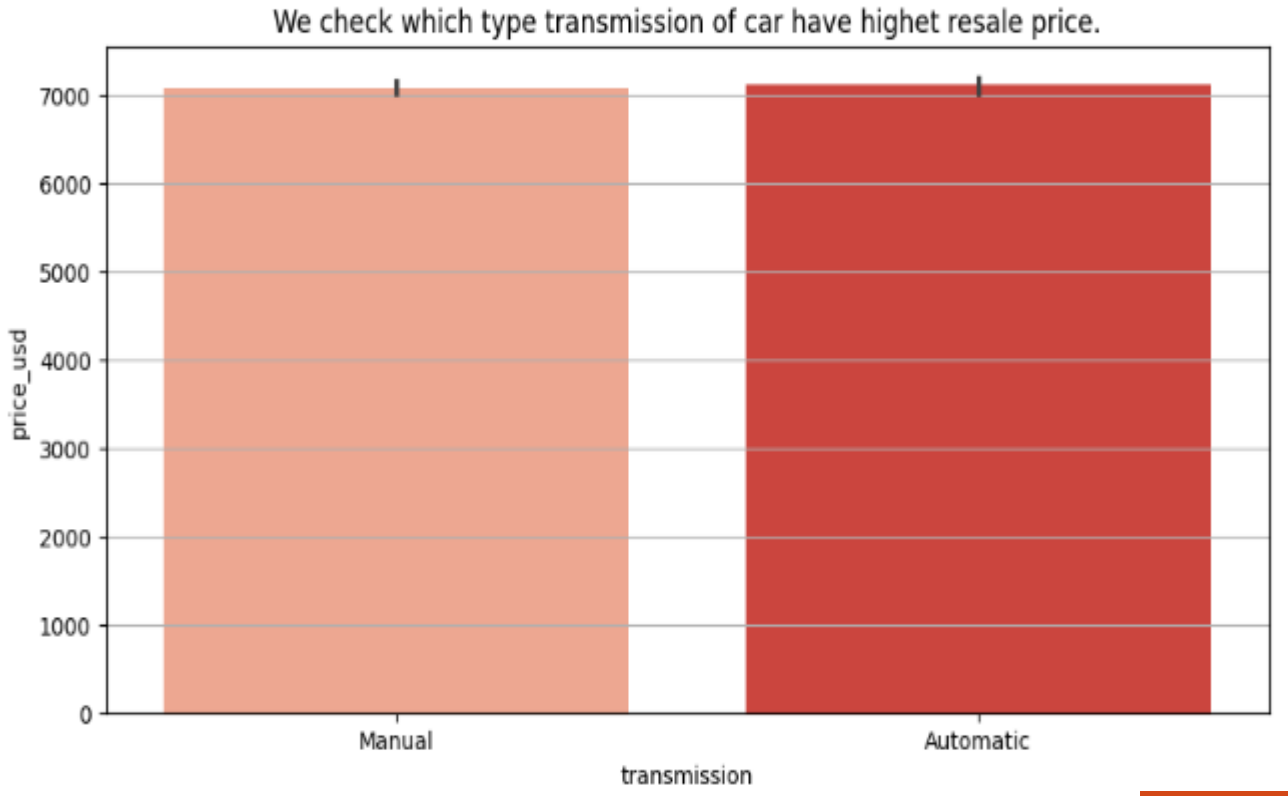
Brand vs Price usd

- Ford, Volkswagen, Kia, and Toyota have the highest average resale prices, all roughly in the range of 7000 to 7200.
- Chevrolet, Honda, BMW, Hyundai, Nissan, and Tesla show slightly lower average resale prices, typically between 6900 and 7100.
- The variation between the highest and lowest average prices is small, suggesting that resale values are relatively consistent across brands.



