

AUSTO PROJECT

COURSE TITLE: PYTHON FOUNDATIONS

DATE: JUNE 26TH, 2022

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BUSINESS PROBLEM OVERVIEW & SOLUTION APPROACH

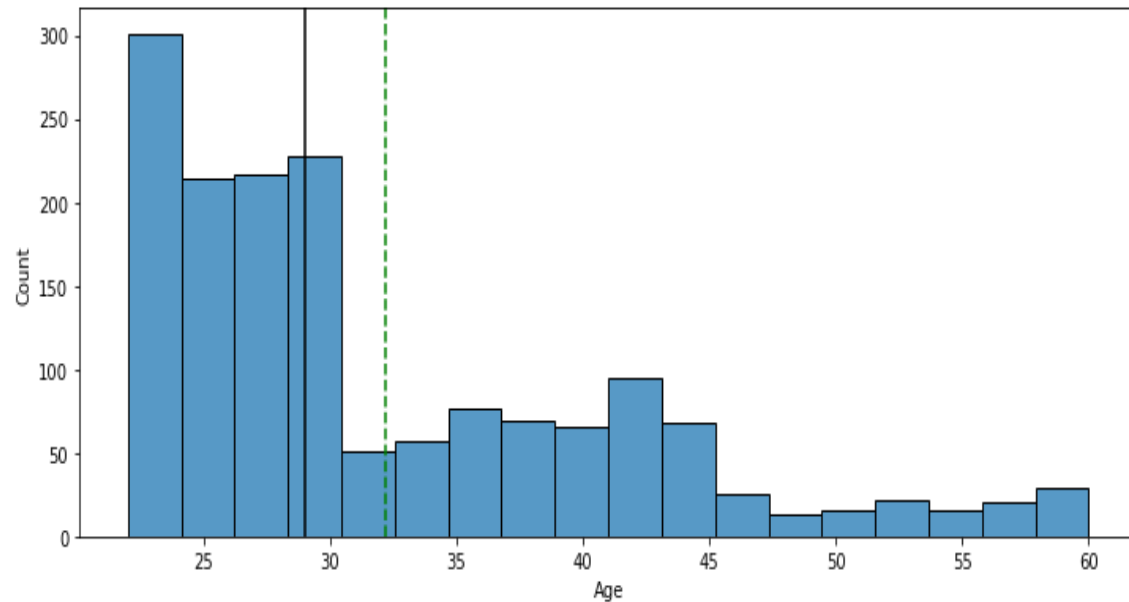
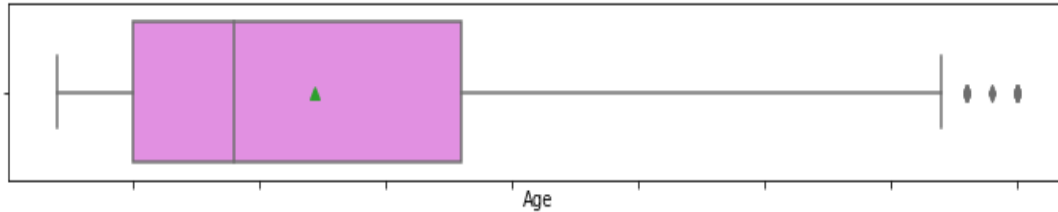
- Austo, a UK-based automobile company aspires to grow its business into the US market after successfully establishing its footprints in the European market.
- They want to understand the demand of the buyers and trends in the US market
- They want to build customer profiles based on the analysis to identify new purchase opportunities so that they can manipulate the business strategy and production to meet certain demand levels.
- To perform the data analysis to generate useful insights that will help the automobile company to grow its business.
- To create buyer's profiles for different types of cars with the available data as well as a set of recommendations.

| NO | VARIABLE | DESCRIPTION |
|----|------------------|--|
| 1 | Age | Age of the customer |
| 2 | gender | Gender of the customer |
| 3 | Profession | Indicates whether the customer is a salaried or business person |
| 4 | Marital_status | Marital status of the customer |
| 5 | Education | Refers to the highest level of education completed by the customer |
| 6 | No_of_dependents | Number of dependents(partner/children/spouse) of the customer |
| 7 | Personal_loan | Indicates whether the customer availed a personal loan or not |
| 8 | House_loan | Indicates whether the customer availed house loan or not |
| 9 | Partner_working | Indicates whether the customer's partner is working or not |
| 10 | Salary | Annual Salary of the customer |
| 11 | Partner_salary | Annual Salary of the customer's partner |
| 12 | Total_salary | Annual household income (Salary + Partner_salary) of the customer's family |
| 13 | Price | Price of the car |
| 14 | Make | Car type (Hatchback/Sedan/SUV) |

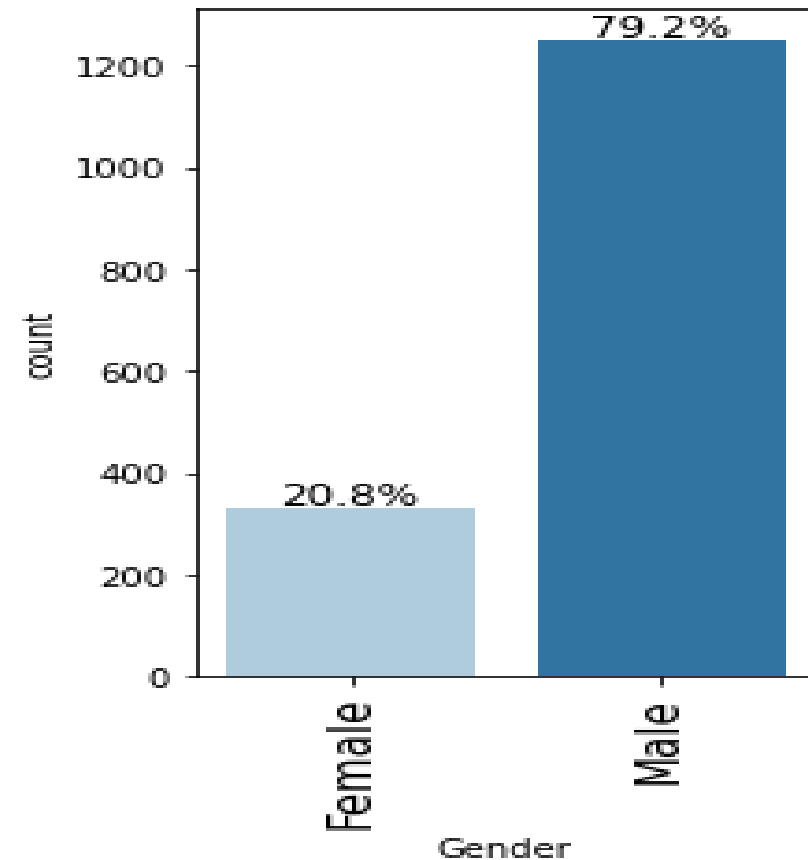
- We have 1581 rows and 8 columns
- We 8 objects and 6 integer
- We converted all the object type to category which reduced the memory usage from 173kb to 87.6kb
- The average age in the data is 32 years with max of 60 years
- The average price for a car is 35,597
- The average salary in the distribution is 59,732
- The average total salary 79,452
- The maximum number of dependents is 4
- Some partners were not working which resulted to zero as the minimum partner salary and 80,000 as the maximum
- We have three unique make of car
 - Hatchback - 884
 - Sedan - 460
 - SUV - 237

EXPLORATORY DATA ANALYSIS(EDA)

- The average age of the distribution is higher than the median indicating the distribution is skewed to the right
- The age bracket from 22 to 30 years are more likely to purchase a car
- there are outliers in the distribution

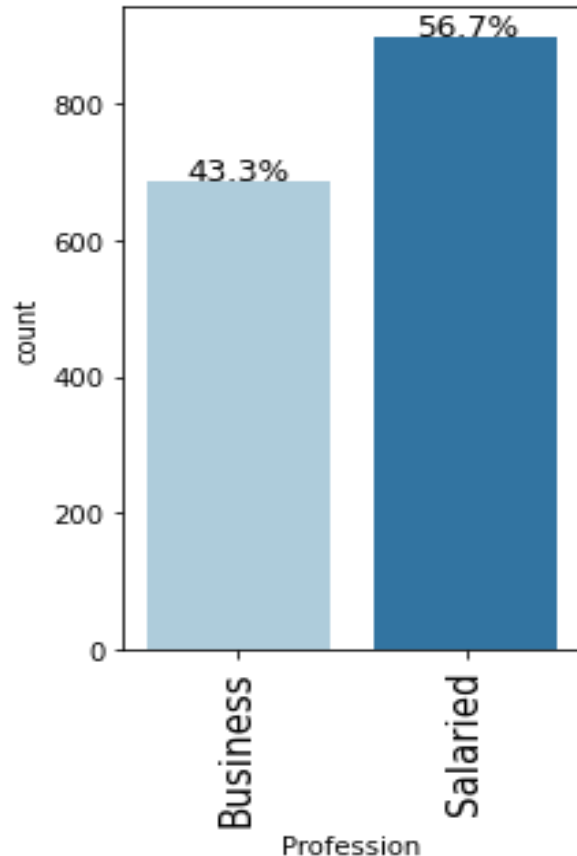


- The gender consist of two unique value male and female
- The distribution shows a 79.2% male are more likely to buy a car and 20.8% are female

