# PYTHON FOR DATA SCIENCE PROJECT AUSTO AUTOMOBILE DATA ANALYSIS

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# 1. <u>Objective:</u>

Austo Motor Company is a leading car manufacturer specializing in SUV, Sedan 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 an analytics professional to improve the existing campaign.

They want to analyze the data to get a fair idea about the demand of customers which will help them in enhancing their customer experience.

# 2. Data Information:

The data contains the detail of the customers who buy the cars in the Austo Motor Company.

| Age | The age of the individual in years. |
|-----|-------------------------------------|
| Gender | The gender of the individual, categorized as male or female. |
| Profession | The occupation or profession of the individual. |
| Marital_status | The marital status of the individual, such as married and single. |
| Education | The educational qualification of the individual Graduate and Post Graduate. |
| No_of_Dependents | The number of dependents (e.g., children, elderly parents) that the individual supports financially. |
| Personal_loan | A binary variable indicating whether the individual has taken a housing loan 'yes' or 'no' |
| House_loan | A binary variable indicating whether the individual has taken a housing loan 'yes' or 'no' |
| Partner_working | A binary variable indicating whether the individual's partner is employed 'yes' or 'no' |
| Salary | The individual's salary or income. |
| Partner_salary | The salary or income of the individual's partner, if applicable |
| Total_salary | The total combined salary of the individual and their partner (if applicable). |
| Price | The price of a product or service. |
| Make | The type of automobile. |

# 3. <u>Statistical summary of the data:</u>

The dataset comprises 1,581 entries with demographic and financial attributes. The average age of respondents is approximately 32 years, with a range from 22 to 54 years. The dataset is predominantly male (1,199 out of 1,528 reported genders) and mostly salaried professionals (896 out of 1,581). A significant majority are married (1,443) and have post-graduate education (985). On average, individuals have around 2 to 3 dependents. Nearly half have personal loans (792), while the majority do not have house loans (1,054) and have working partners (868). The mean salary is about $60,392, with total household income averaging $79,626. Partner salaries vary widely, averaging $20,225. The average price of products in the dataset is around $35,598, with sedans being the most common product type (702 out of 1,581).

