Exploratory Data Analysis (EDA)

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Objective: To analyze the customer and transaction data using visualizations to uncover patterns and insights.

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1. Customer Distribution by Region

- **Visualization Description:**
  The bar chart displays the distribution of customers across different regions. The x-axis represents the regions, while the y-axis indicates the number of customers.
- **Key Insights:**
  - Certain regions have a significantly higher number of customers compared to others.
  - Regions with fewer customers could indicate areas with untapped potential for targeted marketing or sales expansion.
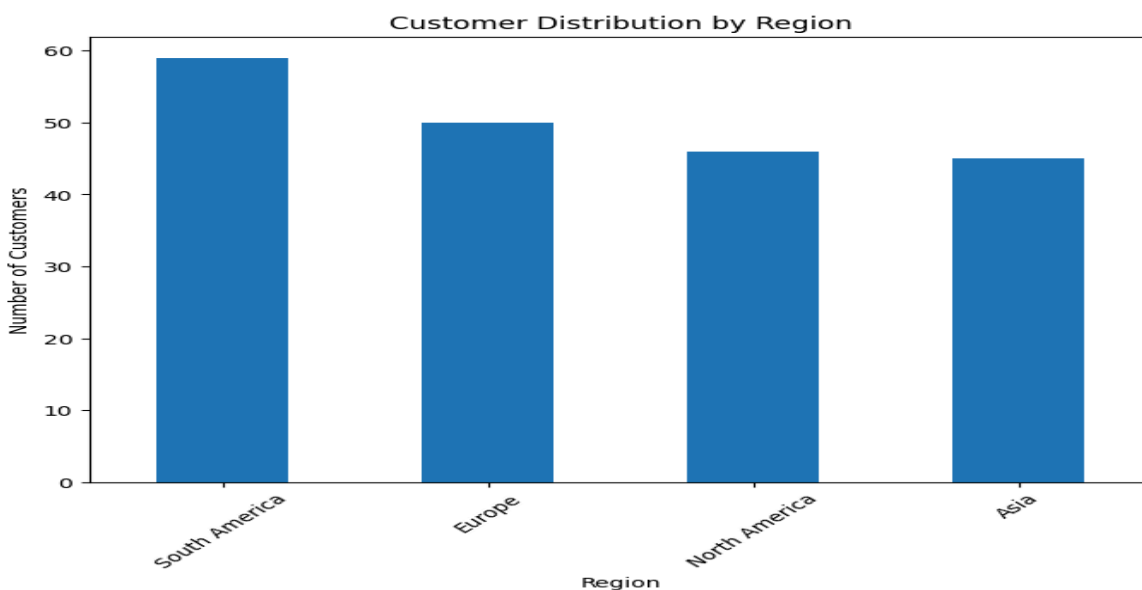
2. Product Price Distribution by Category

