Assignment

Assignment title- Experiential Learning : Data Science Visualization Tools using Python

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- What the dataset represents?
  - **Dataset**: The dataset contains information about customer purchasing behaviors. It includes features like customer demographics (age, gender, income), purchase amounts, product categories, purchase frequencies, and more.
  - **Purpose**: The goal is to understand trends and patterns in customer purchasing behavior. This helps identify key insights such as which demographics are mo st likely to purchase certain products, how often customers make purchases, an d the average transaction value across different groups.
  - **Data contains** -
    - User id
    - age
    - annual income
    - purchase amount
    - loyalty score region
    - purchase frequency

- How the visualizations represent the data clearly?

1. Bar Graph: Average Purchase Amount by Gender
   - Visualization: A bar graph was used to compare the average purchase amount for male and female customers.
   - Insight: The visualization reveals whether one gender spends more on average than the other. For example, female customers might tend to spend slightly more per purchase than male customers, highlighting potential targeting strategies.
2. Line Chart: Purchases Over Time
   - Visualization: A line chart depicting the number of purchases made by customers over different time periods (e.g., months, weeks, or days).
   - Insight: This helps identify trends like seasonal spikes or periods of higher/lower activity. For example, purchases might spike during holiday seasons or certain sales periods, indicating when marketing efforts should be intensified.

3. Scatter Plot: Age vs Purchase Amount
    - Visualization: A scatter plot was used to analyze the relationship between customers' ages and their purchase amounts. Each point represents an individual customer.
    - Insight: This chart provides insights into whether certain age groups tend to make larger or smaller purchases. For example, middle-aged customers (35-50 years) might make higher-value purchases, while younger customers (18-25) make smaller purchases more frequently.
4. Heatmap: Correlation Between Income, Age, and Purchase Amount
    - Visualization: A heatmap visualizing the correlation between Income, Age, and Purchase Amount.
    - Insight: This helps to identify key relationships. For example, a strong positive correlation between Income and Purchase Amount might indicate that higher-income customers tend to spend more.

- Insights drawn from your visualizations
    - Gender-Based Insights: Female customers tend to make slightly larger purchases on average, suggesting marketing campaigns could be tailored to leverage this behavior.
    - Time-Based Patterns: Purchases tend to increase during specific time periods, such as holiday seasons or sales events, indicating when marketing efforts should be intensified.
    - Age-Based Purchasing Patterns: Middle-aged customers tend to spend more per transaction, while younger customers make smaller, more frequent purchases, which can help in product placement and pricing strategies.
    - Income-Driven Behavior: Higher-income customers are more likely to make larger purchases, emphasizing the importance of segmenting customers by income brackets for personalized marketing.