**Customer Purchase Behavior Analysis**

**Objective**

The purpose of this project is to analyze customer purchase behavior based on demographic and transaction data, derive actionable insights, and visualize trends to inform business decisions.

**Dataset Details**

The dataset includes the following columns:

* **User\_ID**: Unique identifier for each customer.
* **Cust\_name**: Customer name (dropped during cleaning).
* **Product\_ID**: Unique identifier for each product.
* **Gender**: Gender of the customer.
* **Age Group**: Grouping of customer age (e.g., 18-25, 26-35).
* **Age**: Exact age of the customer.
* **Marital\_Status**: Marital status of the customer (e.g., Single, Married).
* **State**: State of residence.
* **Zone**: Zone of residence (e.g., North, South).
* **Occupation**: Customer’s occupation.
* **Product\_Category**: Category of the purchased product.
* **Orders**: Number of orders placed.
* **Amount**: Total purchase amount.

**Methodology**

**1. Data Cleaning**

* Dropped unrelated/blank columns such as Cust\_name.
* Checked for null values and identified 12 missing values in the Amount column. Rows with null values were removed.

**2. Data Analysis**

Performed exploratory data analysis (EDA) to uncover trends and patterns.

**Key Analysis Steps:**

1. **State-wise Analysis:**
   * Plotted state-wise purchase counts and total purchase amounts.
   * Insights: Identified states with the highest purchase volumes.
2. **Age Group and Gender Analysis:**
   * Analyzed purchase counts split by gender across different age groups.
   * Insights: Determined age groups with the highest purchase activity and their gender distribution.
3. **Top 10 States:**
   * Ranked the top 10 states based on total number of orders and purchase amounts.
4. **Occupation Analysis:**
   * Aggregated total purchase amounts and order counts for each occupation category.
   * Insights: Highlighted professions contributing the most to sales.
5. **Product Category Analysis:**
   * Analyzed total revenue generated by each product category.
   * Insights: Determined best-performing product categories.
6. **Top 10 Customers:**
   * Ranked customers by total purchase amounts.
   * Insights: Identified loyal and high-value customers.

**Tools and Technologies Used**

* **Python**: For data cleaning and analysis.
* **Pandas & NumPy**: For data manipulation and preprocessing.
* **Matplotlib & Seaborn**: For data visualization.

**Visualizations**

1. **State-wise Purchase Trends:** Bar charts for state-wise purchase counts and total purchase amounts.
2. **Age Group Contribution by Gender:** Pie chart to visualize the contribution of men and women in each age group.
3. **Top 10 States:** Line plot showcasing purchase trends by state.
4. **Occupation Trends:** Bar chart highlighting purchase amounts by occupation.
5. **Product Category Analysis:** Bar chart showing revenue for each product category.
6. **Top 10 Customers:** Ranking chart of the most valuable customers.

**Results and Insights**

1. **Top-performing States:** States with the highest revenue contribution were identified, enabling targeted marketing strategies.
2. **Age Group Insights:** Customers aged 25-35 were found to contribute the most to purchases, with a significant share from male customers.
3. **Occupation Trends:** Certain professions were identified as the key contributors to sales.
4. **Product Categories:** High-performing product categories were highlighted for inventory prioritization.
5. **Top 10 Customers:** A small group of loyal customers accounted for a significant share of total sales, helping focus customer retention efforts.

**Conclusion**

This analysis provided actionable insights into customer purchase behavior, enabling data-driven decisions for marketing, inventory management, and customer engagement strategies. By leveraging Python and visualization tools, the project effectively summarized complex data into meaningful insights.

**Recommendations**

1. Focus marketing efforts on top-performing states and high-contributing age groups.
2. Develop strategies to target professions with lower purchase rates.
3. Prioritize inventory for best-performing product categories.
4. Engage with top 10 customers to improve loyalty and retention.