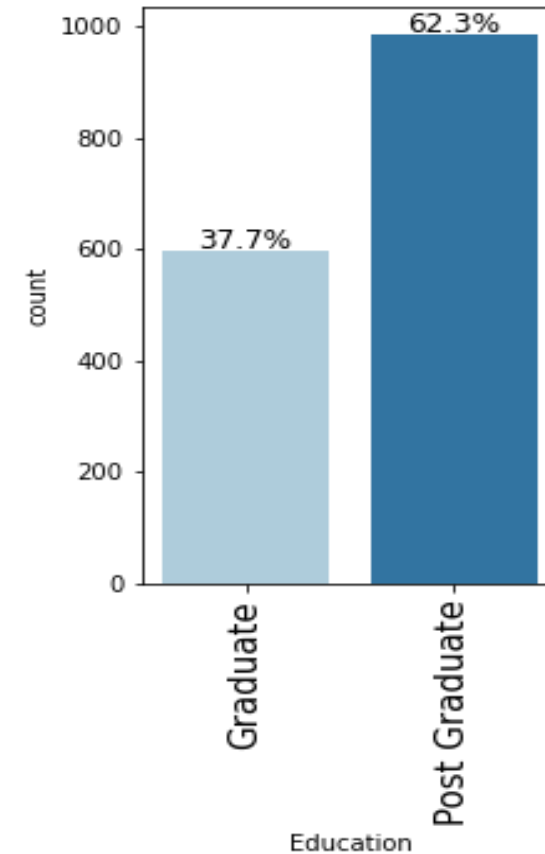


EXPLORATORY DATA ANALYSIS(EDA)

- The chart shows two unique value in the profession for customers
- There is a slight difference in the distribution, salary earned customers have an approximate of 57% and business owners 43%
- Salary earners are more likely to buy a car

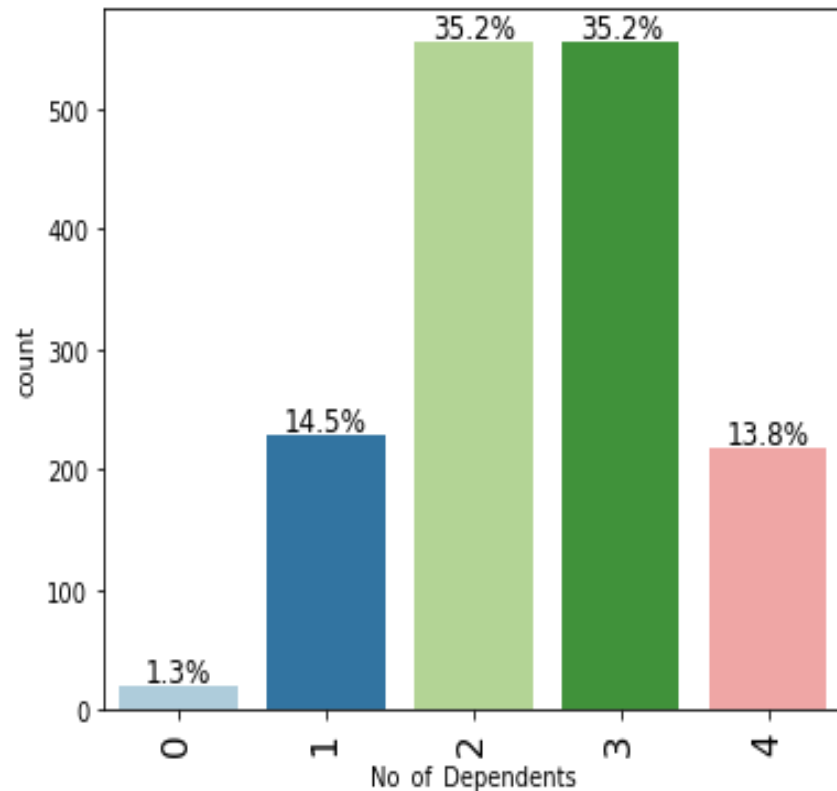


- We have two unique value for education, graduate and post graduate
- The distribution shows that 62.3% post graduate are interested in a car and 37.7% for graduate

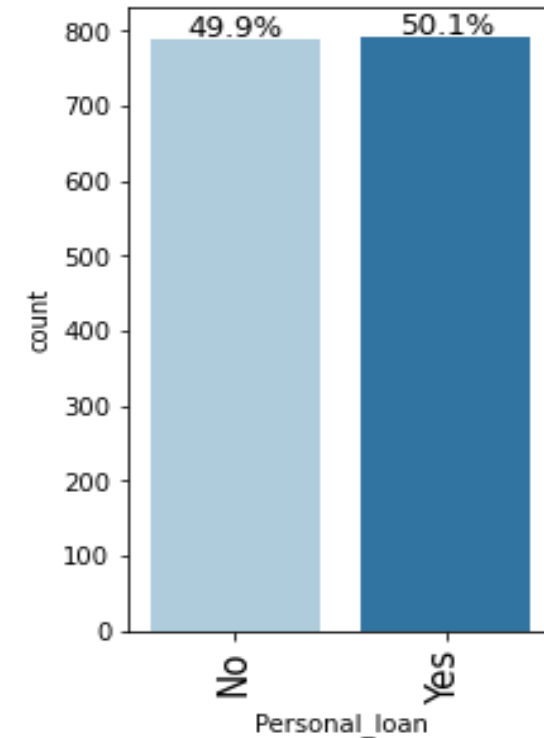


EXPLORATORY DATA ANALYSIS(EDA)

- The chart shows people with 2 to 3 number of dependents are more likely to buy a car compared to those with zero or four dependents
- We have 35.2% for both 2 to 3 no of dependents, 14.5%, 13.8% for 1 and 4 no of dependents
- People who have zero dependents have the lowest percentage 1.3%

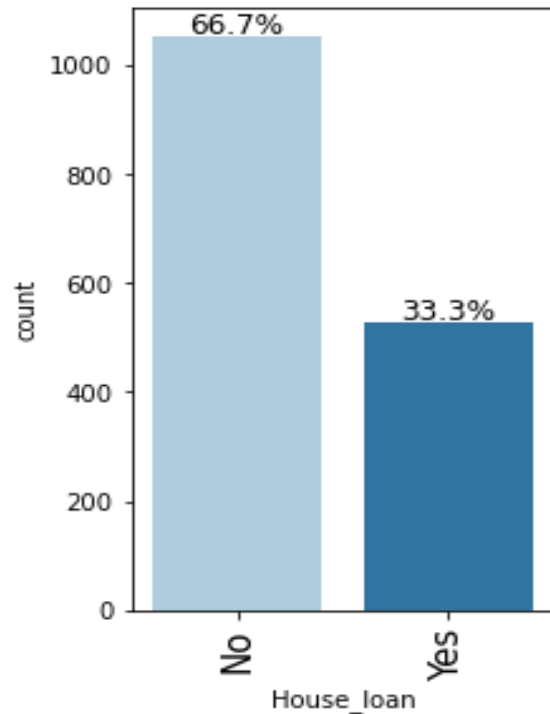


- The distribution shows slight difference in who has a personal loan and still wants a car
- 50.1% has person loan and 49.9% do not

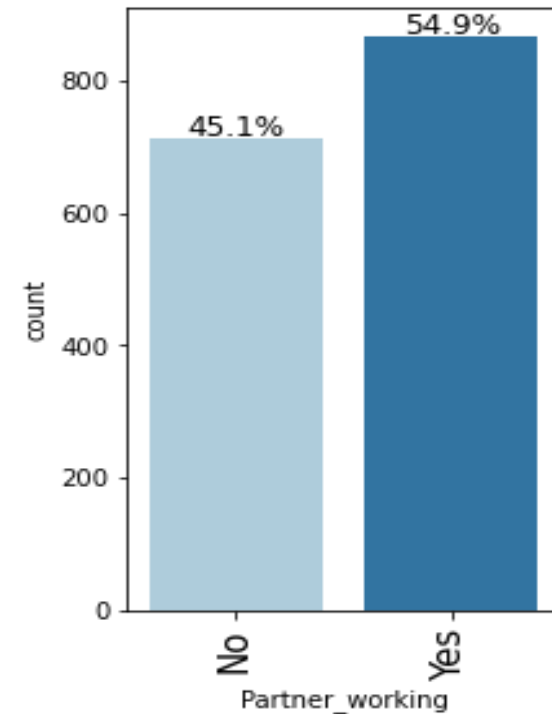


EXPLORATORY DATA ANALYSIS(EDA)

- The distribution shows a difference in who has a house loan and still wants a car
- 66.7% has no house loan and 33.3 % do have house loan



