Business Report
(SMDM Project)

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Analysts are required to explore data and reflect on the insights. Clear writing skill is an integral part of a good report. Note that the explanations must be such that readers with minimum knowledge of analytics are able to grasp the insight.

Austo Motor Company is a leading car manufacturer specializing in SUV, Sedan, and Hatchback models. In its recent board meeting, concerns were raised by the members on the efficiency of the marketing campaign currently being used. The board decides to rope in analytics professional to improve the existing campaign.

1. What is the important technical information about the dataset that a database administrator would be interested in?

Considering the given dataset, the most important variables to be considered are the contribution of partner salary, Profession, and the gender preference of the car model.

Also, we may be interested in the variables that might possibly be a hinderance to the costumers when they actually decide to opt to buy the cars.

2. Take a critical look at the data and do a preliminary analysis of the variables. Do a quality check of the data so that the variables are consistent. Are there any discrepancies present in the data?

Data Preprocessing and Data Cleaning:

- Firstly, checking for Duplicates there were no duplicated values in the dataset.

- There were 106 missing values in the dataset for Partner_salary column and 53 missing values in Gender. So, the missing values in the Gender column was filled by mode of the column. Also, the spelling errors in Gender were corrected.

```
Age                 0
Gender             53
Profession          0
Marital_status      0
Education           0
No_of_Dependents    0
Personal_loan       0
House_loan          0
Partner_working     0
Salary              0
Partner_salary    106
Total_salary        0
Price               0
Make                0
dtype: int64
```

- And for the missing values in the Partner salary, it was treated with the help of another column partner working. If the partner working was yes, the missing values were treated with mean and if no, it was replaced by 0.

```
Age                0
Gender             0
Profession         0
Marital_status     0
Education          0
No_of_Dependents   0
Personal_loan      0
House_loan         0
Partner_working    0
Salary             0
Partner_salary     0
Total_salary       0
Price              0
Make               0
dtype: int64
```

- It was observed that there were significant outliers in the Total salary column. So, it was treated respectively.
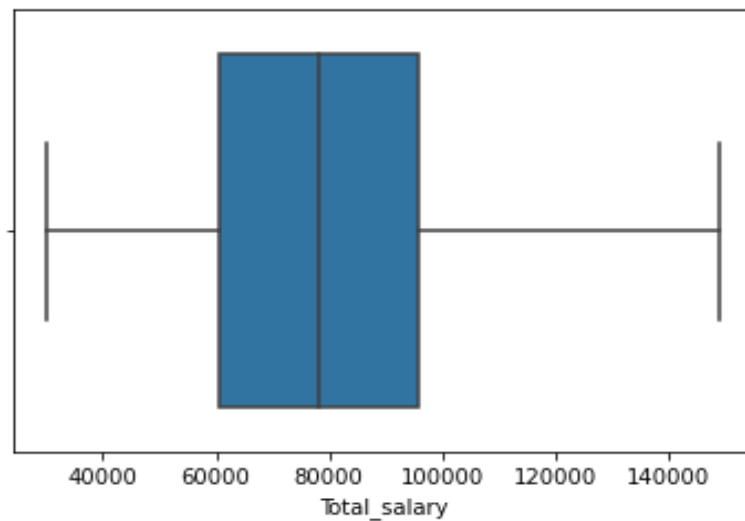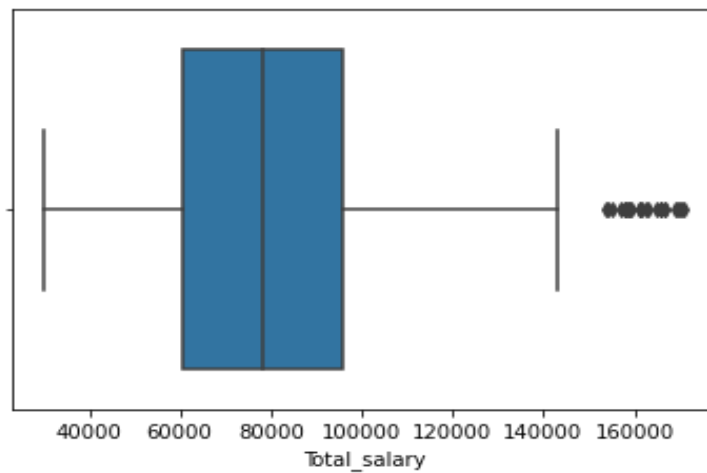
3. Explore all the features of the data separately by using appropriate visualizations and draw insights that can be utilized by the business.

Before going into detailed analysis, we may consider couple of general insights that can be drew to understand the nature of variables using univariate and bivariate analysis.
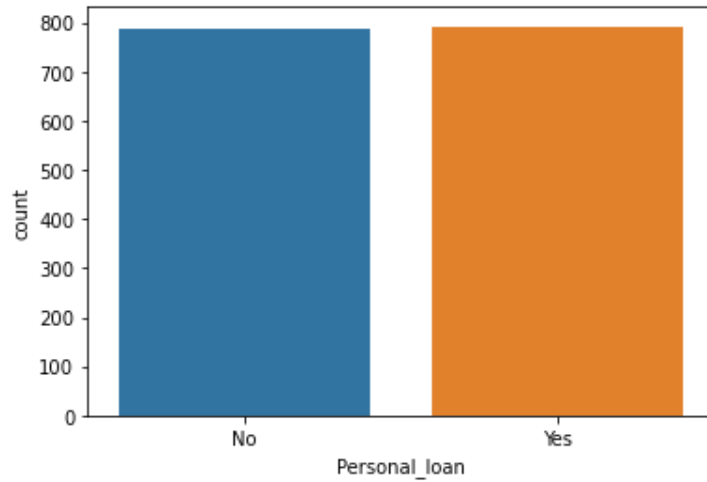
- We could see that the large number of individuals aged 22-30 approximately.
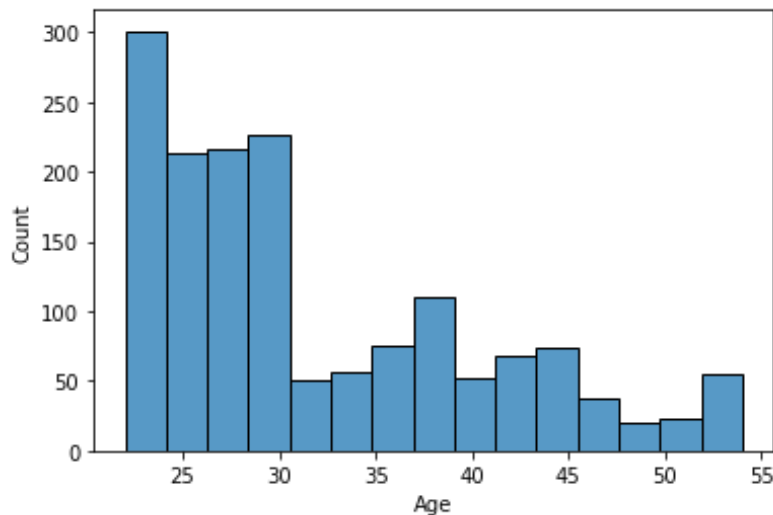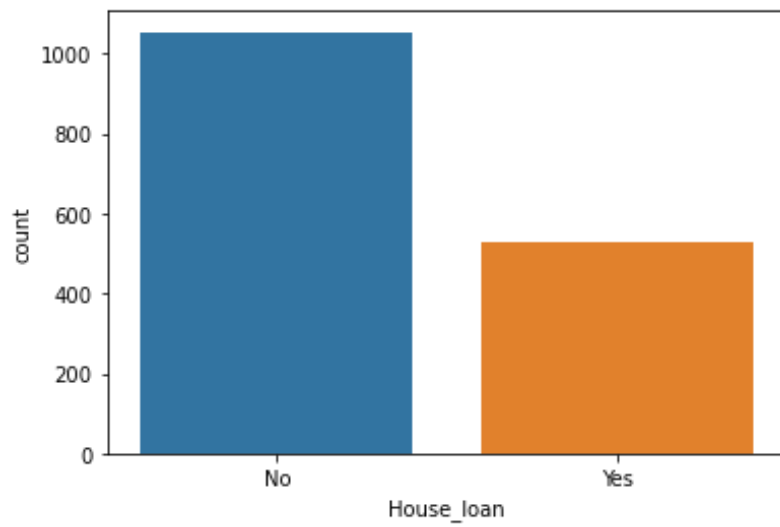

