

1. Descriptive Statistics:

- **Basic Summary:**
 - Count, mean, median, mode, standard deviation for numerical columns (e.g., **Purchase**).
 - Frequency distribution for categorical columns (e.g., **Gender, Age, Occupation, City_Category, Marital_Status**).

2. Demographic Analysis:

- **Gender Analysis:**
 - Sales by gender.
 - Average purchase amount by gender.
- **Age Group Analysis:**
 - Sales by age group.
 - Average purchase amount by age group.
- **Occupation Analysis:**
 - Sales by occupation.
 - Average purchase amount by occupation.
- **City Category Analysis:**
 - Sales by city category.
 - Average purchase amount by city category.
- **Marital Status Analysis:**
 - Sales by marital status.
 - Average purchase amount by marital status.

3. Behavioral Analysis:

- **Stay in Current City:**
 - Analyze the impact of the number of years in the current city on purchase behavior.
- **Product Category Analysis:**
 - Sales by product category.
 - Average purchase amount by product category.
 - Popular product categories by different demographics (e.g., gender, age group, occupation).

4. Purchase Analysis:

- **Overall Sales Performance:**
 - Total purchase amount.
 - Average purchase amount.
- **Distribution of Purchases:**
 - Histogram of purchase amounts.
- **High-Value Purchases:**
 - Identify transactions with the highest purchase amounts.

5. Customer Segmentation:

- **RFM Analysis (Recency, Frequency, Monetary):**
 - Segment customers based on their purchase recency, frequency, and monetary value.
- **Demographic Segmentation:**
 - Segment customers based on demographic data (e.g., age, gender, occupation, city category).

6. Trend Analysis:

- **Temporal Trends:**
 - Analyze sales trends over time if time-based data (e.g., date of purchase) is available.
- **Seasonal Trends:**
 - Identify seasonal patterns in purchase behavior if applicable.

7. Correlation Analysis:

- **Correlation Matrix:**
 - Examine the correlation between numerical variables (e.g., **Purchase** and other numerical features).
- **Demographic Correlation:**
 - Analyze correlations between demographic factors and purchase amounts.

8. Predictive Analysis:

- **Predictive Modeling:**
 - Build models to predict purchase amounts based on demographic and behavioral factors.
- **Customer Lifetime Value (CLV):**
 - Estimate the long-term value of customers based on their purchase history.

9. Visualization:

- **Bar Charts and Pie Charts:**
 - Visualize categorical data (e.g., gender distribution, sales by product category).
- **Histograms and Box Plots:**
 - Visualize numerical data distribution (e.g., purchase amounts).
- **Heatmaps:**
 - Visualize correlation matrices.