# 4.  Exploratory Data Analysis:

# Bivariate analysis

## 4.1.  Explanation for relationship between Numeric variables.
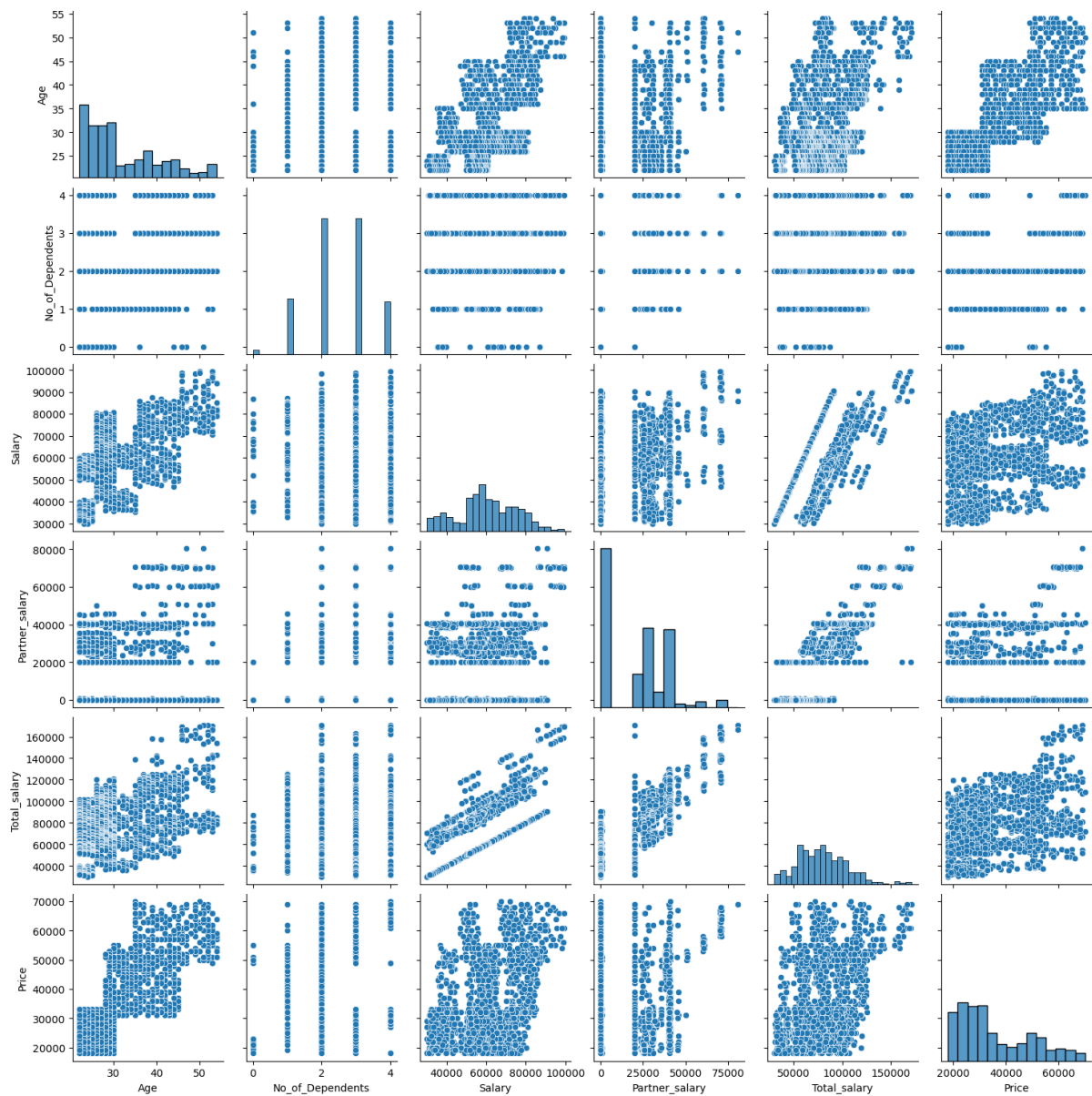
The pair plot analysis provides insights into the relationships between various numerical variables in the dataset. By examining each scatter plot and the distribution of each variable, we can identify patterns, correlations, and potential areas of interest. There is a positive correlation between age and salary, indicating that older individuals tend to earn higher incomes. Similarly, total household income increases with age, suggesting that older households have higher spending power. While the number of dependents does not significantly correlate with any numerical variables, individual salaries and partner salaries both show strong positive correlations with total household income. Additionally, there is a positive relationship between total salary and product prices, indicating that households with higher combined incomes tend to afford higher-priced products. These insights can guide targeted marketing strategies, income-based segmentation, and product pricing decisions.

## 4.2.  Explanation for relationship between Categorical and Numeric variables.



 The violin plot provides a detailed view of the total salary distribution across two professional categories: Business and Salaried. Understanding these salary distributions can help Austo Motor Company tailor their compensation strategies to enhance employee satisfaction and retention.
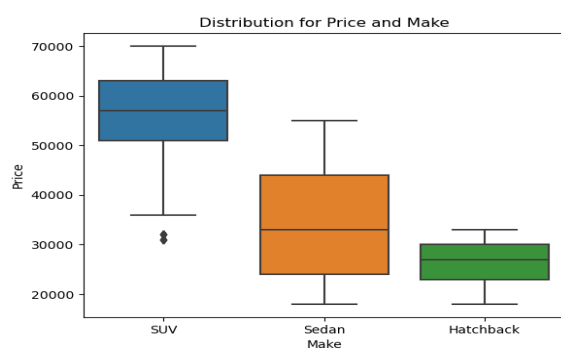


The box plot analysis provides insights into the distribution of car prices across three different car types: SUV, Sedan, and Hatchback. This analysis helps to understand the pricing variability and the typical price range for each car type. SUVs

exhibit the highest median prices and the greatest variability, appealing to a broad range of consumers with different budgets. Sedans, with moderate prices and variability, serve as a middle-ground option. Hatchbacks, with the lowest and most consistent prices, are ideal for cost-conscious buyers.

