

Black Friday Sale Analysis Report

1. Introduction

This report provides insights derived from the Black Friday Sale dataset through data exploration, cleaning, and analysis. The goal is to understand customer spending behavior based on demographics, product preferences, and purchasing trends.

2. Data Import and Preprocessing

Libraries Used:

- Pandas
- NumPy
- Matplotlib
- Seaborn

Dataset Overview:

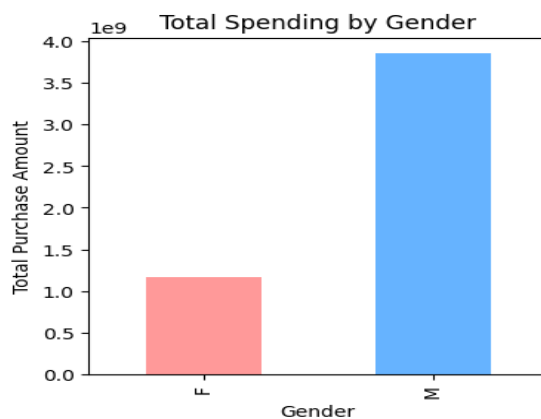
- **Rows & Columns:** The dataset consists of 537,578 transactions with various customer and product attributes.
 - **Missing Values:** Product_Category_2 and Product_Category_3 contained missing values, which were replaced with 0.
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3. Data Analysis & Insights

A. Demographic-Based Trends

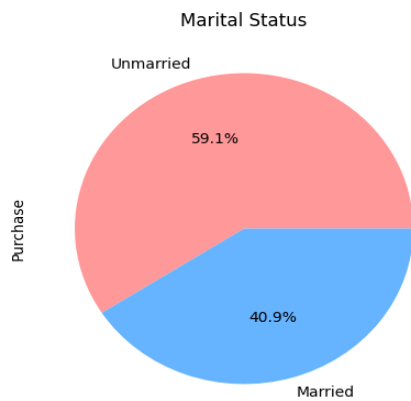
1. Gender-Based Spending

- **Observation:** Men spend more than women.



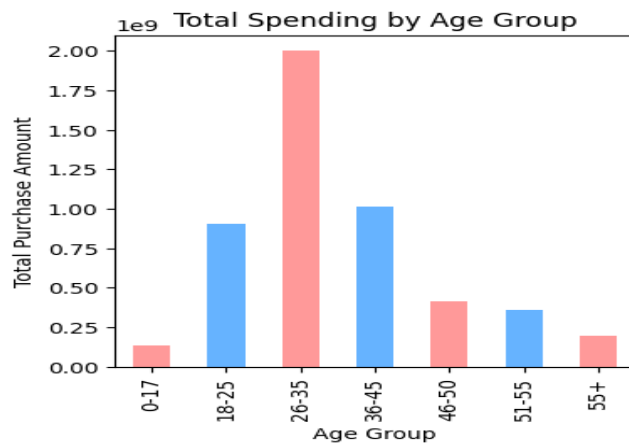
2. Marital Status Spending

- Observation:** Unmarried individuals spend more than married ones.



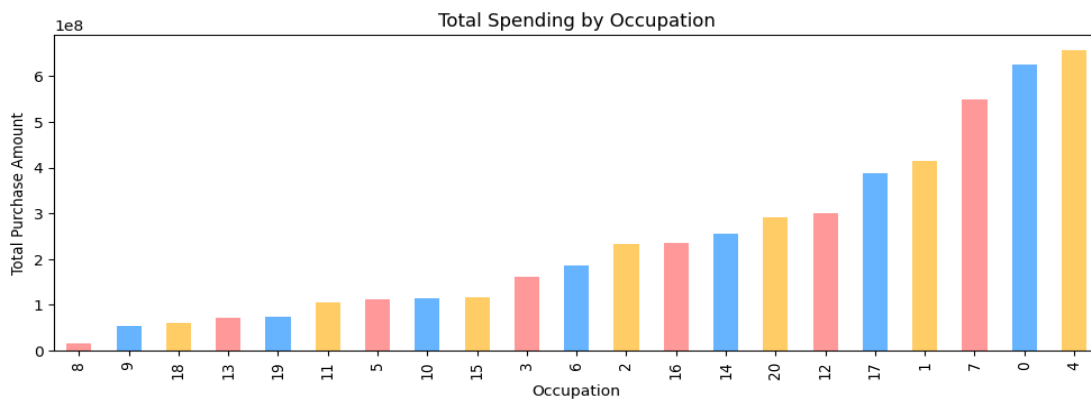
3. Age Group Spending

- Observation:** People aged **26-35** have the highest spending.