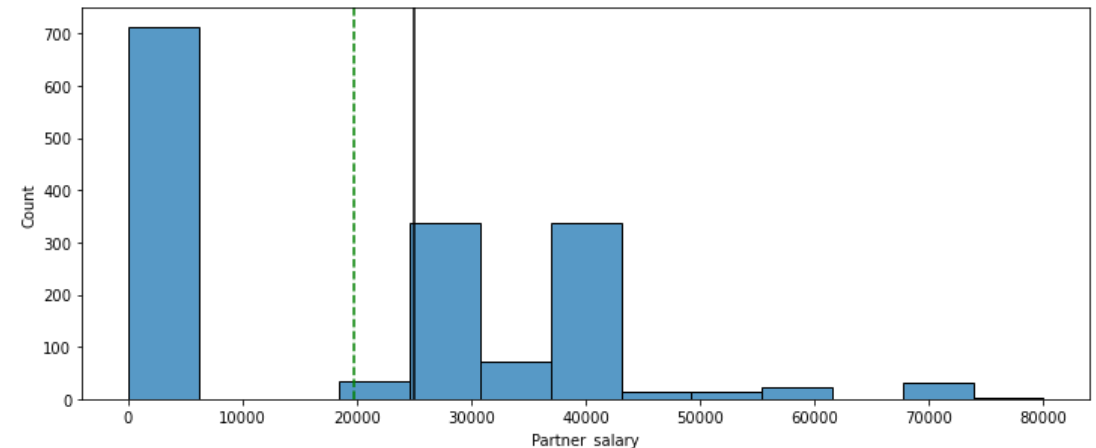
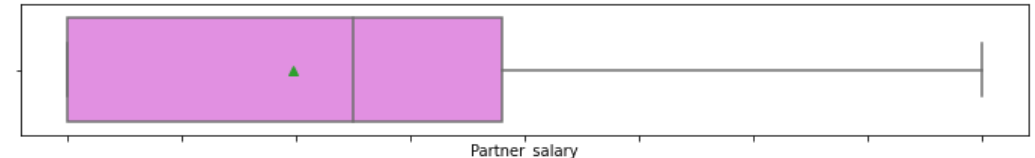
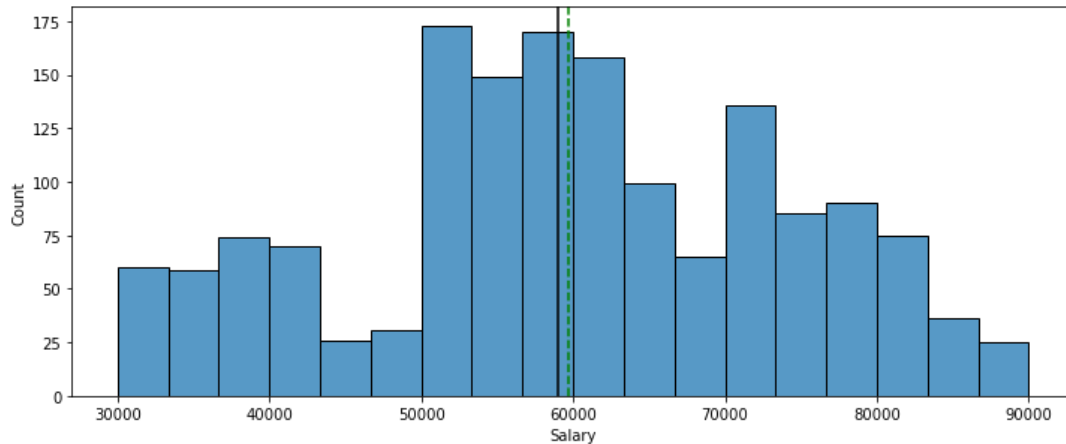
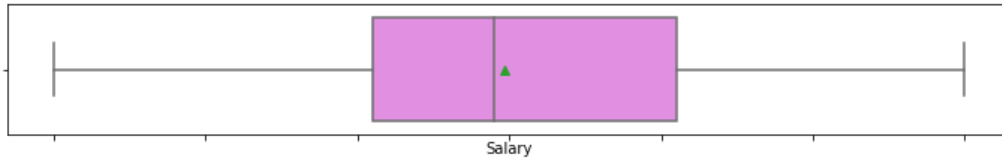
- The distribution shows slight difference in who has a partner working and still wants a car
- 45.1% do not have a partner working and 54.9% have partner working



EXPLORATORY DATA ANALYSIS(EDA)

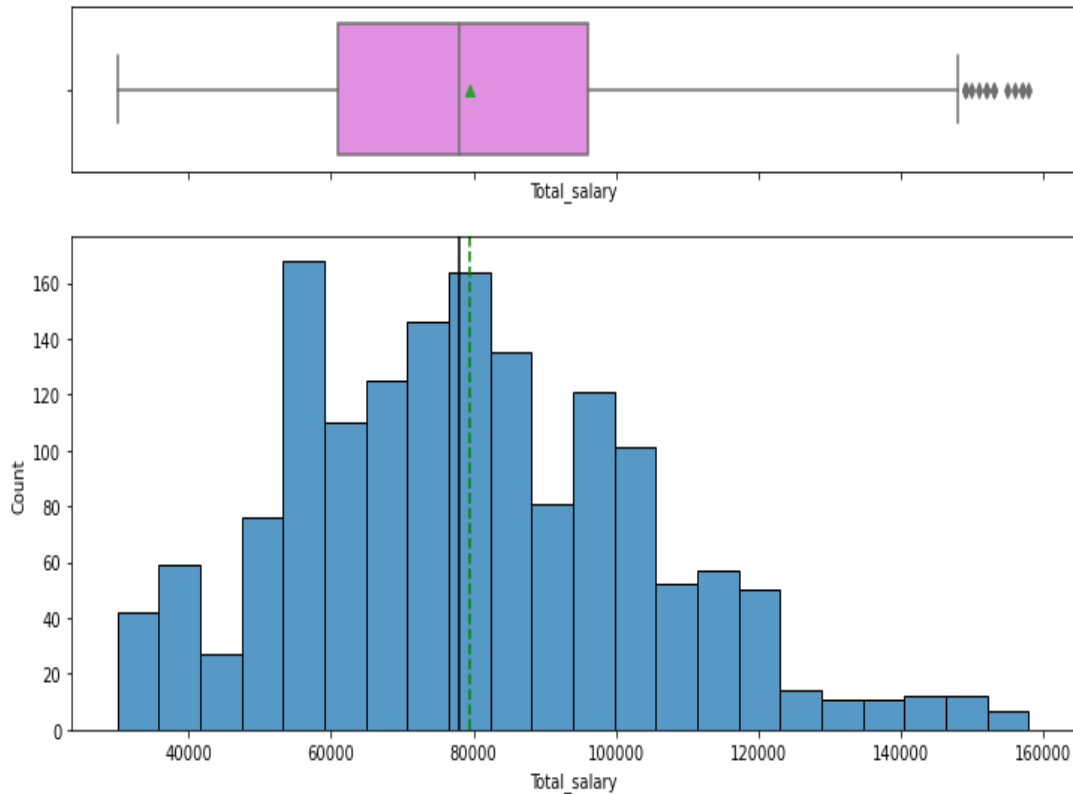
- The average salary is almost the same with the median salary indicating the median is nearly symmetrical
- There is not outlier in the distribution
- The salary is almost evenly distributed between 30,000 to 90,000

- The average partner salary is smaller than the median partner salary indicating the distribution is left skewed
- There are no outlier in the distribution
- The distribution shows average partner salary ranging around 20,000

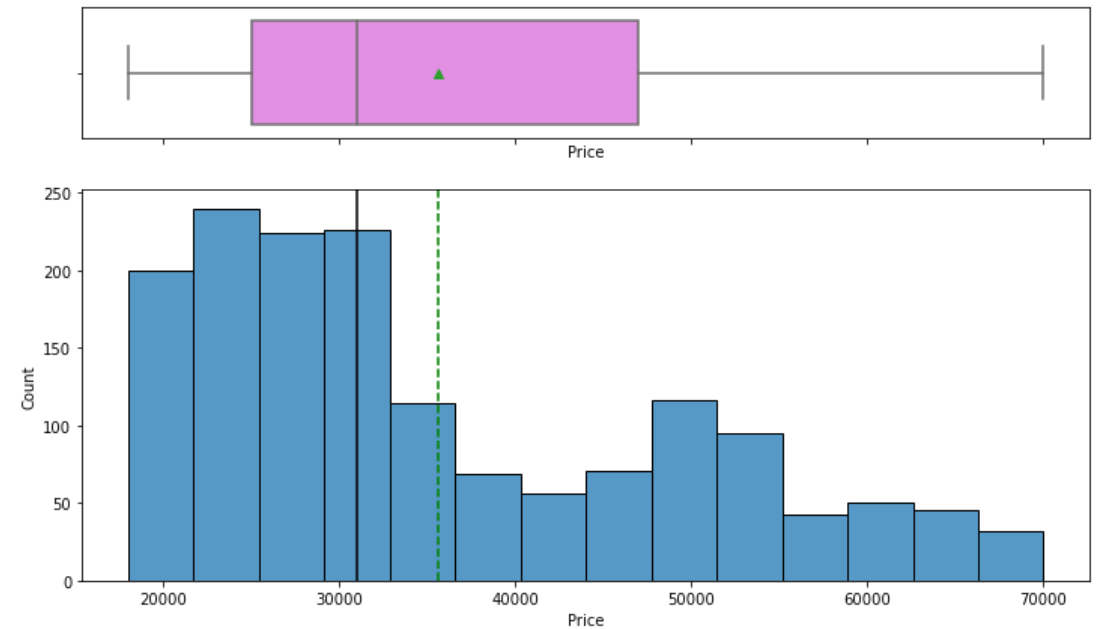


EXPLORATORY DATA ANALYSIS(EDA)

- The average total salary is almost the same with the median total salary indicating the median is nearly symmetrical
- The salary is almost evenly distributed between 40,000 to 160,000
- There are outliers in the distribution

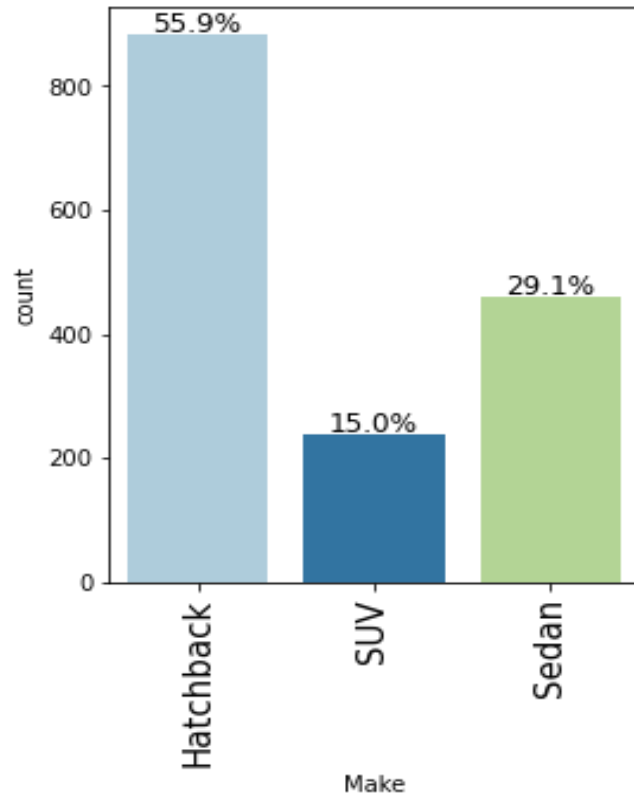


- The average price of the distribution is higher than the median for price indicating the distribution is skewed to the right
- This indicates that the price most likely to be paid for a car is 20,000 to 32,000
- there are no outliers in the distribution