## 4.3.  Check do men tend to prefer SUVs more compared to women.
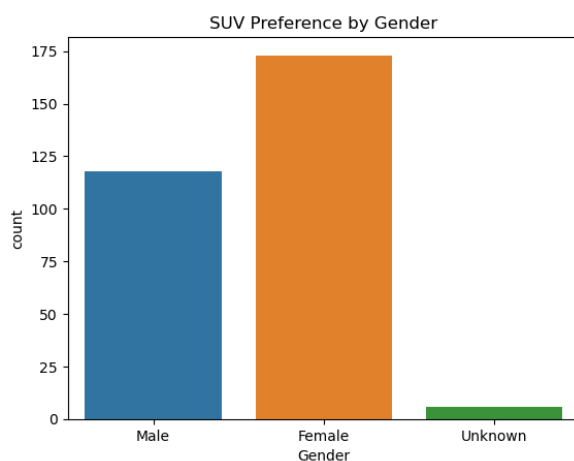


The analysis of SUV preferences by gender reveals that females have the highest interest in SUVs, followed by males, with the unknown category showing minimal preference. These insights suggest a need to tailor marketing strategies and inventory to cater more effectively to female buyers, while also addressing the interests of male buyers. Improving data accuracy for the unknown category could further refine these strategies.

## 4.4. Check what is the likelihood of a salaried person buying a Sedan
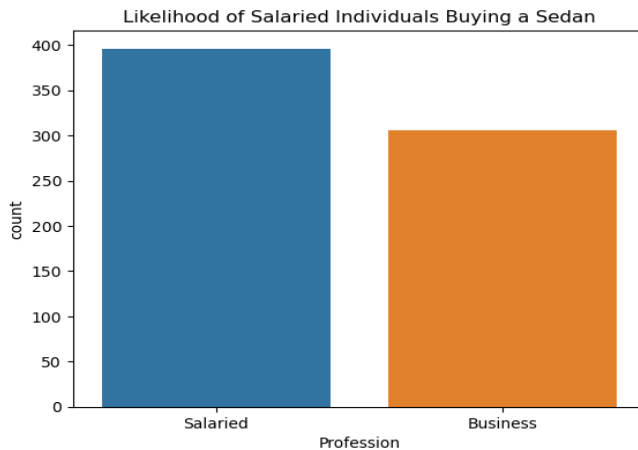


The analysis of Sedan purchase preferences by profession reveals that salaried individuals are more likely to purchase Sedans compared to business people. This trend suggests that Sedans meet the financial and practical needs of salaried individuals. Marketing strategies should emphasize the affordability, comfort, and practicality of Sedans to appeal to this demographic. Additionally, exploring the preferences of business people could help identify other car types that align with their needs and preferences.

## 4.5. <u>Check Sheldon Cooper's claim on SUV sales to salaried males</u>

SUV v/s Sedan Preferences among Salaried Males
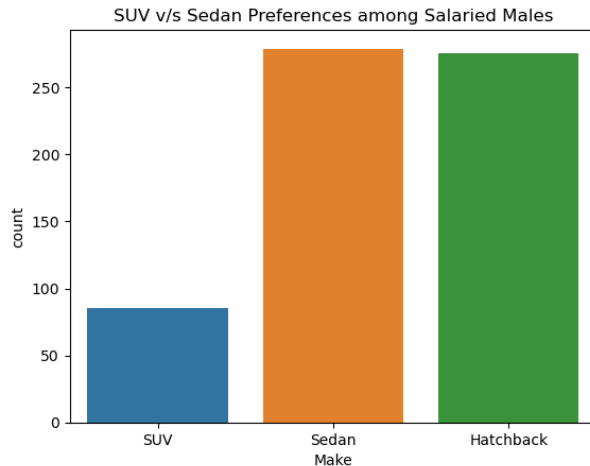