- Out of all models, SUV is a high-end vehicle followed by Sedan and Hatchback with lesser price range.
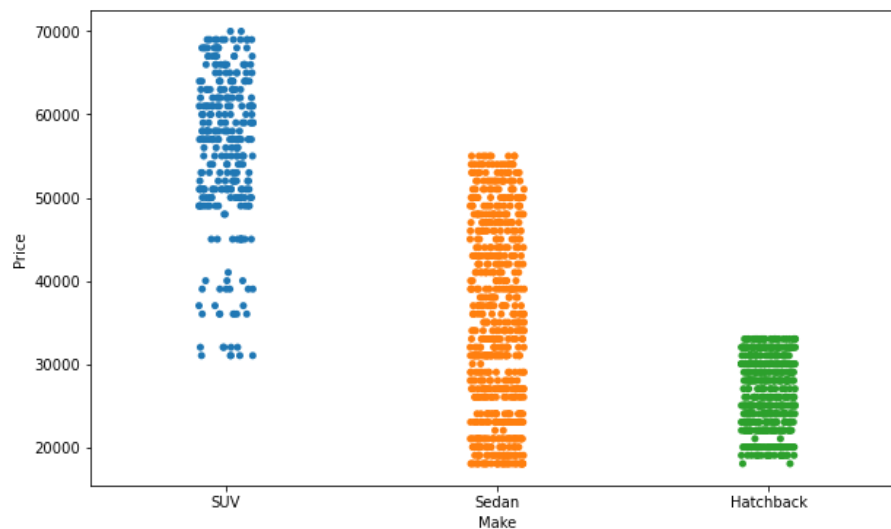
- The count of individuals with ongoing personal loan is almost same as the ones who do not have any personal loans.

- There is a significant difference in count with respect to ongoing House loan.

- The number working partners are higher compared to non-working partners.
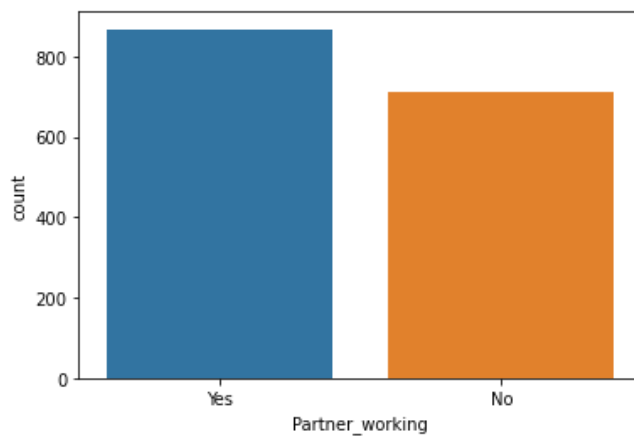
- In terms of profession, irrespective of Gender there are large number of salaried individuals rather than Business Professionals

- Considering the active loans (personal and house loans) with respect to gender and profession.

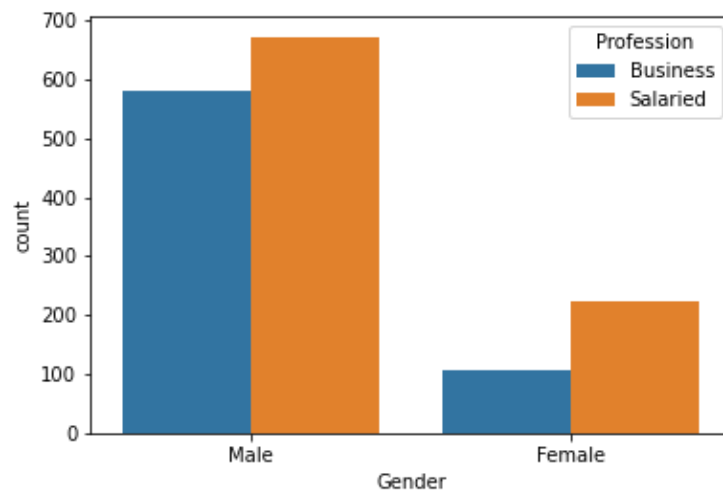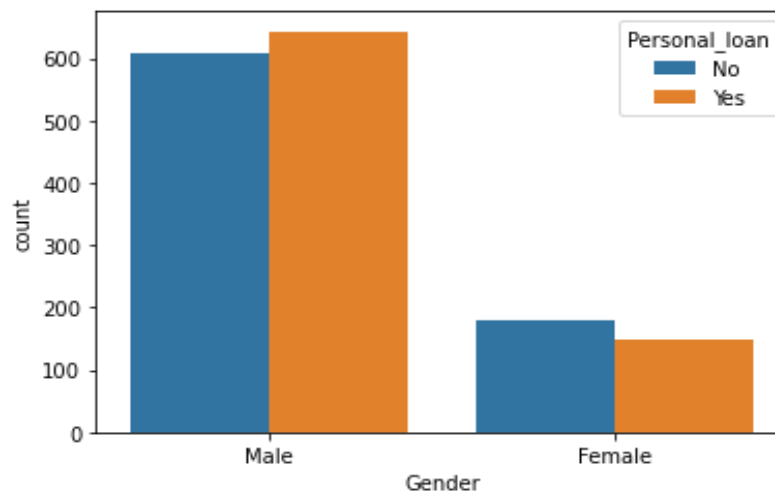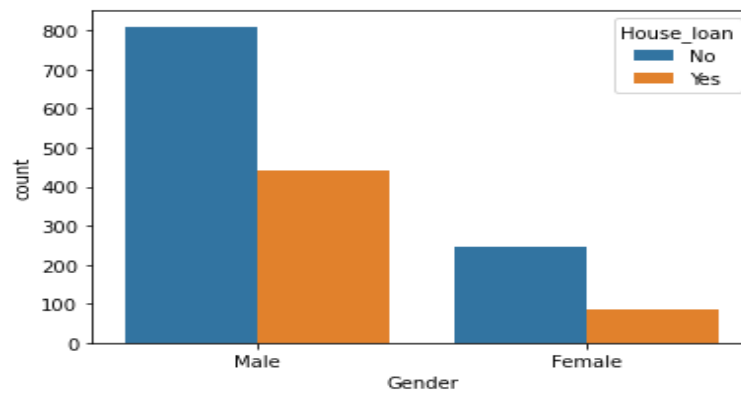4. Understanding the relationships among the variables in the dataset is crucial for every analytical project. Perform analysis on the data fields to gain deeper insights. Comment on your understanding of the data.