EXPLORATORY DATA ANALYSIS(EDA)

- The chart shows three unique value in the car make for customers
- 55.9% are interested in hatchback which is the highest, 29.1% in sedan and the lowest SUV with 15%

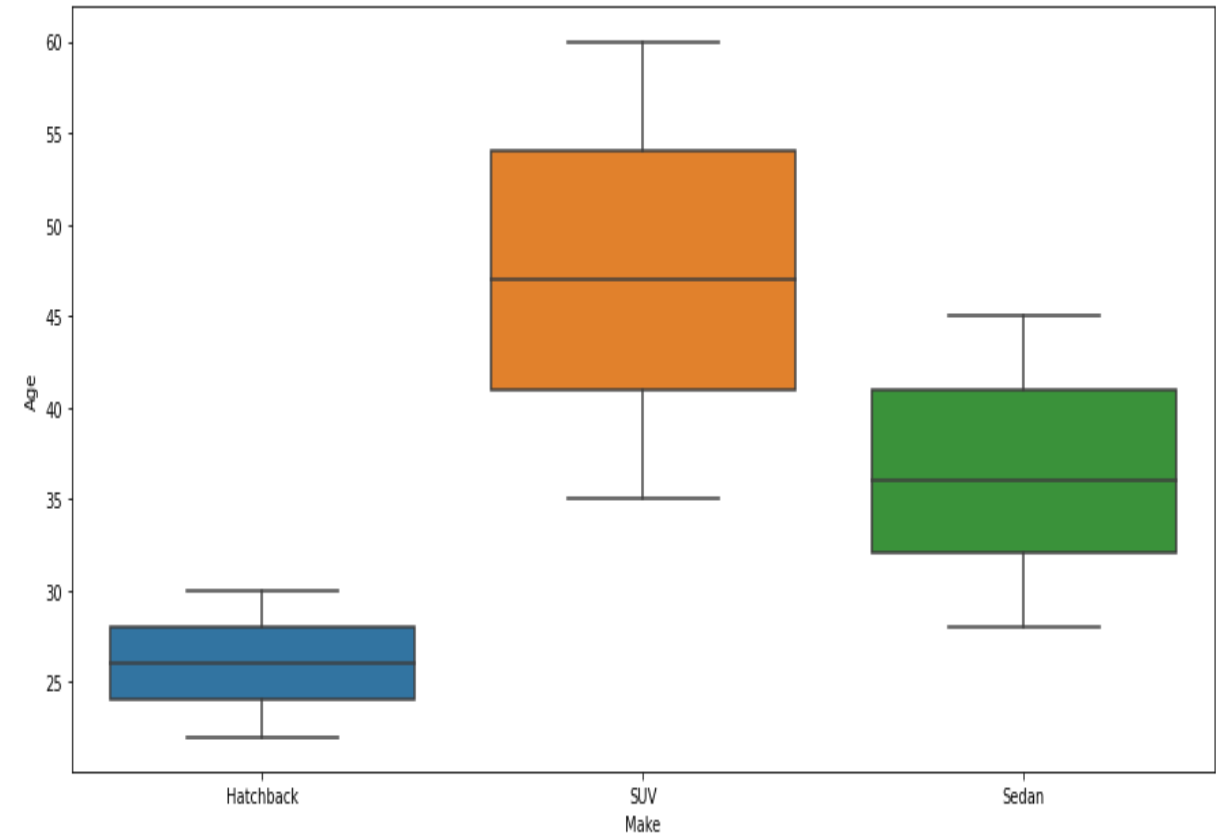


- This map shows very little or no correlation between with no of dependents and the other variables
- There is a strong correlation between the partner salary and total salary but little to no correlation with other variables
- There is a positive correlation between age and price while very low correlation with the other variables
- There is a positive correlation between salary, age and total salary compared to other variables
- There is positive correlation between total salary, partner salary and salary compared to other variables



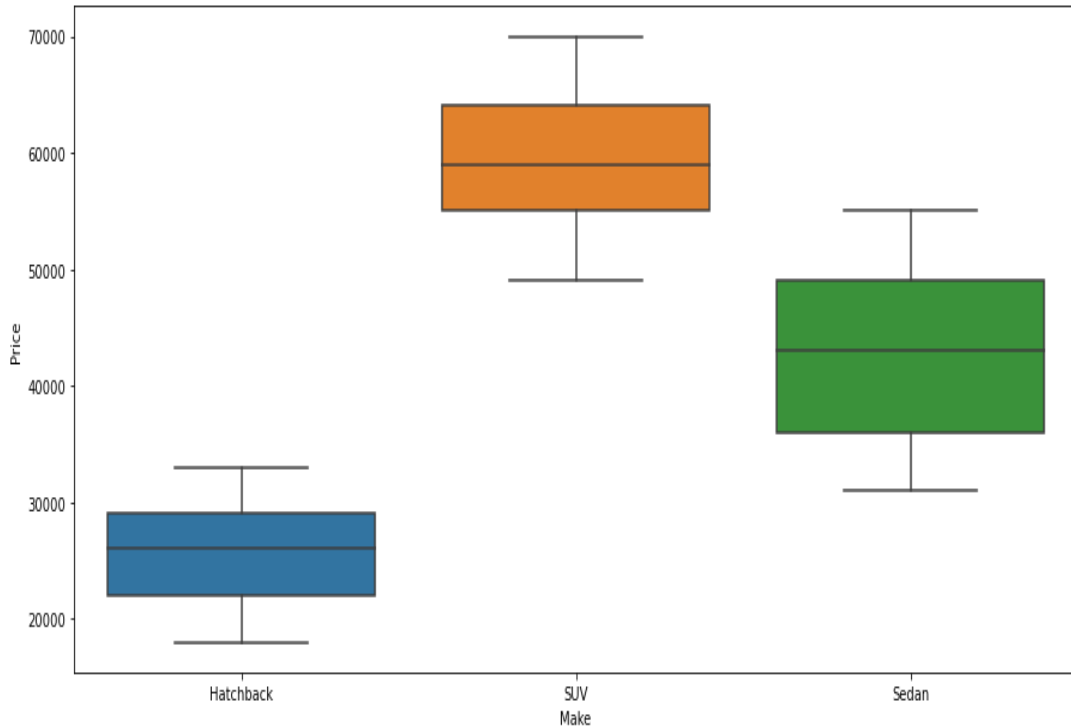
EXPLORATORY DATA ANALYSIS(EDA)

- This chart shows the average age of 22 want hatchback maybe because its cheaper
- Age bracket of s5 wants a sedan maybe because of the higher no of dependents as a family
- The older customer want the SUV

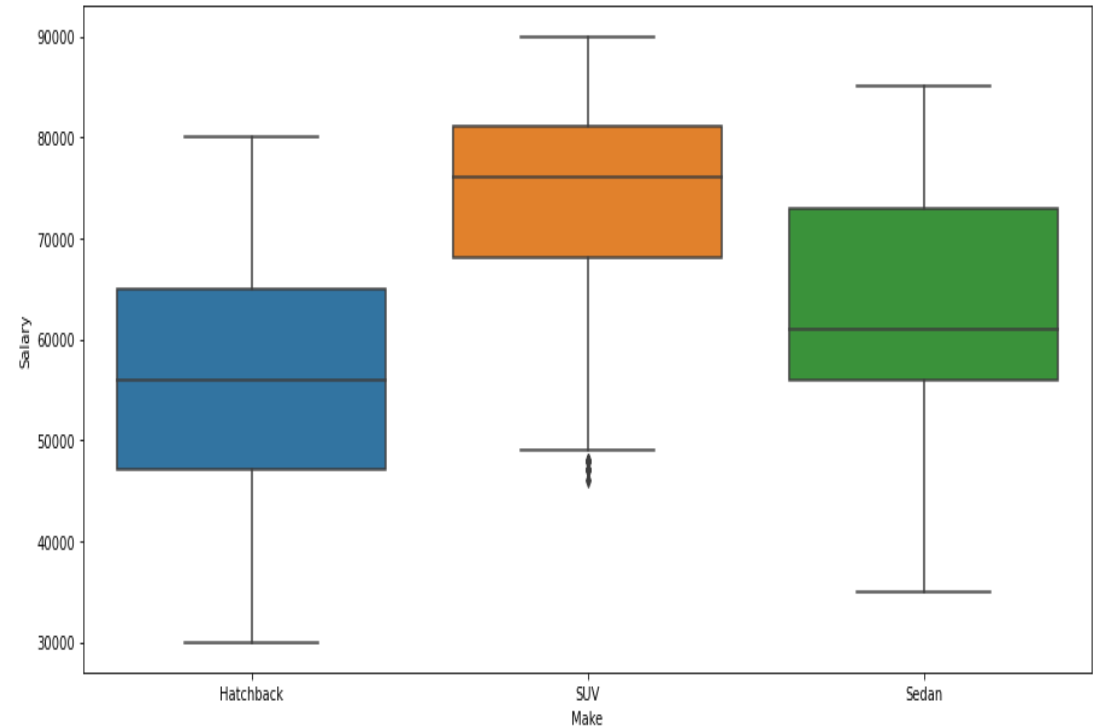


EXPLORATORY DATA ANALYSIS(EDA)