- **Visualization Description:**
  A boxplot visualizing the price distribution of products within each category. The x-axis represents the product categories, and the y-axis shows the price ranges.
- **Key Insights:**
  - Categories like "Electronics" have a wider range of prices, reflecting a mix of premium and budget products.
  - Outliers in specific categories may indicate premium products with significantly
 - higher prices.
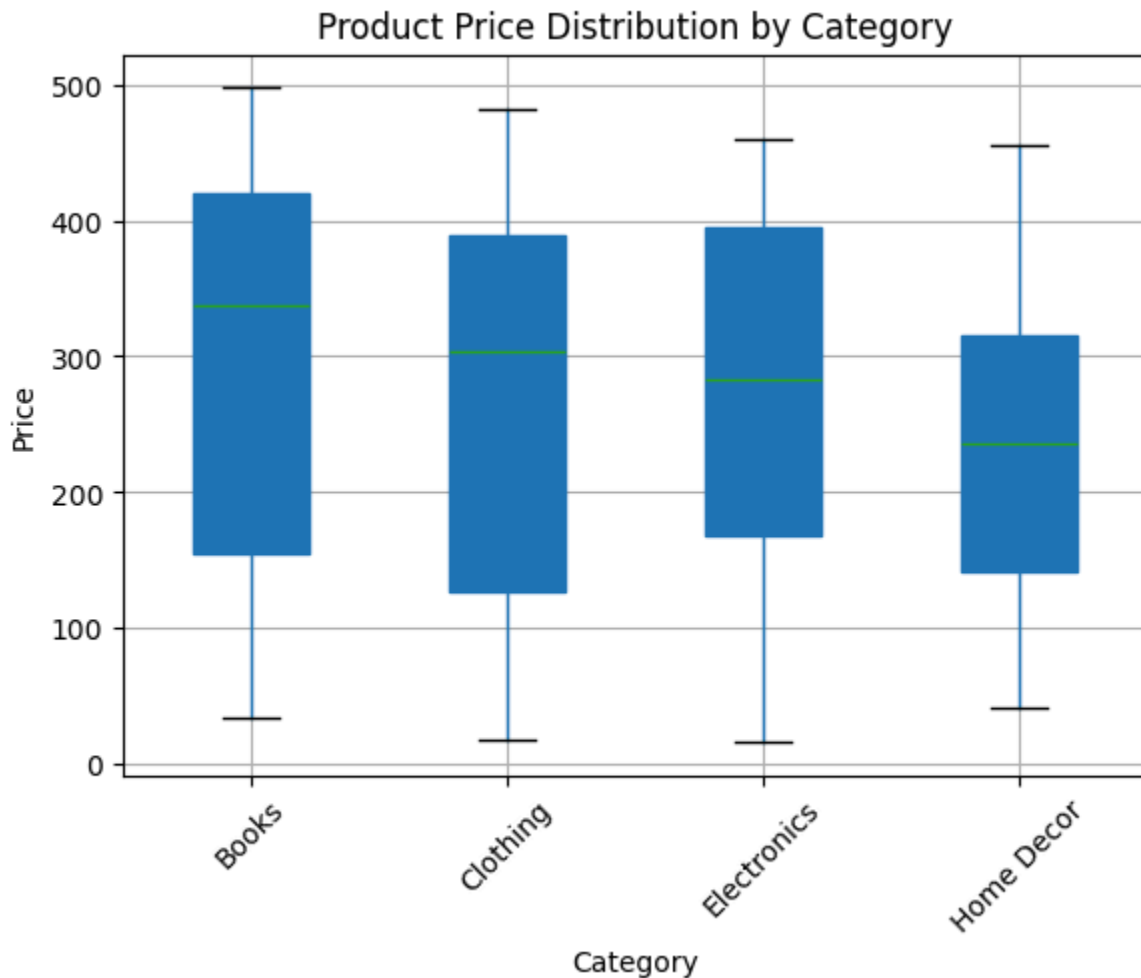
3. Customer Purchase Frequency