4. Occupation-Based Spending

- Observation:** Occupation codes **4, 0, and 7** contribute to the highest spending.



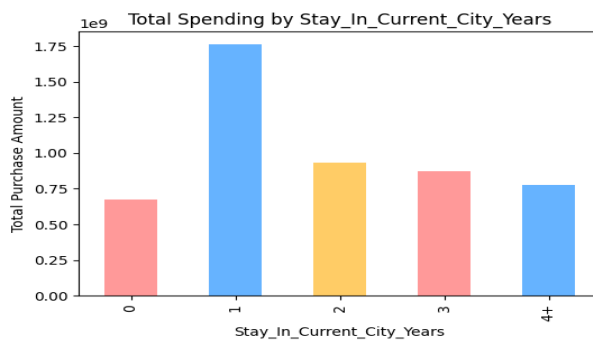
5. City Category Spending

- Observation:** City **Category B** contributes to the highest spending.



6. Stay Duration-Based Spending

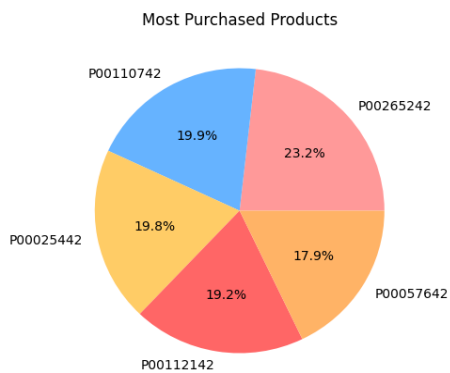
- Observation:** Customers who have stayed in the city for **1 year** spend the most.



B. Product-Based Trends

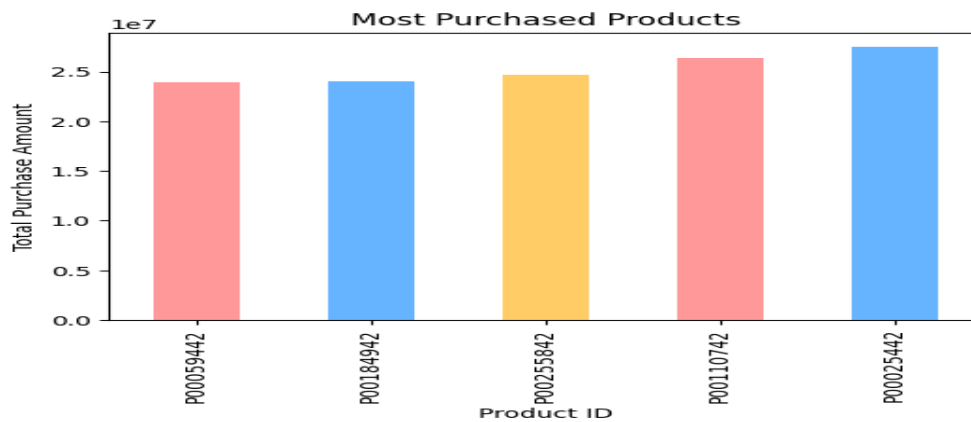
1. Most Purchased Products (Quantity)

- Observation:** Top 5 most purchased product IDs are **P00265242**, **P00110742**, **P00025442**, **P00112142**, and **P00057642**.



2. Highest Revenue Generating Products

- **Observation:** Top 5 highest revenue-generating products are **P00025442**, **P00110742**, **P00255842**, **P00184942**, and **P00059442**.