- This distribution shows the SUV has a higher price range, followed by the sedan and the hatchback has the lowest

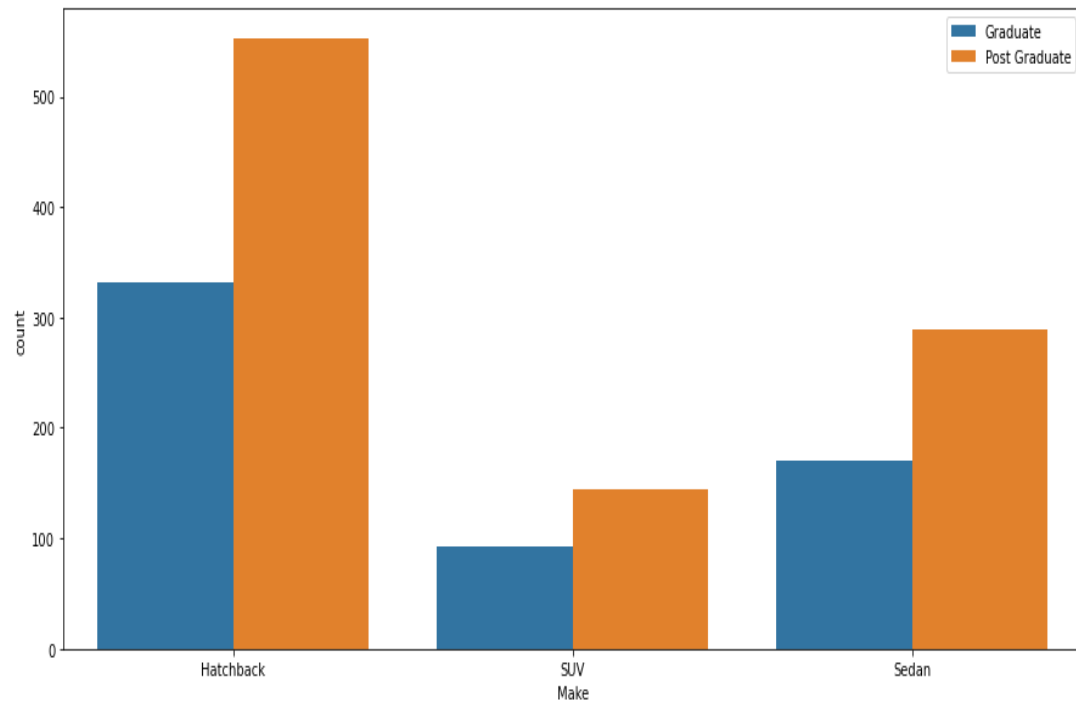


- The relationship between the make of a car and salary shows that highest salary earners go for SUV
- The salary earners between 50,000 to 60,000 go for hatch back and sedan

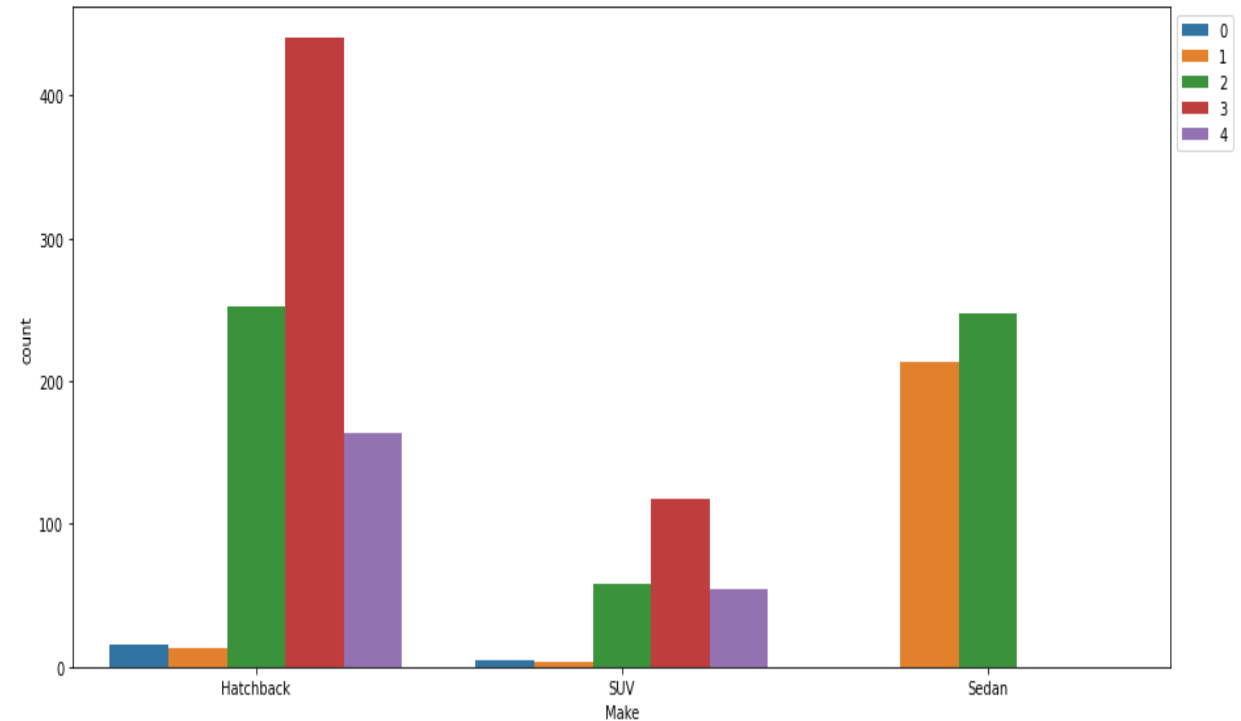


EXPLORATORY DATA ANALYSIS(EDA)

- The distribution shows the postgraduate has the highest purchasing power for all the make of car

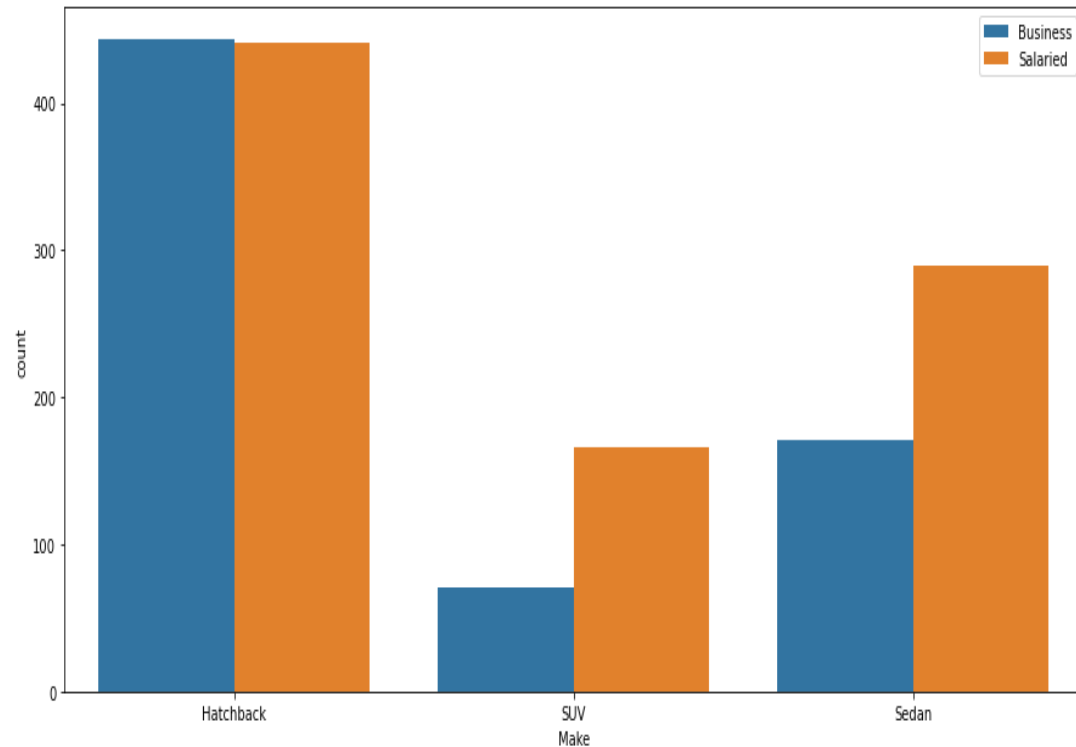


- This distribution shows family with 2 - 3 dependents will serve as customers for the hatchback