- **Visualization Description:**
  A histogram displaying the frequency of purchases by customers. The x-axis shows the number of purchases, while the y-axis represents the number of customers.
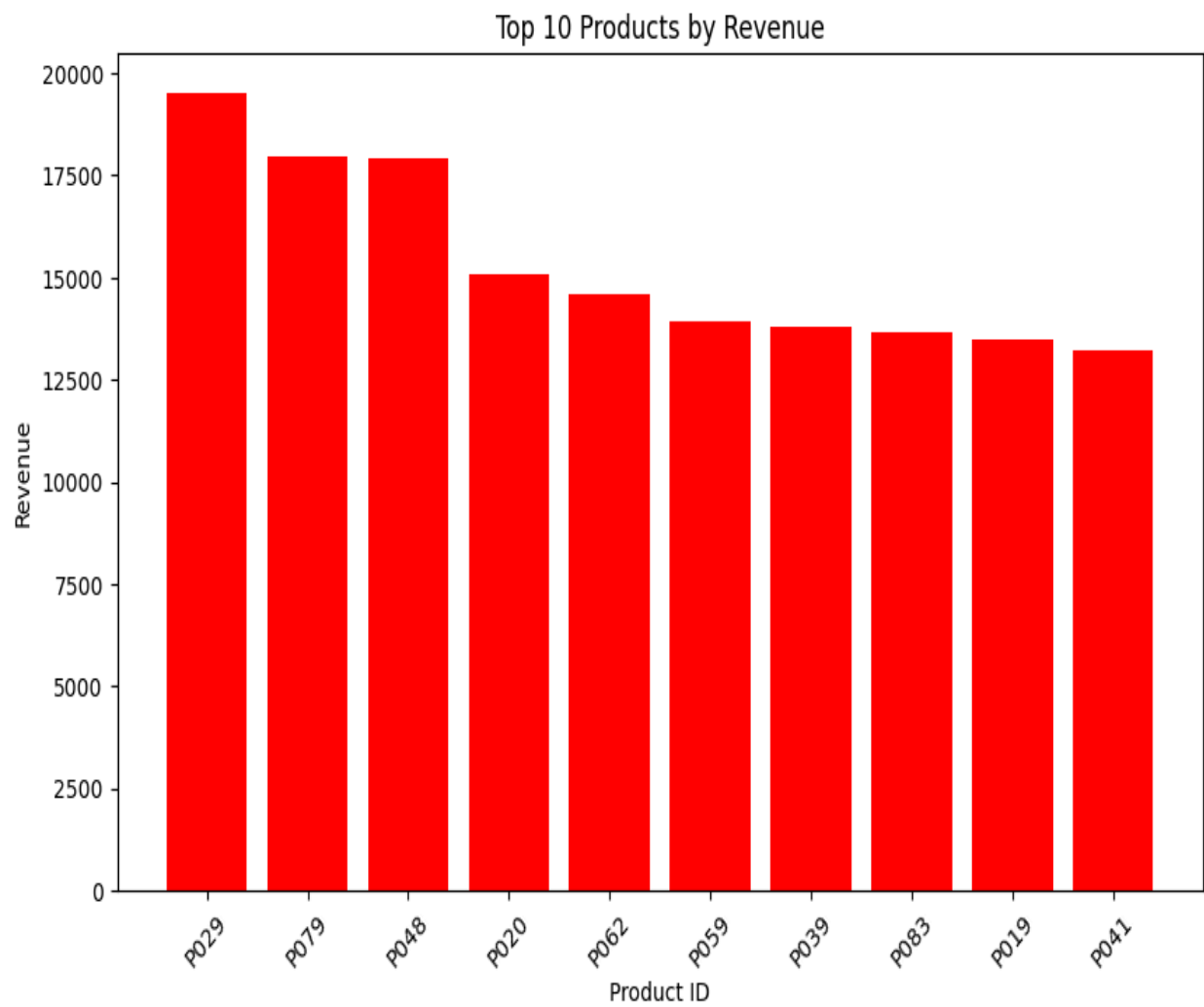- **Key Insights:**