The bar chart analysis reveals that Sedans and Hatchbacks are the most preferred car types among salaried males, with Sedans slightly leading. SUVs, on the other hand, have significantly lower preference in this demographic. These insights can guide marketing strategies to focus more on promoting Sedans and Hatchbacks to salaried males, highlighting their affordability, comfort, and practicality. Additionally, re-evaluating the positioning of SUVs might be necessary to better align with the preferences of salaried males. The data indicates that Sheldon Cooper's claim about high SUV sales to salaried males is not supported.

## 4.6. Check the amount spent on purchasing automobiles by gender
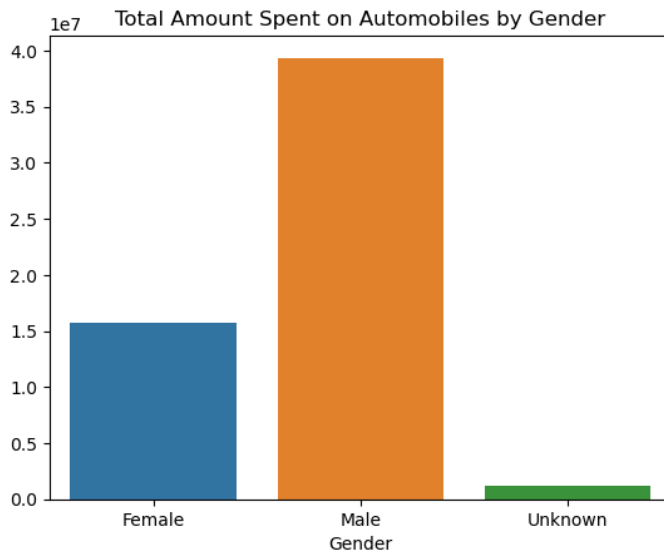


The analysis of total automobile expenditure by gender reveals that males have the highest expenditure, followed by females, with the unknown gender category showing minimal expenditure. These insights suggest a need to focus marketing and sales efforts on male consumers, while also addressing the preferences and needs of female buyers. Improving data accuracy for the unknown gender category could further refine these strategies and uncover additional market opportunities.

## 4.7. Check the money spent by the individuals with a personal loan

Based on the data analysis, the total amount of money spent by individuals with a personal loan is $27,290,000. This significant expenditure highlights the financial leverage individuals are using through personal loans to afford these cars. This indicates that personal loans are a popular financing option for large purchases, possibly due to their accessibility and flexibility.

## 4.8. Check the Influence of a working partner on purchase of higher-priced cars
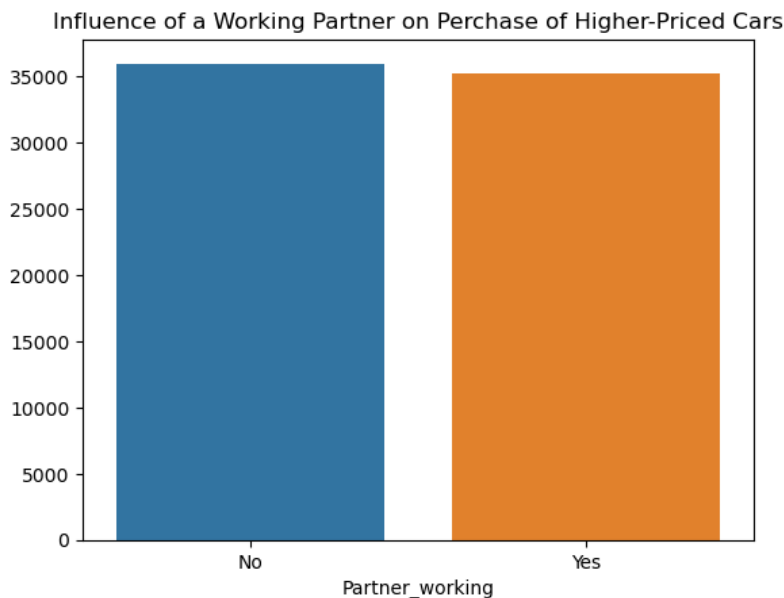