- Gender Preference: Males tend to buy Sedan and Hatchback more compared to SUV.
- Females usually prefer SUV more than Sedan; Hatchback is the least preferred.
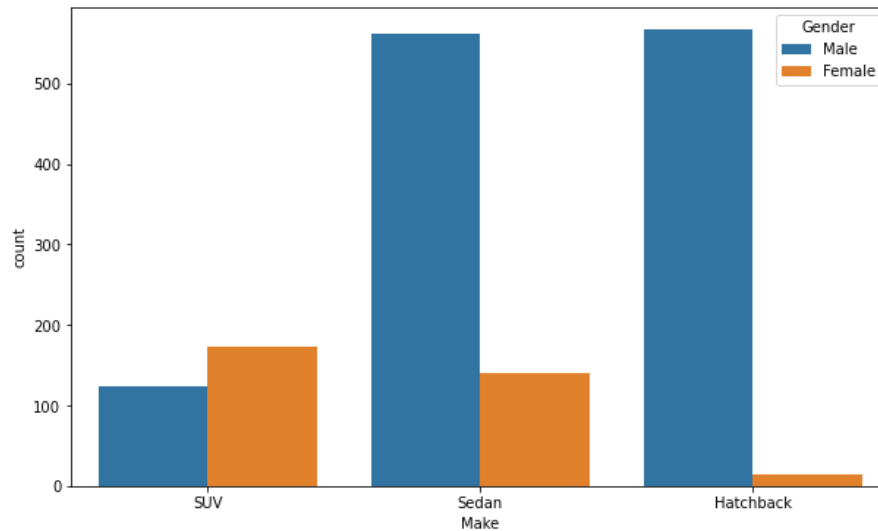
- As we further analyze the given data, we can see the car purchase is fairly affected by the ongoing house loan.
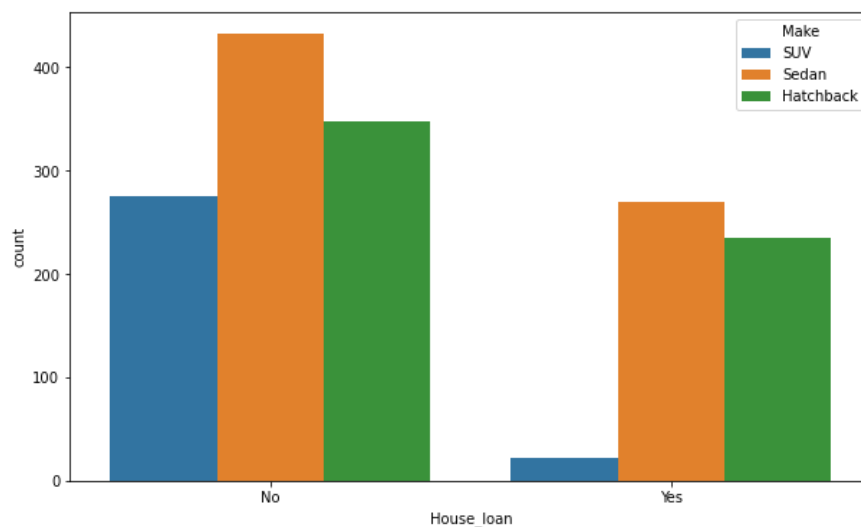
- The preference of vehicle in all 3 categories of cars is almost the same regardless Partner working or not. So, this doesn't affect the sales in any aspect.
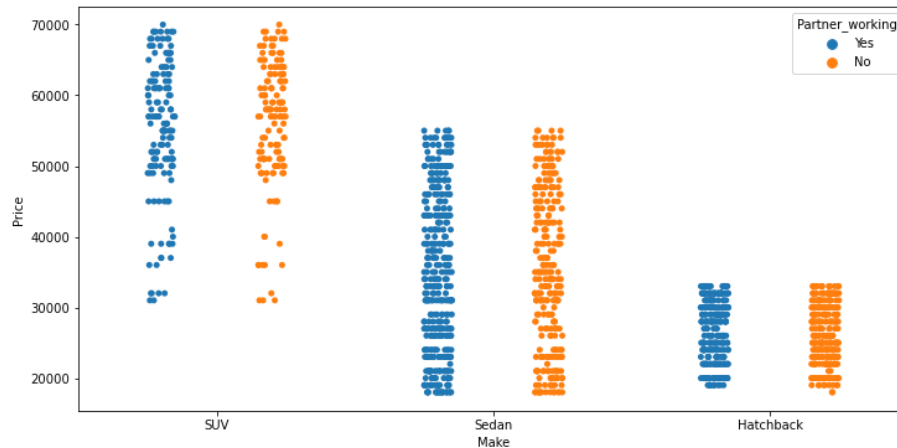
- But however, we could see that fairly number of high-end cars preferred if the partner salary is high
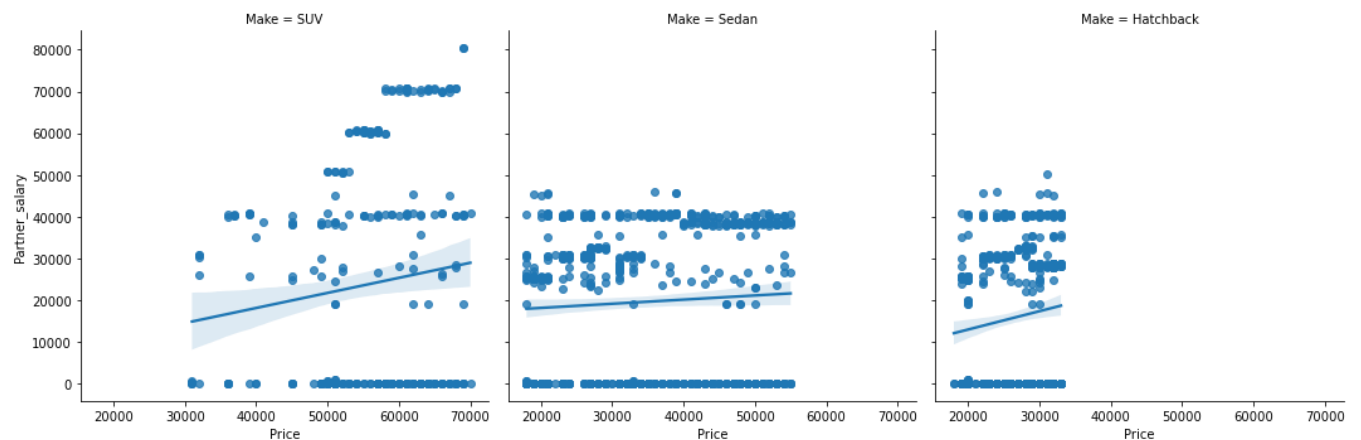
- To add furthermore insight to the above point, we may consider the ongoing house loan as we did observe previously this is known to affect the sales.
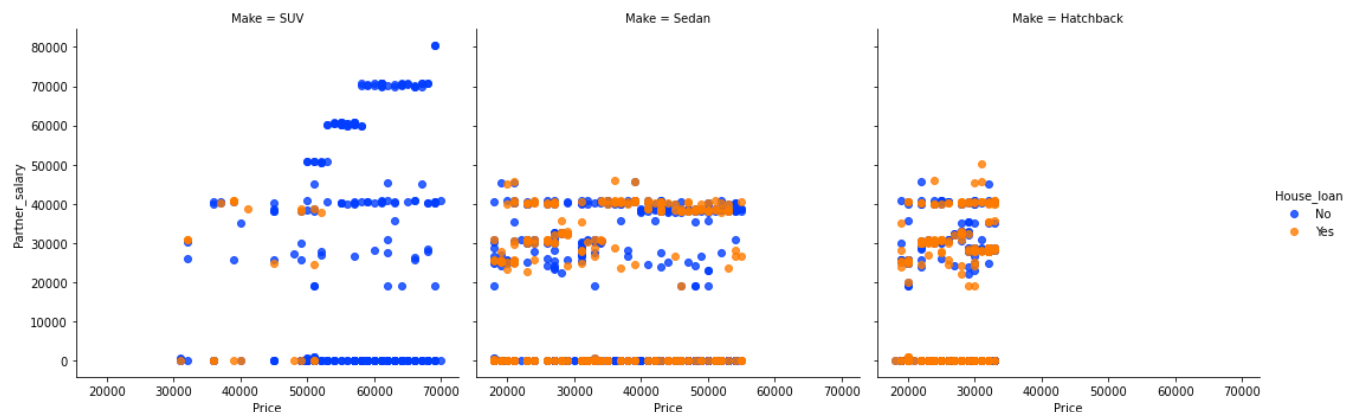
- To summarize the above graph, Individuals with "NO HOUSE LOAN AND HIGHER PARTNER SALARY" tend to opt for high end SUV cars specifically