  - A majority of customers have a low purchase frequency, indicating a one-time or infrequent buyer behavior.
  - A small segment of customers shows high purchase frequency, suggesting the presence of loyal or repeat buyers.
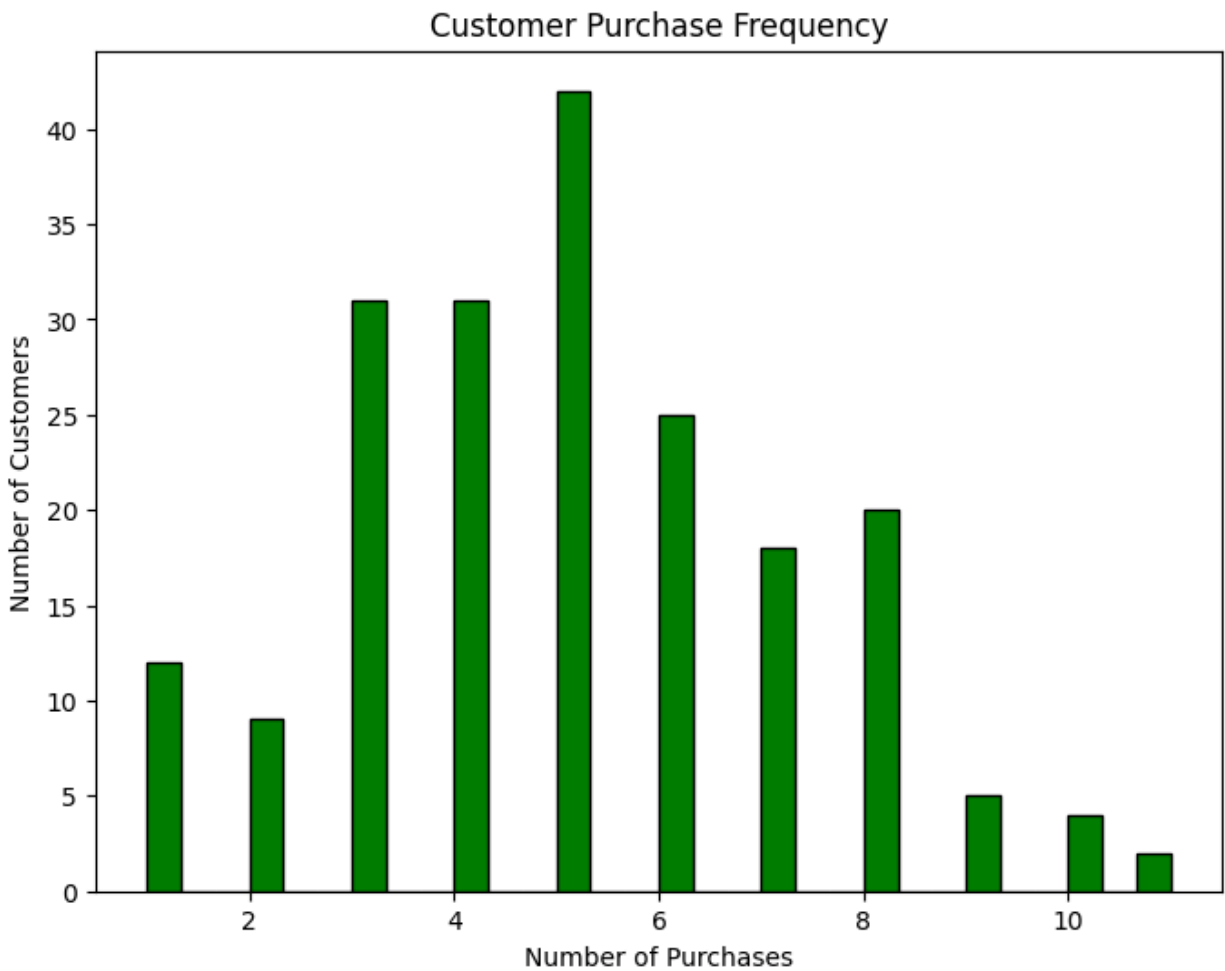
4. Top 10 Products by Revenue