The analysis reveals that the influence of having a working partner on the purchase of higher-priced cars is minimal. Both groups exhibit a high percentage of respondents who

do not purchase higher-priced cars, indicating that a working partner's status is not a significant determinant in this decision. Marketing strategies should therefore focus on highlighting the intrinsic value and benefits of higher-priced cars rather than emphasizing the dual-income aspect.

# 5. CONCLUSION:

The comprehensive analysis of Austo Motor Company's customer data has provided valuable insights into the demographics, financial status, and purchasing behaviours of its customers. Key findings from the exploratory data analysis include:

**Demographic and Financial Overview:**

- The average age of customers is 32 years, with a balanced distribution of dependents and a predominant representation of salaried professionals.
- Males constitute the majority of the customer base, and most customers are married and hold post-graduate degrees.
- The average salary is approximately $60,392, and the total household income averages around $79,626.

**Customer Preferences and Patterns:**

- Car Type Preferences: Sedans are the most popular car type, particularly among salaried individuals. SUVs are

preferred more by females than males, and Hatchbacks appeal to cost-conscious buyers.

- Expenditure Analysis: Males have the highest total expenditure on automobiles, followed by females, with minimal spending from the unknown gender category.
- Personal Loans: A significant portion of car purchases is financed through personal loans, indicating their importance as a financing option.
- Working Partner Influence: The presence of a working partner has minimal impact on the decision to purchase higher-priced cars.

# 6.  Recommendations:

Based on the findings, the following recommendations are proposed to enhance Austo Motor Company's marketing strategies and customer experience:

**Targeted Marketing Campaigns:**

- **Focus on Sedans:** Given the high preference for Sedans, especially among salaried individuals, marketing campaigns should highlight the affordability, comfort, and practicality of Sedans. Emphasize features that appeal to this demographic, such as fuel efficiency, safety, and technology.
- **Promote SUVs to Females:** Tailor marketing efforts to emphasize the benefits of SUVs that resonate with

female buyers, such as spaciousness, safety features, and family-oriented benefits.

**Product Pricing and Financing Options:**

- **Flexible Financing:** Highlight the availability and benefits of personal loans in marketing materials, as they are a popular financing option among customers. Offering competitive loan terms and showcasing success stories can attract more buyers.
- **Value Proposition for Higher-Priced Cars:** Develop marketing content that emphasizes the intrinsic value and benefits of higher-priced cars, rather than focusing on dual-income households. Highlight features like luxury, advanced technology, and long-term value.

**Customer Segmentation and Personalization:**

- **Segmented Campaigns:** Use the insights from the data to create segmented marketing campaigns that cater to different customer groups based on age, gender, profession, and marital status. Personalized marketing can improve engagement and conversion rates.
- **Improve Data Collection:** Enhance data collection methods to reduce the unknown gender category and gather more accurate customer information. This will allow for more precise targeting and better understanding of customer needs.

**Enhanced Customer Experience:**

- **Customer Feedback:** Regularly collect and analyze customer feedback to understand their preferences and

pain points. Use this information to continuously improve products and services.

- **Customer Loyalty Programs:** Develop loyalty programs that reward repeat customers and encourage referrals. Tailored incentives can enhance customer satisfaction and retention.