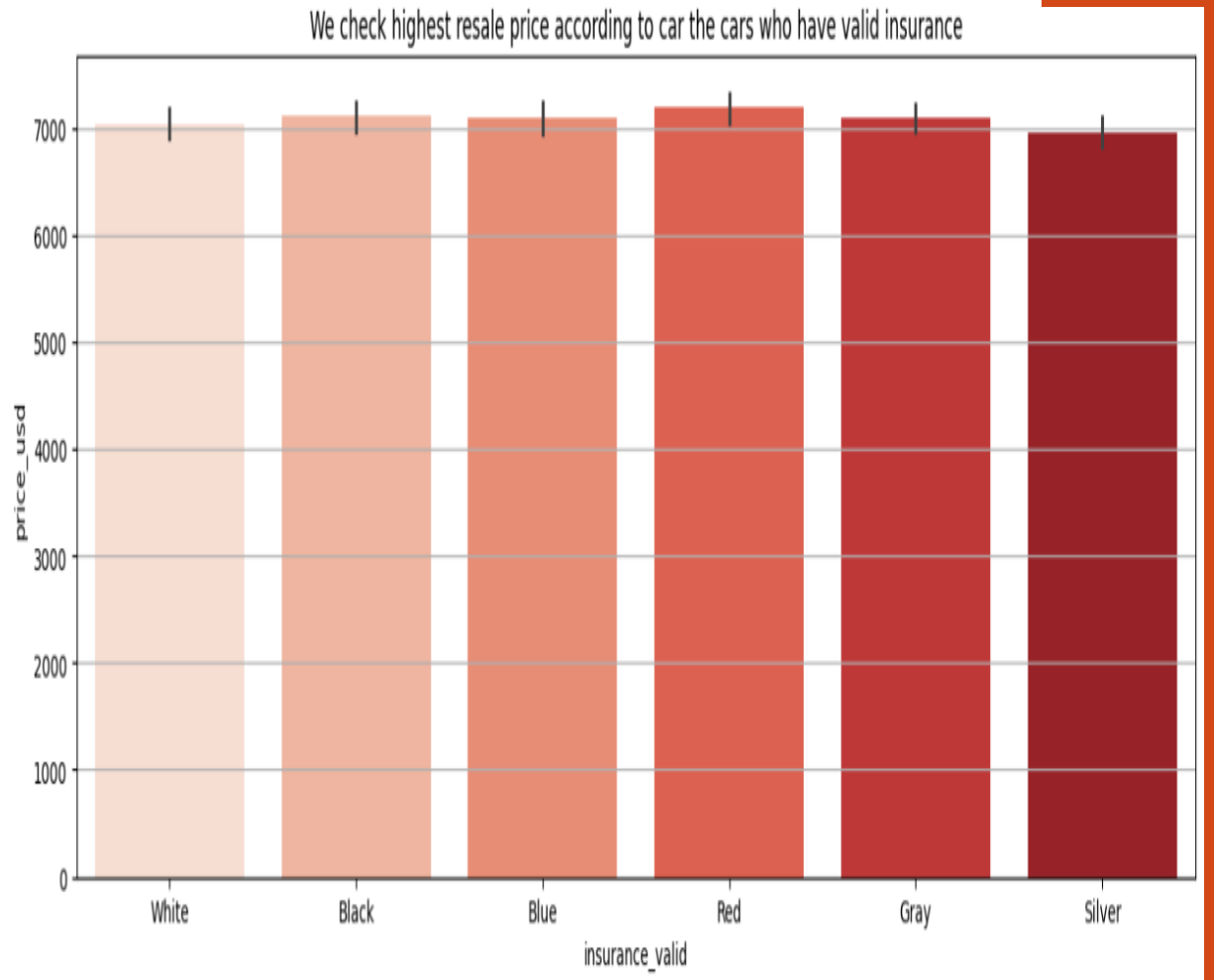
Transmission vs Price usd

- Price difference between the two is minimal.
- Automatic cars have a slightly higher resale price than manual cars.
- Both transmission types offer similar resale value overall.