- If they have ongoing HOUSE LOAN, usually Hatchback within price range < 35,000 is opted and Sedan <56,000 is opted
- When we observe SEDAN particularly, the house loan is not causing much of difference in price range opted by the customers
- Some Marketing Campaign and also some workaround to support customers is needed to target the customers with ongoing HOUSE LOAN
- Lastly considering the 2 interesting variables, Marital status and no of dependents or the number of family members.
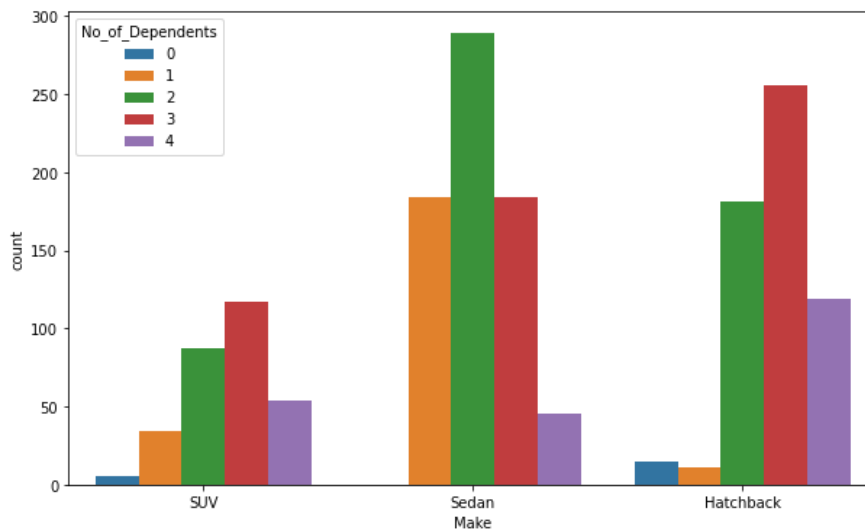
Hatchback is preferred more by the bigger families; Sedan seems preferred when the members are 2-3
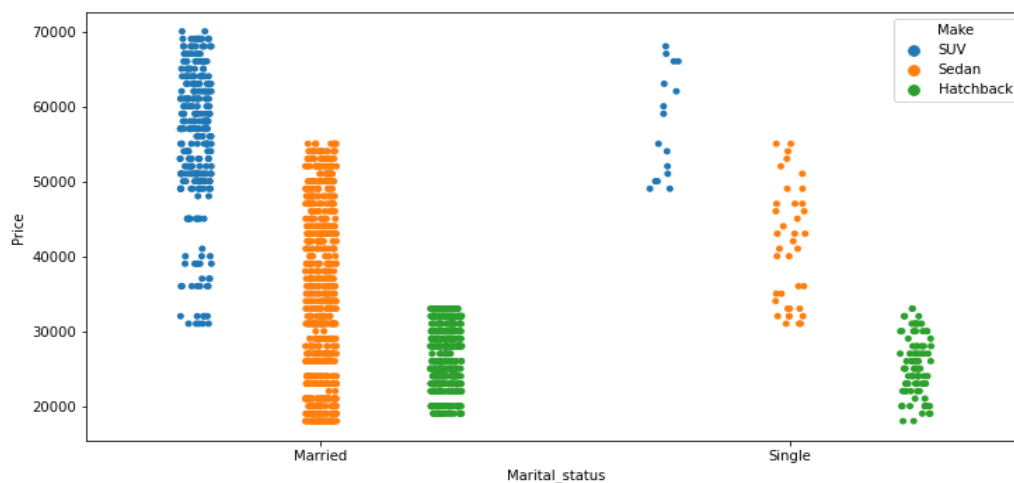
Married Couples tend to consider buying cars compared to single individuals

5. Employees working on the existing marketing campaign have made the following remarks. Based on the data and your analysis state whether you agree or disagree with their observations. Justify your answer Based on the data available.

E1) Steve Roger says "Men prefer SUV by a large margin, compared to the women"
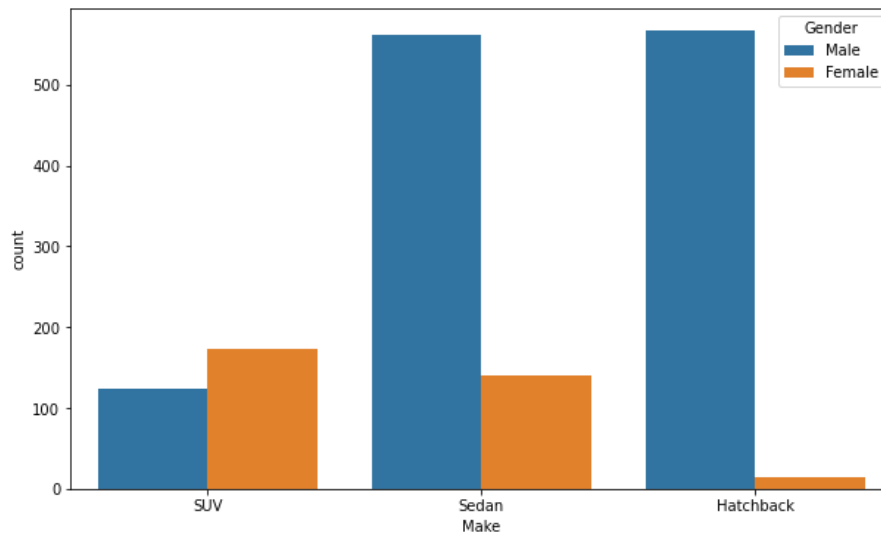
As per the above data analysis, we can see Females prefer SUV by a large margin compared to males. Usually, males prefer more Sedan or Hatchback.