- **Visualization Description:**
  A bar chart highlighting the top 10 products generating the highest revenue. The x-axis lists the product IDs, and the y-axis shows the revenue.
- **Key Insights:**
  - The top 10 products contribute disproportionately to the total revenue, indicating their popularity or high price points.
  - Strategies such as bundling or promoting these products can further enhance revenue.

5. Total Transaction Value Over Time

- **Visualization Description:**
  A line chart showing the total transaction value for each month. The x-axis represents months, and the y-axis shows the transaction values.
- **Key Insights:**
  - Transaction values display seasonal trends, with noticeable peaks during specific months, possibly due to holidays or promotional events.
  - Identifying these trends can help in planning inventory and marketing campaigns.
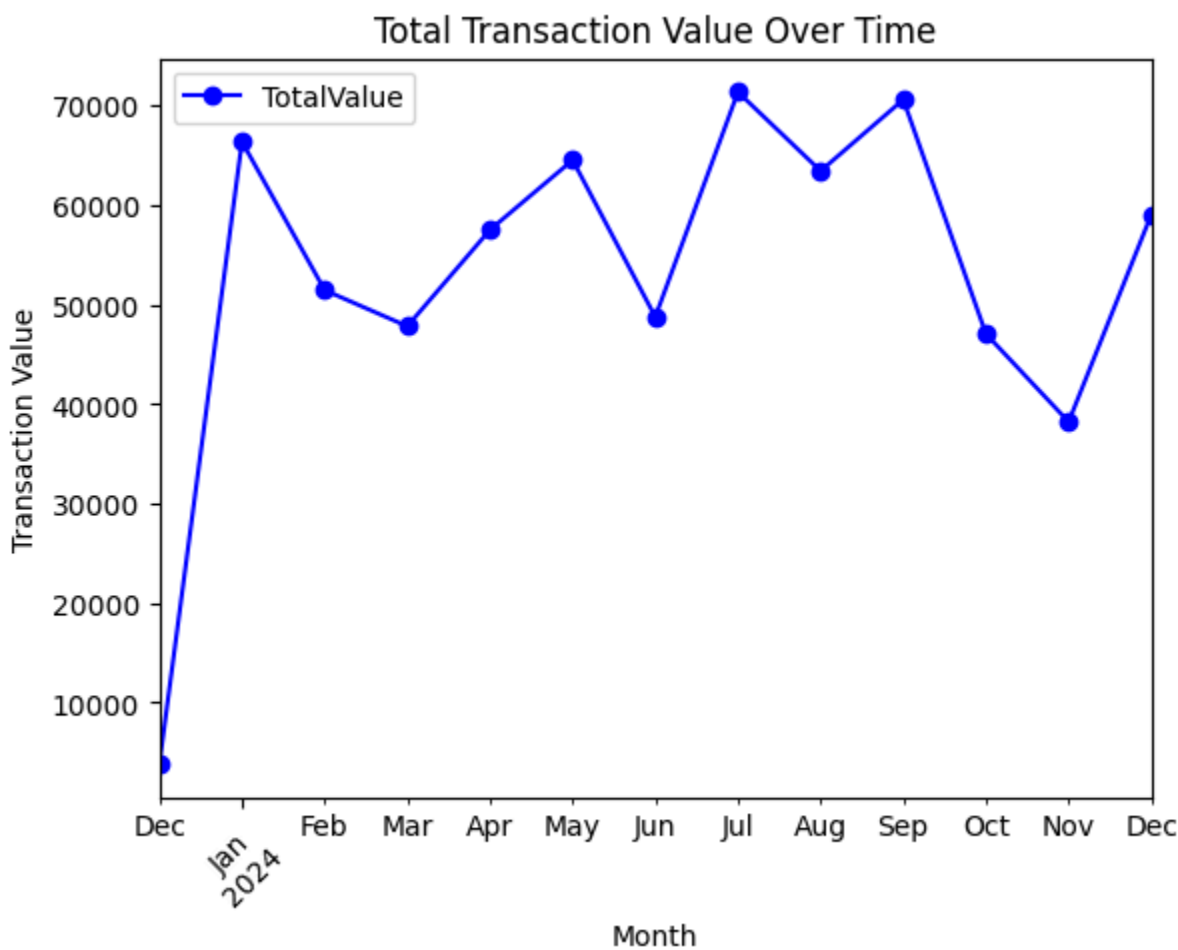
Summary of Insights:

- Customer behavior, product performance, and transaction trends highlight areas of opportunity.
- Regional customer distribution and high-revenue products indicate potential for targeted marketing.
- Seasonal trends in transaction values can optimize sales strategies and resource allocation.

Tools Used: Python (Pandas, Matplotlib), Jupyter Notebook