Color vs Price usd

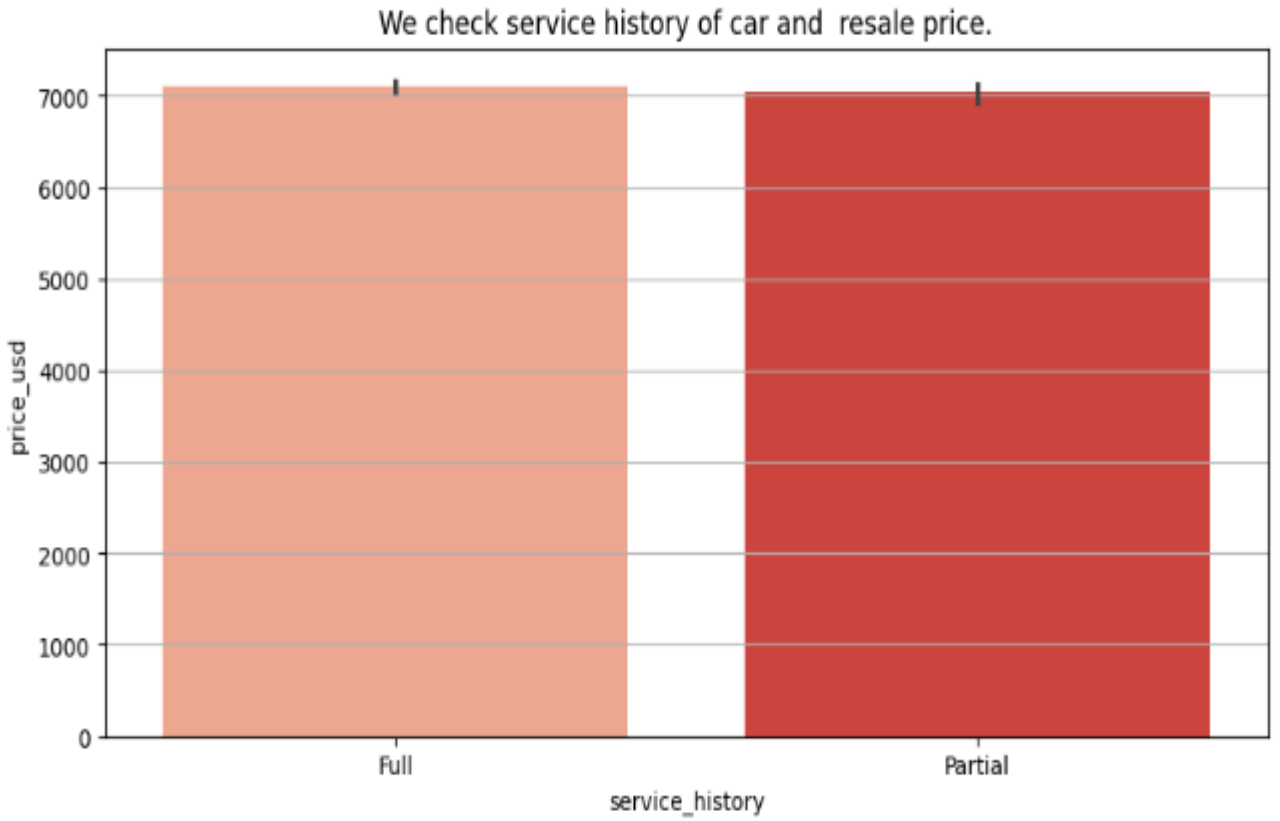
- Red cars with valid insurance have the highest resale price.
- Silver cars have the lowest resale price among all colors.
- Other colors like Black, Blue, Gray, and White show similar resale prices, with small variations.



Service History vs Price usd

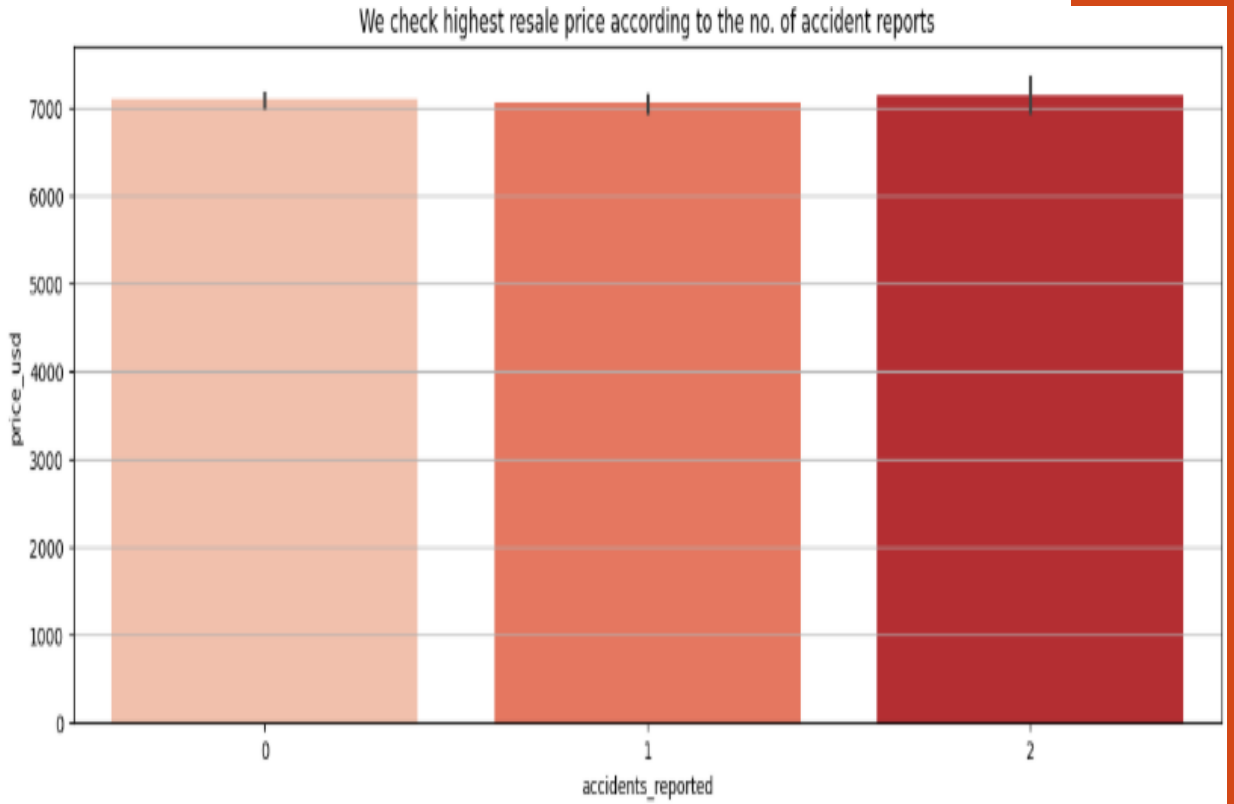
- The car who have service history is full they have highest resale price and who have service history is partial, they have resale price is lower than full.