E2) Ned Stark believes that a salaried person is more likely to buy a Sedan.
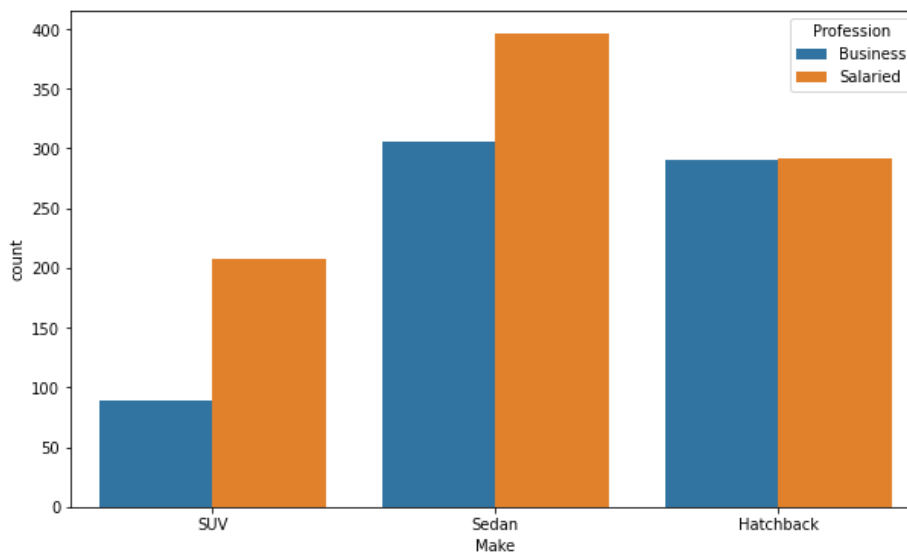
This is true, the data supports the above statement. We can see that the salaried persons prefer Sedan, followed by Hatchback.

E3) Sheldon Cooper does not believe any of them; he claims that a salaried male is an easier target for a SUV sale over a Sedan Sale.

As per the above representation, the salaried males usually prefer Sedan. They are not an easy target for SUV sales.

Instead, we can see a potential group of customers from the Hatchback preference who can be targeted to buy a high-end Sedan.

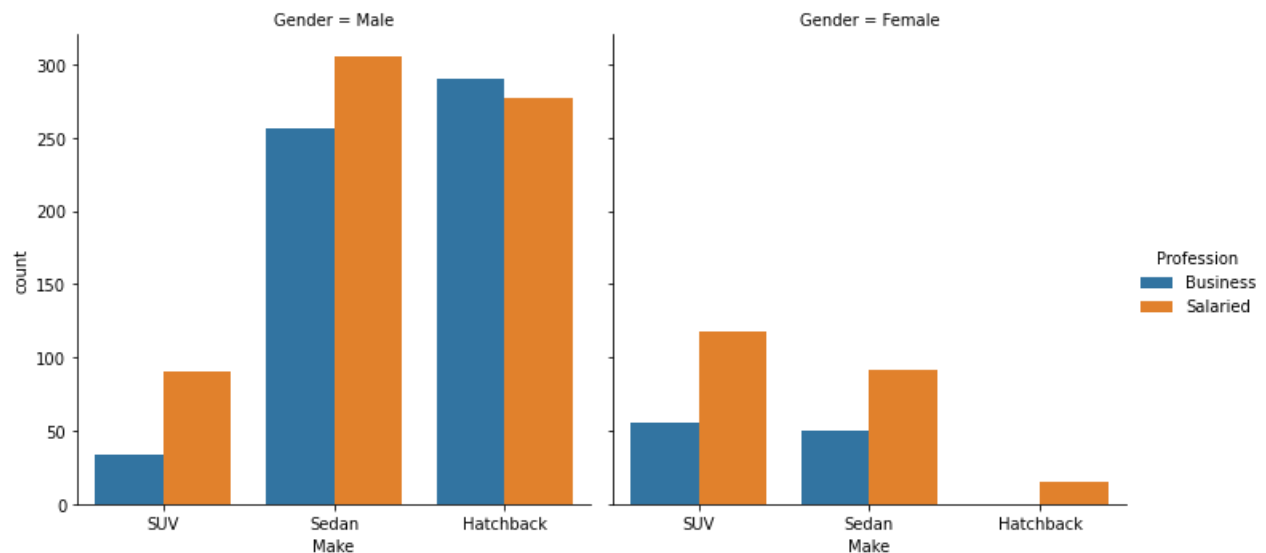Additionally, we could see that the salaried Females prefer opting for an SUV. So, this makes the women in Business filed an easy target to market the SUV model cars.

6. From the given data, comment on the amount spent on purchasing automobiles across the following categories. Comment on how a business can utilize the results from this exercise. Give justification along with presenting metrics/charts used for arriving at the conclusions.

Give justification along with presenting metrics/charts used for arriving at the conclusions.

F1) Gender: Males tend to buy Sedan and Hatchback more compared to SUV. Females usually prefer SUV more than Sedan; Hatchback is the least preferred
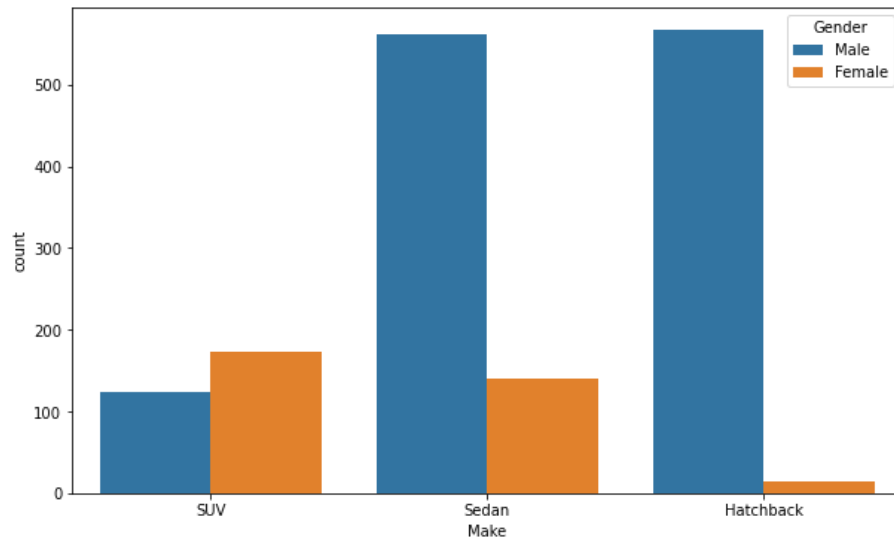
F2) Personal_loan: Though the personal loan does not largely affect the sales, there is a slight hinderance observed. However, Sedan is preferred when there is ongoing personal loan.