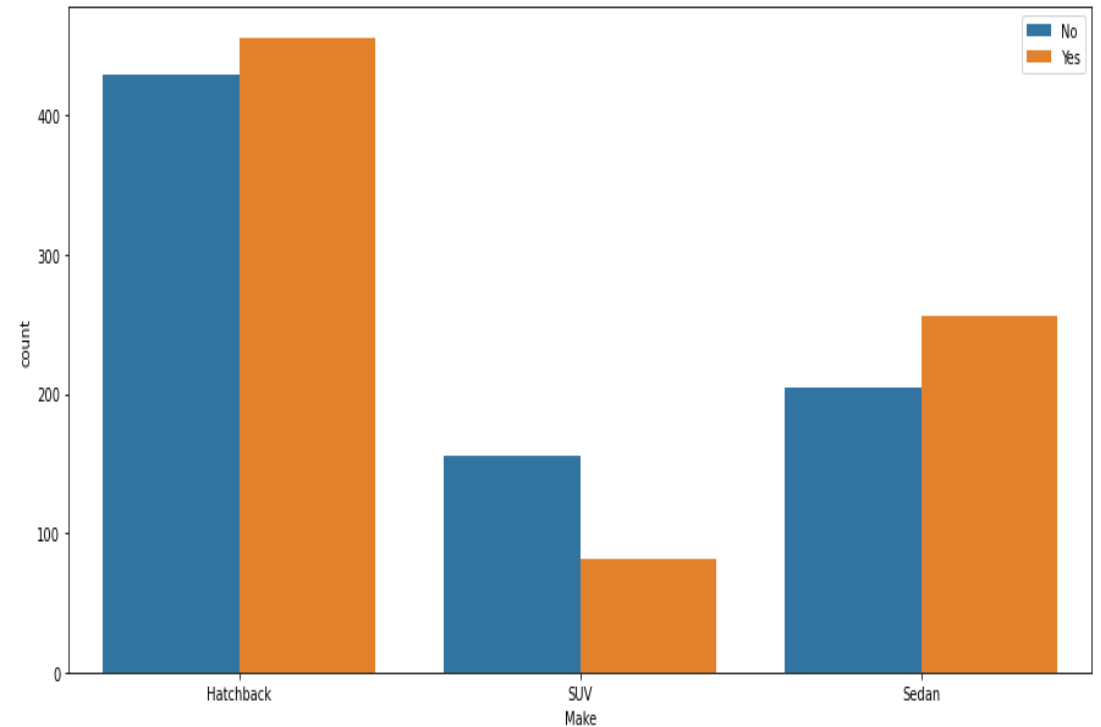


EXPLORATORY DATA ANALYSIS(EDA)

- This distribution little difference between the profession for customers interested in hatchback with business owners higher
- Salary earners have a higher percentage to buy the SUV or sedan

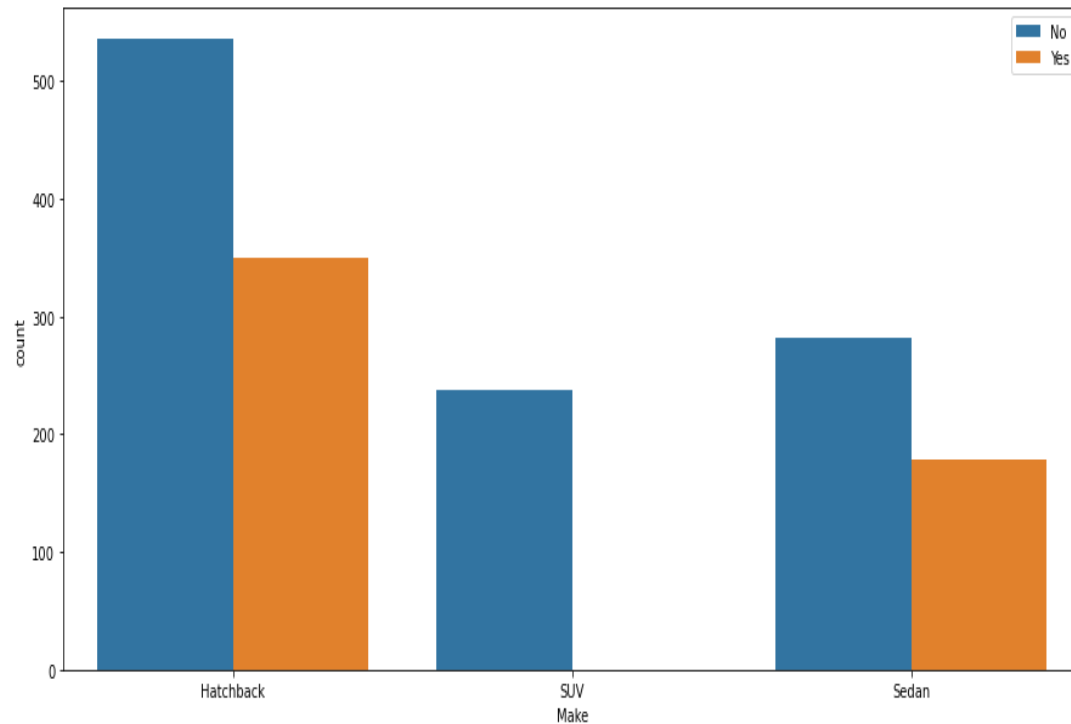


- This distribution show more customers interested in the hatchback have personal loans
- More customers interested in the SUV have no personal loan
- More customers interested in the sedan have with personal loans

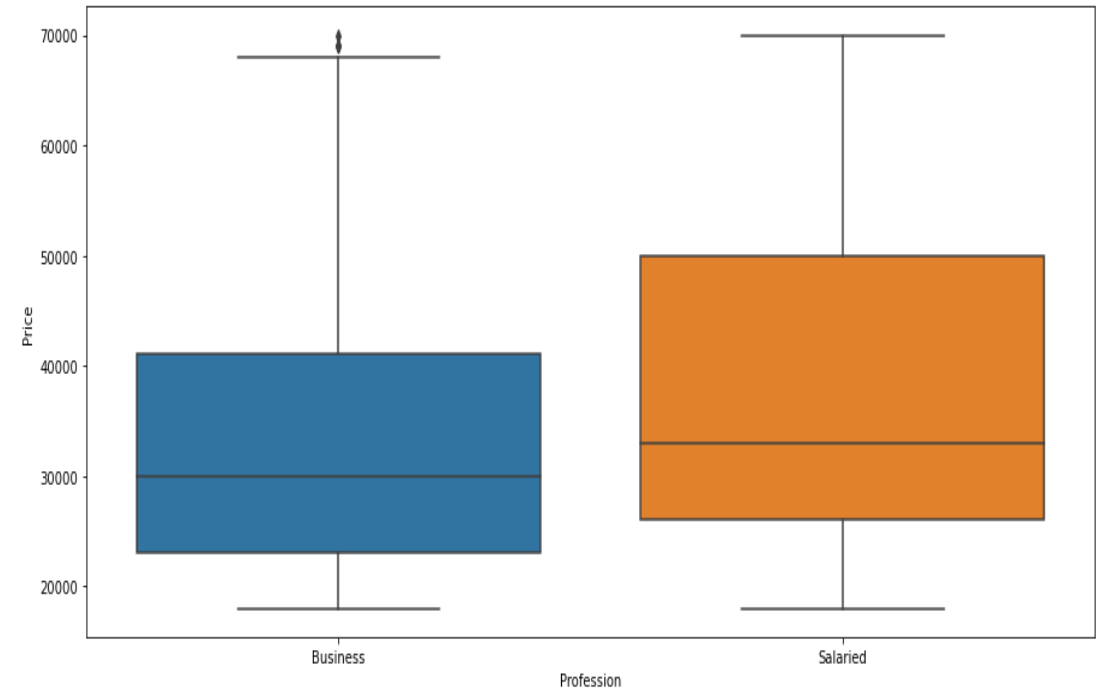


EXPLORATORY DATA ANALYSIS(EDA)

- This distribution show more customers interested in the hatchback have no house loans
- All the customers interested in the SUV have no house loan
- More customers interested in the sedan have no house loans

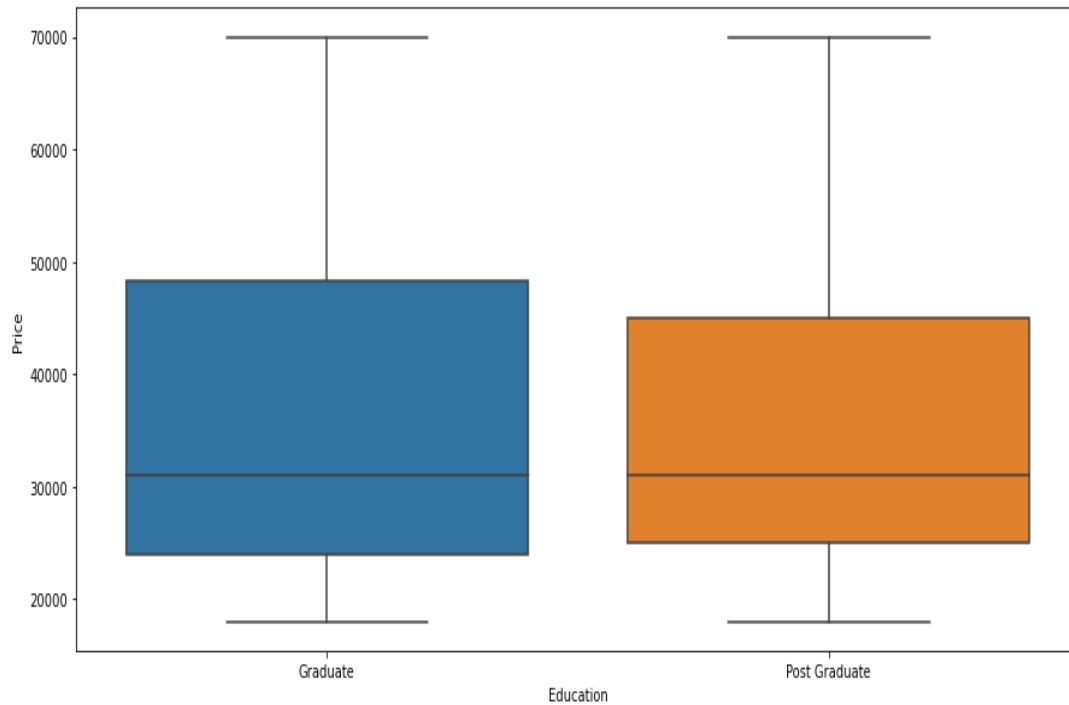


- This distribution shows salary earners have more interest in a car priced higher than business owners