- Almost both have small change in resale price.



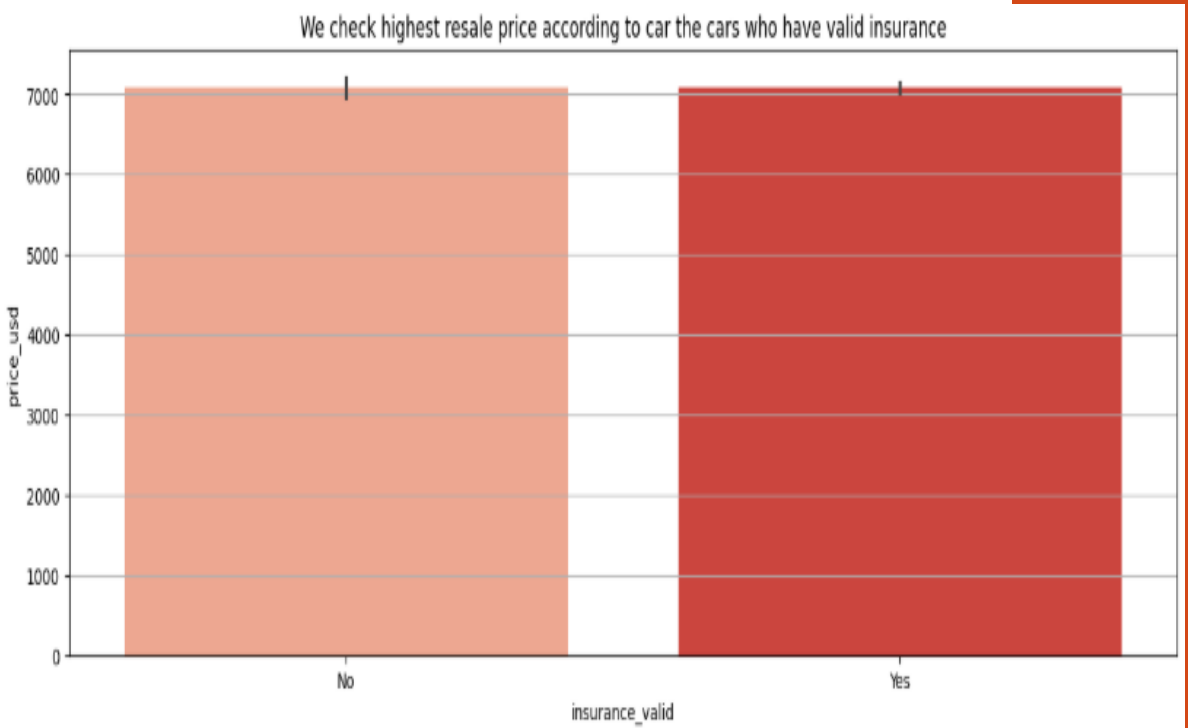
Accidents Reported vs Price usd

- The number of accident reports increases, the average resale price decreases slightly.
- Cars with 0 accidents have the highest average resale price.
- Cars with 1 or 2 accidents show a gradual decline in resale value.
- This suggests that accident history negatively impacts resale price, although the effect is not drastically large in this dataset.



Insurance Valid vs Price usd

- Cars with valid insurance tend to have a slightly higher average resale price compared to those without valid insurance.
- Although the difference is not very large, it is noticeable and consistent.
- This suggests that valid insurance adds value to a used car, likely because it implies the car is better maintained and legally safer to transfer.



Overall Observation

- Mileage shows a slight positive correlation with resale price, but price variation remains high across all mileage levels.
- Electric cars tend to have significantly higher resale values compared to petrol and diesel cars.
- Automatic transmission vehicles have a slightly higher resale price than manual ones, though the difference is minimal.
- Car color has a small impact on resale price, with red cars performing slightly better and silver cars showing the lowest average price.
- Data cleaning revealed outliers and missing values, which were handled to improve the quality of the analysis.
- Correlation analysis helped identify key factors like fuel type and engine capacity that influence resale price the most.

Thank You. . .