However, some workaround with respect to this might possibly increase the sales of the cars as there are potential buyers. We can see there is just a slight difference in the sales count.
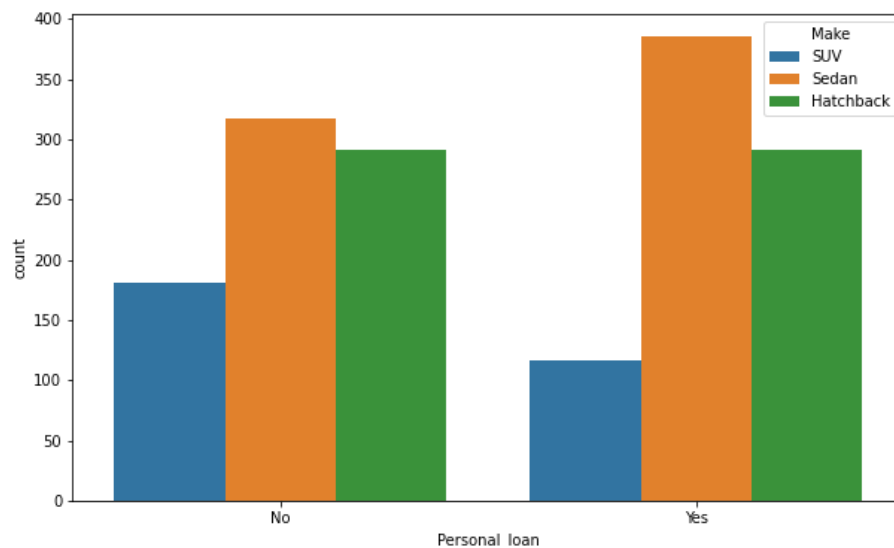
F3) House_loan: As we can see the car purchase is fairly affected by the ongoing house loan. Some Marketing Campaign and also some workaround to support customers is needed to target the customers with ongoing HOUSE LOAN
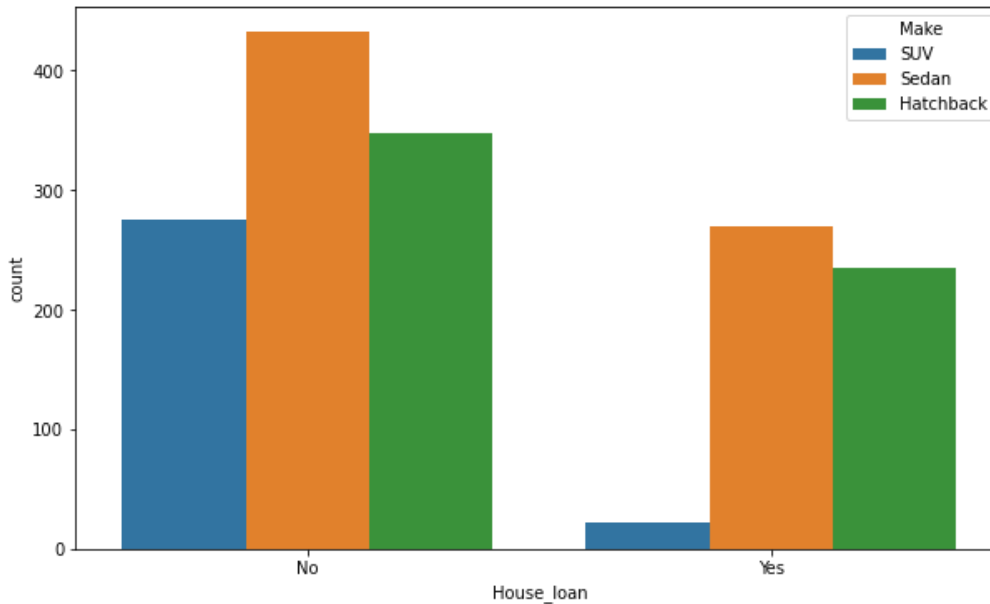
7. From the current data set comment if having a working partner lead to the purchase of a higher-priced car.
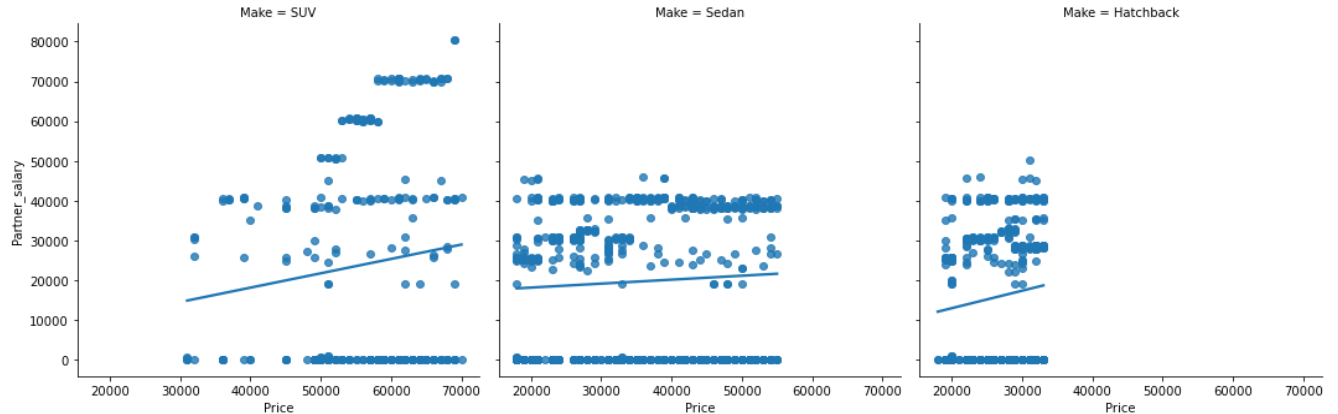
We could see that fairly number of high-end cars preferred if the partner salary is high.

8. The main objective of this analysis is to devise an improved marketing strategy to send targeted information to different groups of potential buyers present in the data. For the current analysis use the Gender and Marital_status - fields to arrive at groups with similar purchase history.

Gender Preference: Males tend to buy Sedan and Hatchback more compared to SUV. Females usually prefer SUV more than Sedan; Hatchback is the least preferred.
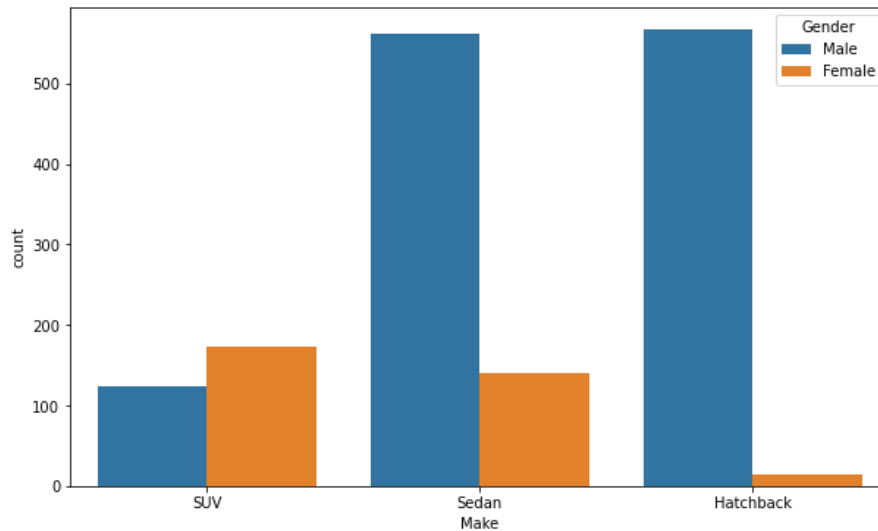