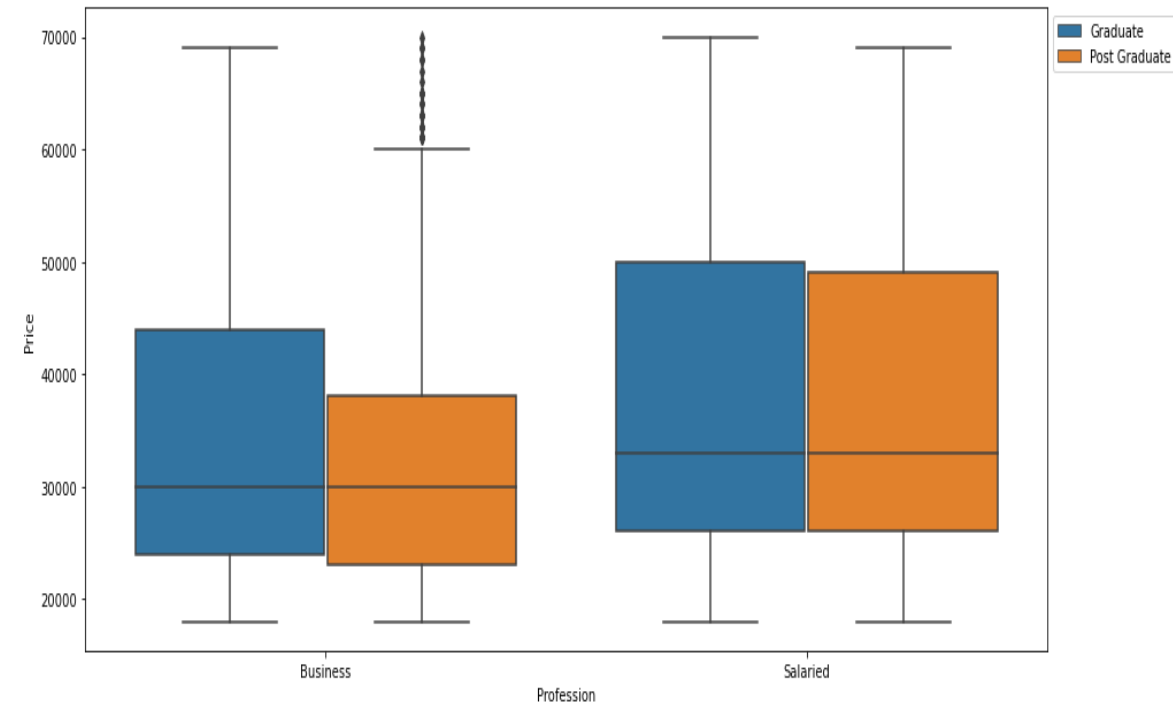


EXPLORATORY DATA ANALYSIS(EDA)

- This distribution shows graduate go a slightly higher price of car

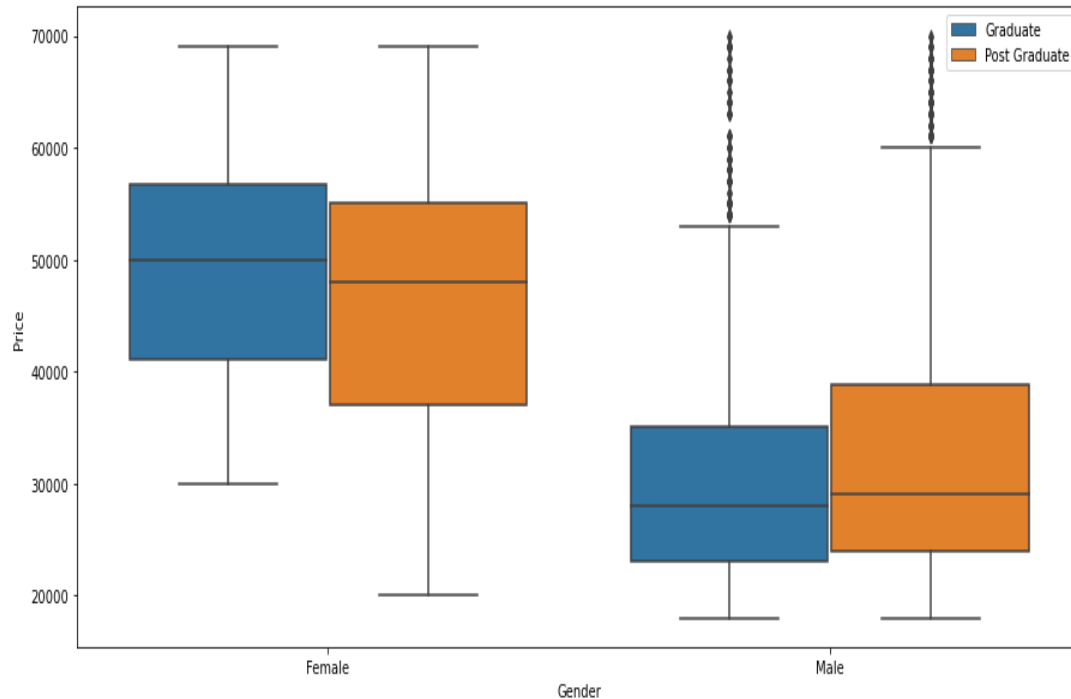


- This distribution shows graduates would prefer a more expensive car

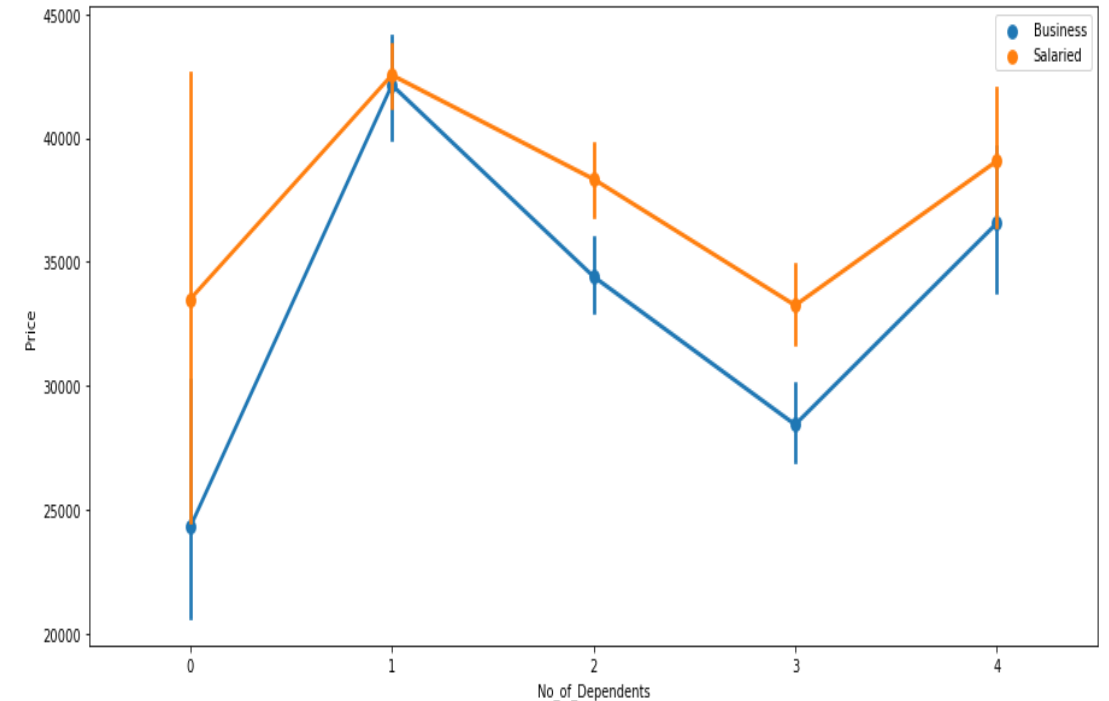


EXPLORATORY DATA ANALYSIS(EDA)

- This distribution shows female graduates prefer a car on the higher price range than the post graduates
- The male post graduates go for a higher car price compared to the graduate

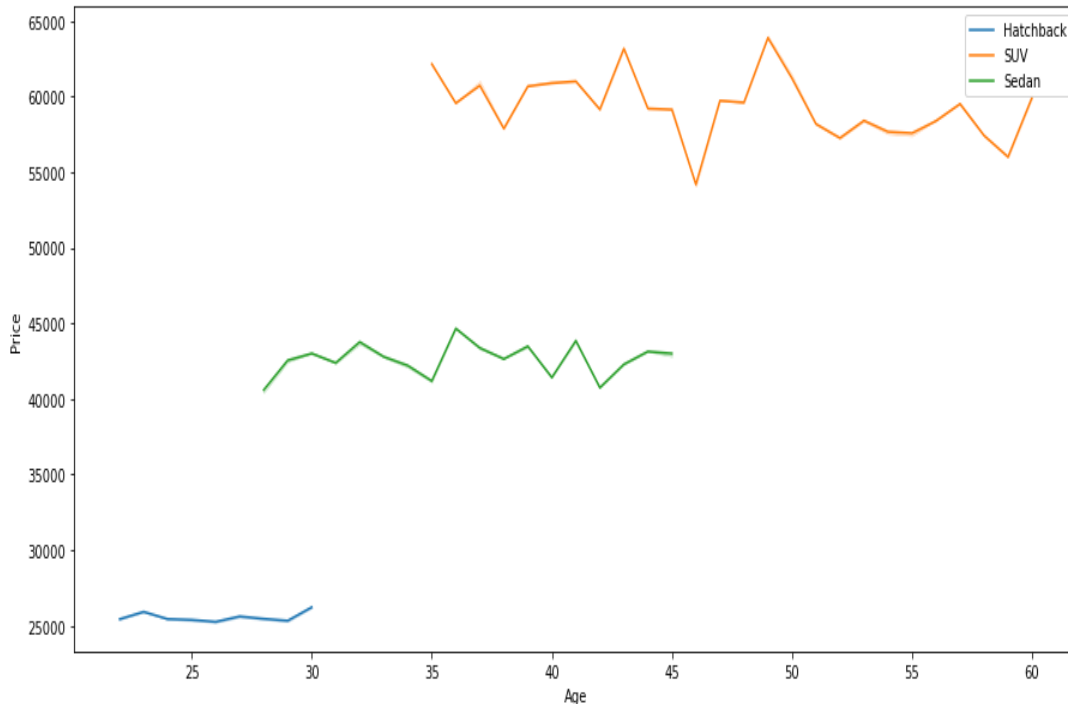


- This distribution shows both business and salaried with 1 dependents go for the car with the highest price range