Married Couples tend to consider buying cars compared to single individuals

9. Suggestions for the upcoming Marketing Campaign to increase sales

- We could see the car purchase is fairly affected by the ongoing house loan. Some Marketing Campaign and also some workaround to support and encourage customers to increase the sales among these customers.
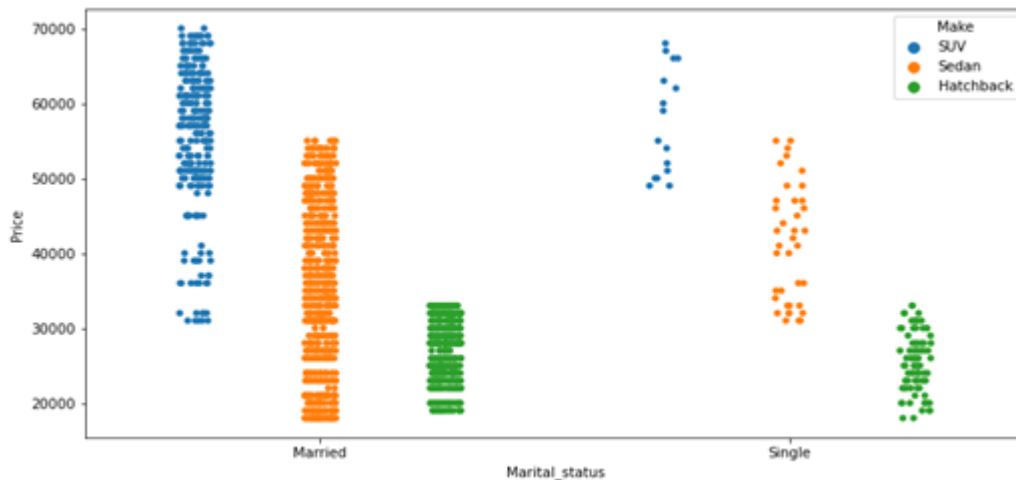- Potential customers are found in the group preferring Hatchback for the sake of huge number of dependents, they can be targeted for Sedan sales as even Sedan is preferred by larger families too. Therefore, the income for the organization can be increased.

- Married Couples tend to consider buying cars compared to single individuals. But there are potential buyers in the singles as well. With the help of proper marketing and some offers or workaround can help increasing the sales.
- We observe that the salaried Females prefer opting for an SUV. So, this makes the women in Business filed an easy target to market the SUV model cars.

A bank can generate revenue in a variety of ways, such as charging interest, transaction fees and financial advice. Interest charged on the capital that the bank lends out to customers has historically been the most significant method of revenue generation. The bank earns profits from the difference between the interest rates it pays on deposits and other sources of funds, and the interest rates it charges on the loans it gives out.

GODIGT Bank is a mid-sized private bank that deals in all kinds of banking products, such as savings accounts, current accounts, investment products, etc. among other offerings. The bank also cross-sells asset products to its existing customers through personal loans, auto loans, business loans, etc., and to do so they use various communication methods including cold calling, e-mails, recommendations on the net banking, mobile banking, etc.

GODIGT Bank also has a set of customers who were given credit cards based on risk policy and customer category class but due to huge competition in the credit card market, the bank is observing high attrition in credit card spending. The bank makes money only if customers spend more on credit cards. Given the attrition, the Bank wants to revisit its credit card policy and make sure that the card given to the customer is the right credit card. The bank will make a profit only through the customers that show higher intent towards a recommended credit card. (Higher intent means consumers would want to use the card and hence not be attrite.)

✚ To address the problem 2 mentioned above, we may consider the top 5 variables:

1. Annual Income at source
2. Occupation at source
3. Average Amount spent
4. cc limit
5. Another bank CC

✚ Firstly, lets understand the occupations the dataset holds:
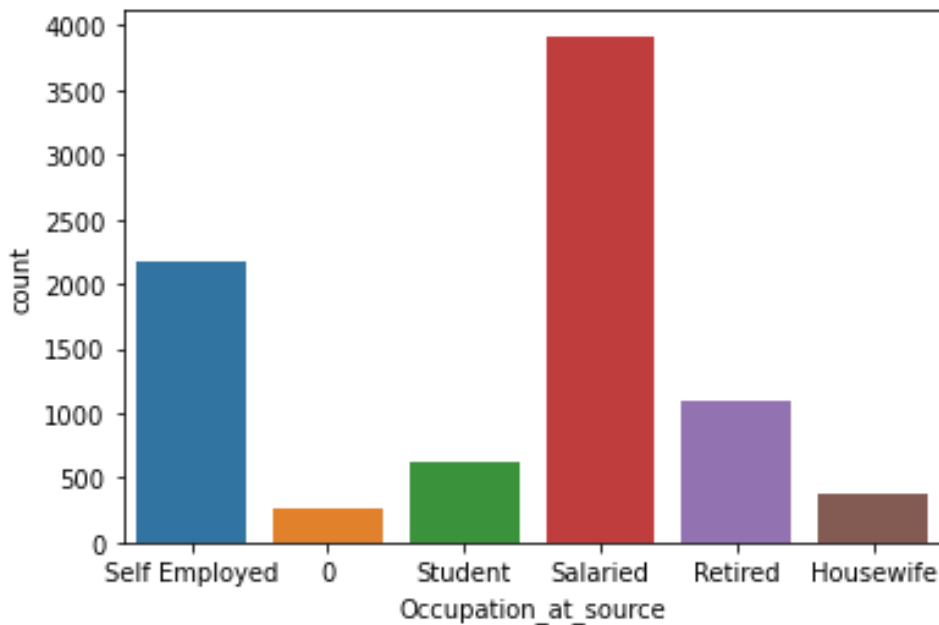
✚ So, if a line plot can be plotted for these variables, we can find that all these are positively correlated.

1. CC Limit is positively related to the annual income of the customer. But, on analyzing the below representation we might see that the Occupation entered as '0' is having the considerable highest salary.
2. Further investigation may be needed on this, as there are larger group of customers in this cluster.
3. This might include a potential and easily targetable group of clusters to increase the income of bank with the help of marketing and service.
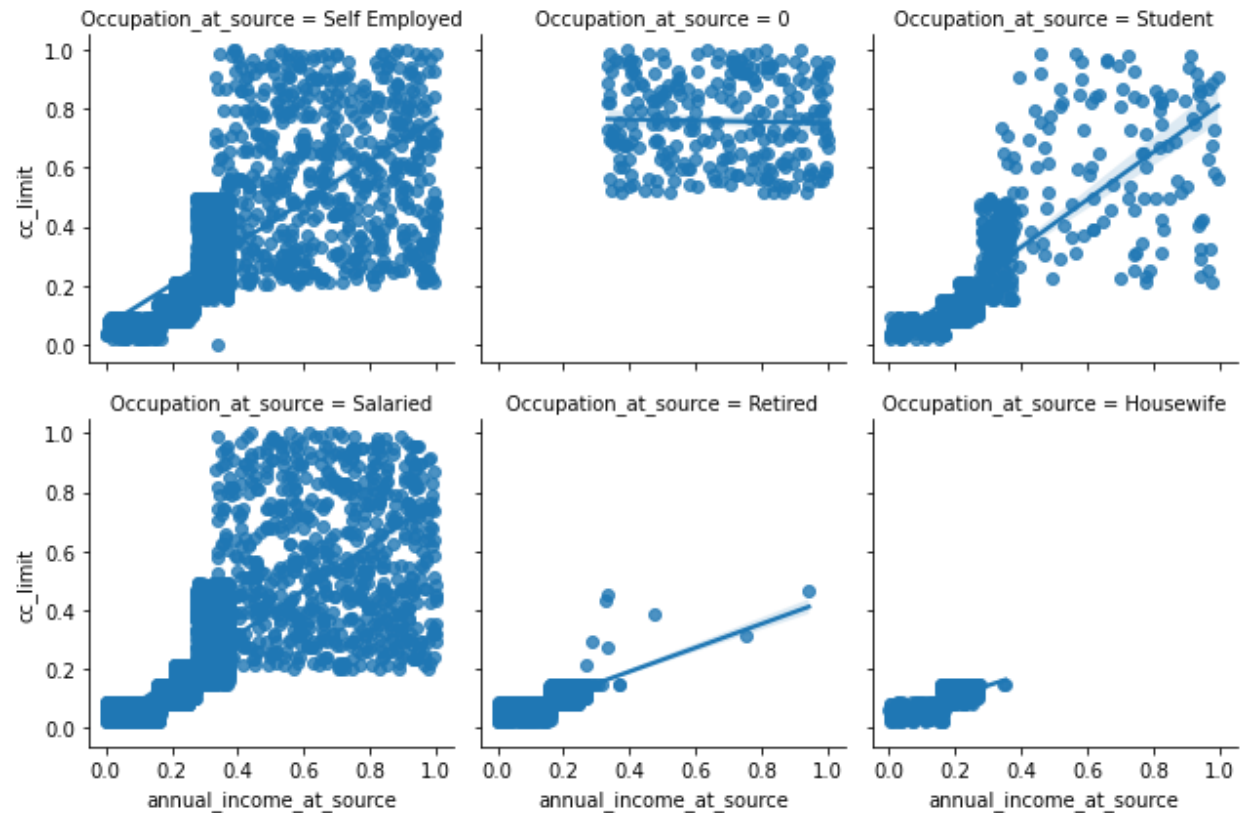
4. CC Limit and Amount spent is also positively correlated. In this we could see that even Retired people and housewives contribute a decent amount of income to the bank.
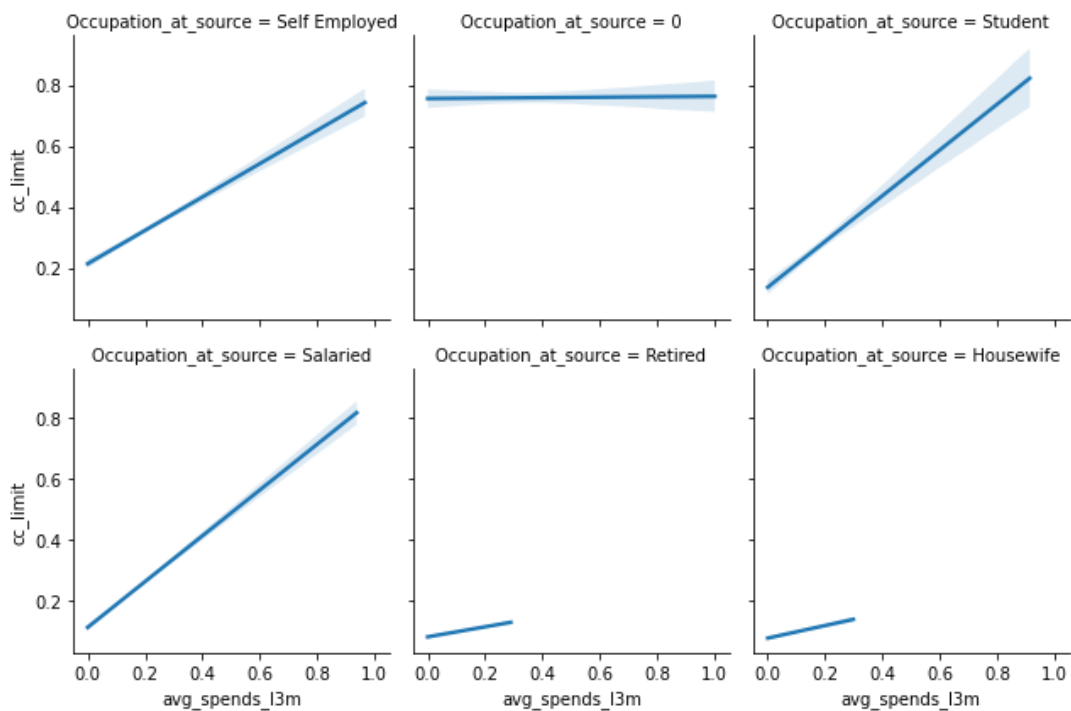
5. Lastly considering the impact on amount spent that contributes to bank's income if the person holds another bank's CC.
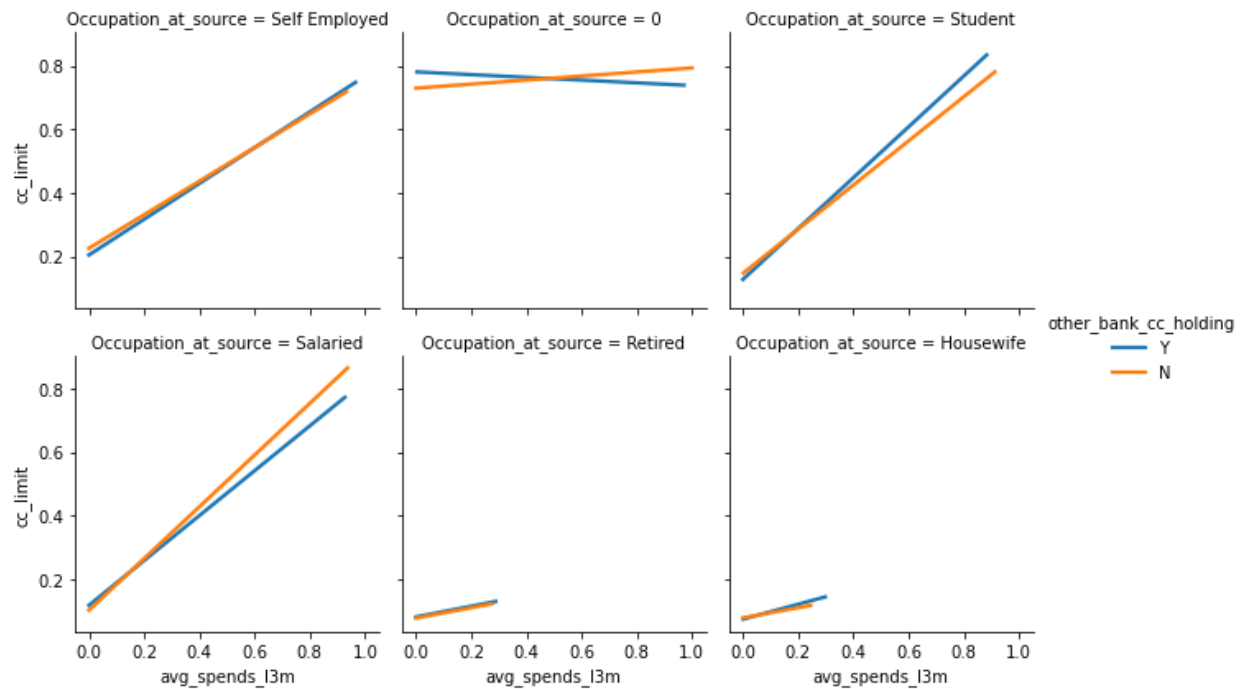
As we say, this does not affect the amount spent to a greater level. However, if closely observed we could see there is a slight impact in the Retired and Housewife cluster.

This might be considered for further improvement for the better income. Also, they may be an easy target group if right strategy and workaround can be devised.