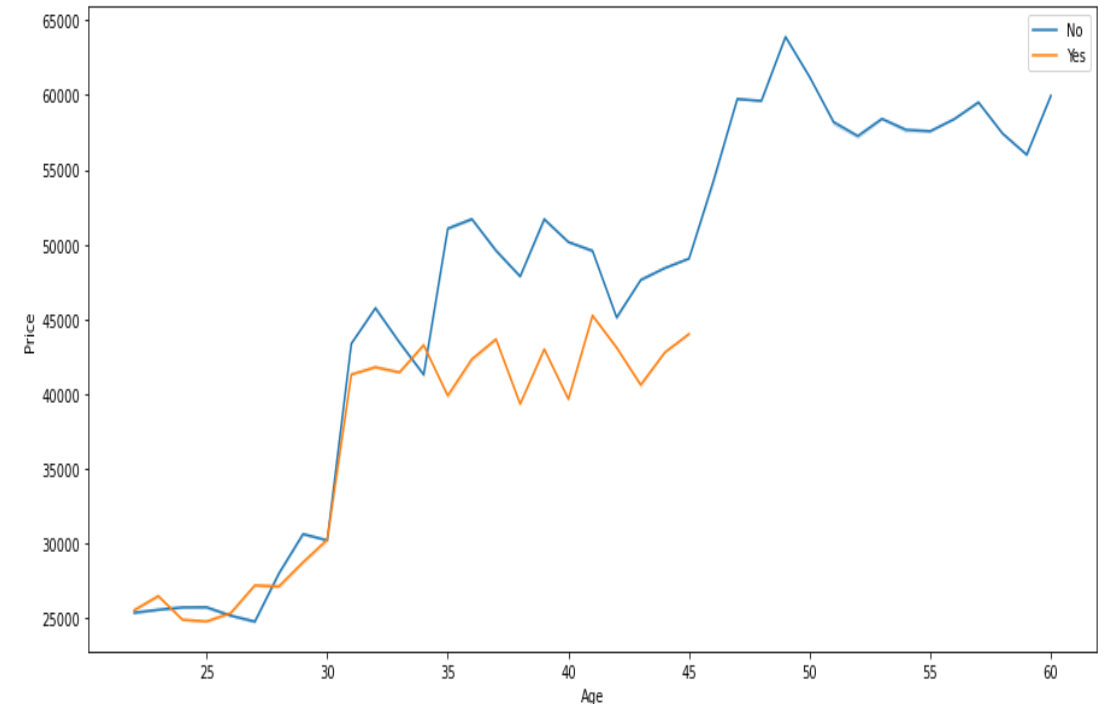


EXPLORATORY DATA ANALYSIS(EDA)

- This distribution shows the older group prefer SUV which has the highest price range
- The younger group prefer the hatchback and has the lowest price range
- The mid age group select the sedan with the average price range

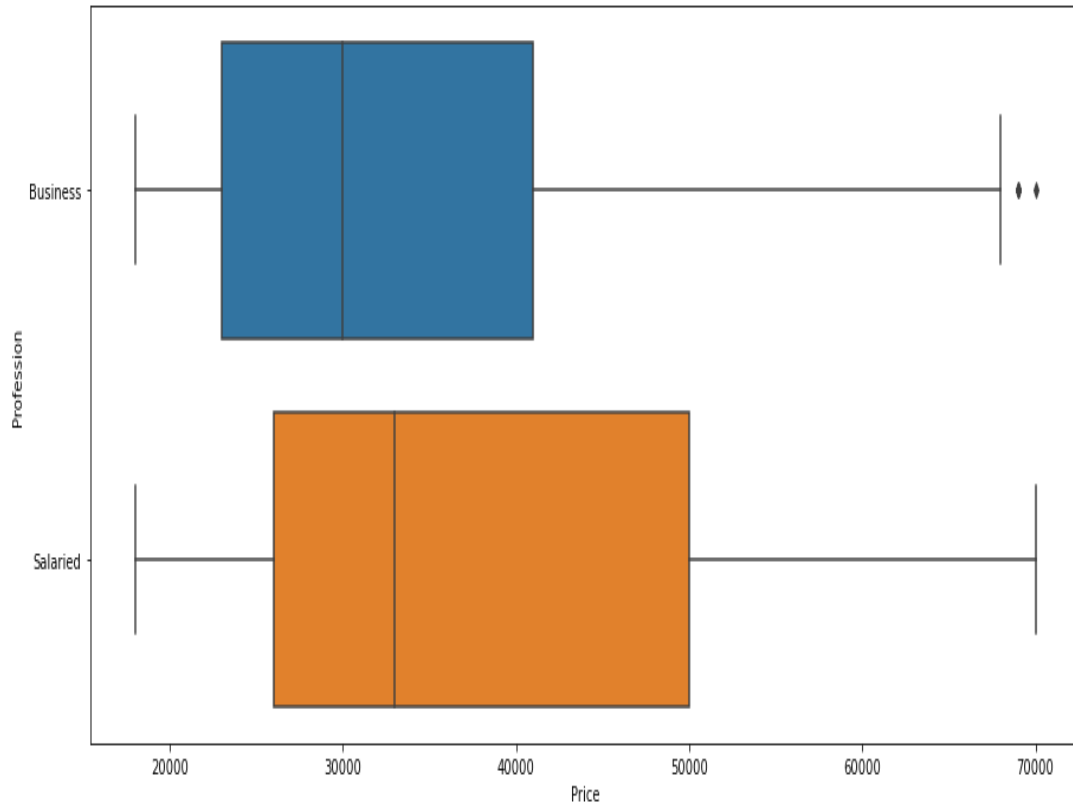


- This chart shows the lower the age group the higher the chance of have a house loan
- The older age group from 47-60 have no house loan

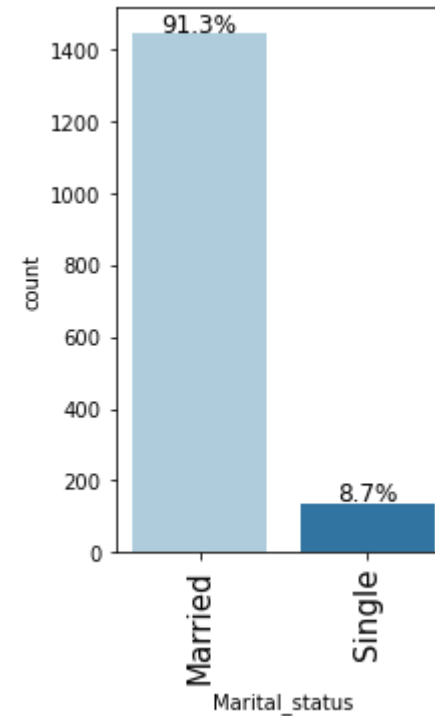


EXPLORATORY DATA ANALYSIS(EDA)

- Business owners who have both house and personal loan have a lower price point compared to the salaried



- We have two unique value for marital status, single and married
- Married people has 91.3% in the chart, which show s a big difference in customers who are likely to buy a car, 8.7% for singles



BUSINESS INSIGHTS AND RECOMMENDATIONS

The following are the insights the data displayed

- The distribution shows a 79.2% male are more likely to buy a car and 20.8% are female
- Salaried customers of 57% have more interest in buying a car and business owners at 43%
- 62.3% post graduate are interested in a car and 37.7% for graduate
- Customers with 2 to 3 number of dependents are more like to buy a car compared to those with zero or four dependents
- 50.1% of the customers has person loan and 49.9% do not
- 66.7% of the customers has no house loan and 33.3 % do have house loan
- 45.1% of the customers do not have a partner working and 54.9% have partner working
- A big chunk 91.3% for married customers are likely to buy a car, 8.7% for singles

The following will be recommended for AUSTO;

- Information from data shows females buy more expensive car, Austo should increase their number of female consumer as this can lead to more profits
- I would recommend Austo increase the price of hatchback as the just 444 is priced above 25,000 and it has the highest request
- Also, there is a huge market for singles missing, I would recommend Austo look into getting a car that would build interest in singles
- Customers who have both person and house loan should have a price bracket for the car they want
- The buyers profile for each make is below;

BUYERS PROFILE

| MAKE | Age | Gender | Profession | Marital_status | Education | No_of_Dependents | Personal_loan | House_loan | Partner_working | Salary | Partner_salary | Total_salary | Price |
|-----------|-----|--------|------------|----------------|---------------|------------------|---------------|------------|-----------------|--------|----------------|--------------|-------|
| HATCHBACK | 25 | Male | Business | Married | Post Graduate | 3 | Yes | No | Yes | 54969 | 17707 | 72676 | 25561 |
| SEDAN | 36 | Male | Salaried | Married | Post Graduate | 2 | Yes | No | Yes | 62213 | 20028 | 82241 | 42671 |
| SUV | 47 | Male | Salaried | Married | Post Graduate | 2 | No | No | Yes | 72683 | 26632 | 99316 | 59303 |