3. Product Popularity Across Cities

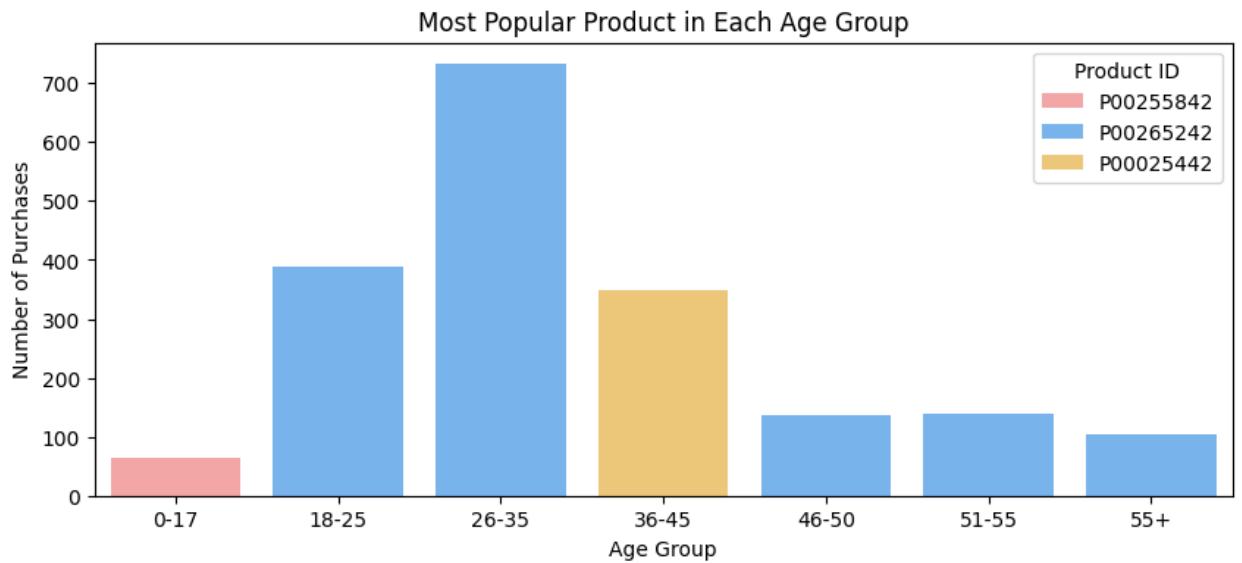
- **Observation:** The top 3 popular products across city categories are **P00265242**, **P00110742**, and **P00025442**.



4. Product Popularity Across Age Groups

- **Observation:**
 - Age 0-17: P00255842
 - Age 18-25: P00265242
 - Age 26-35: P00265242
 - Age 36-45: P00025442

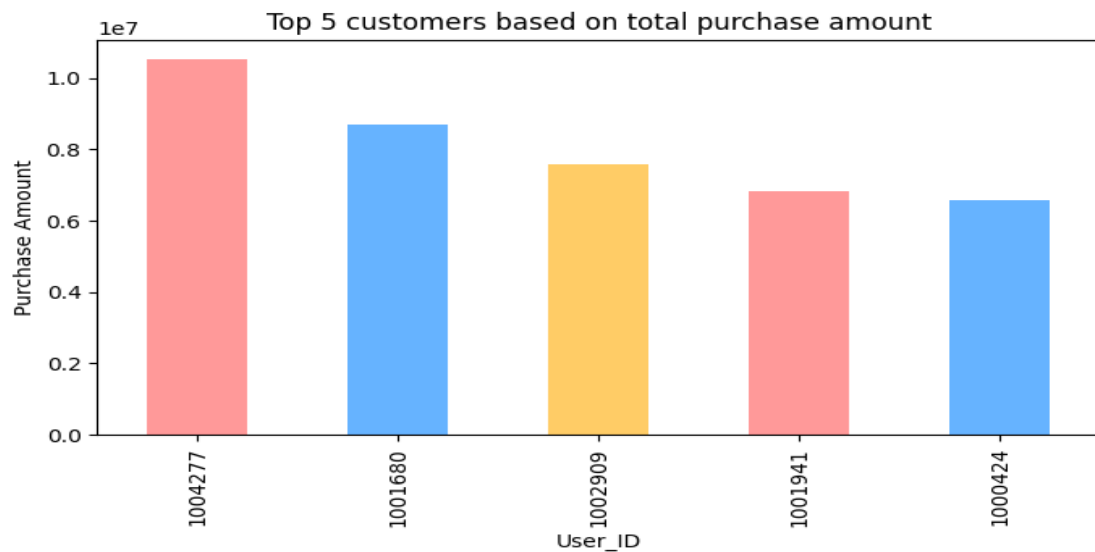
- Age 46-50: P00265242
- Age 51-55: P00265242
- Age 55+: P00265242



C. Price & Spending Behavior Trends

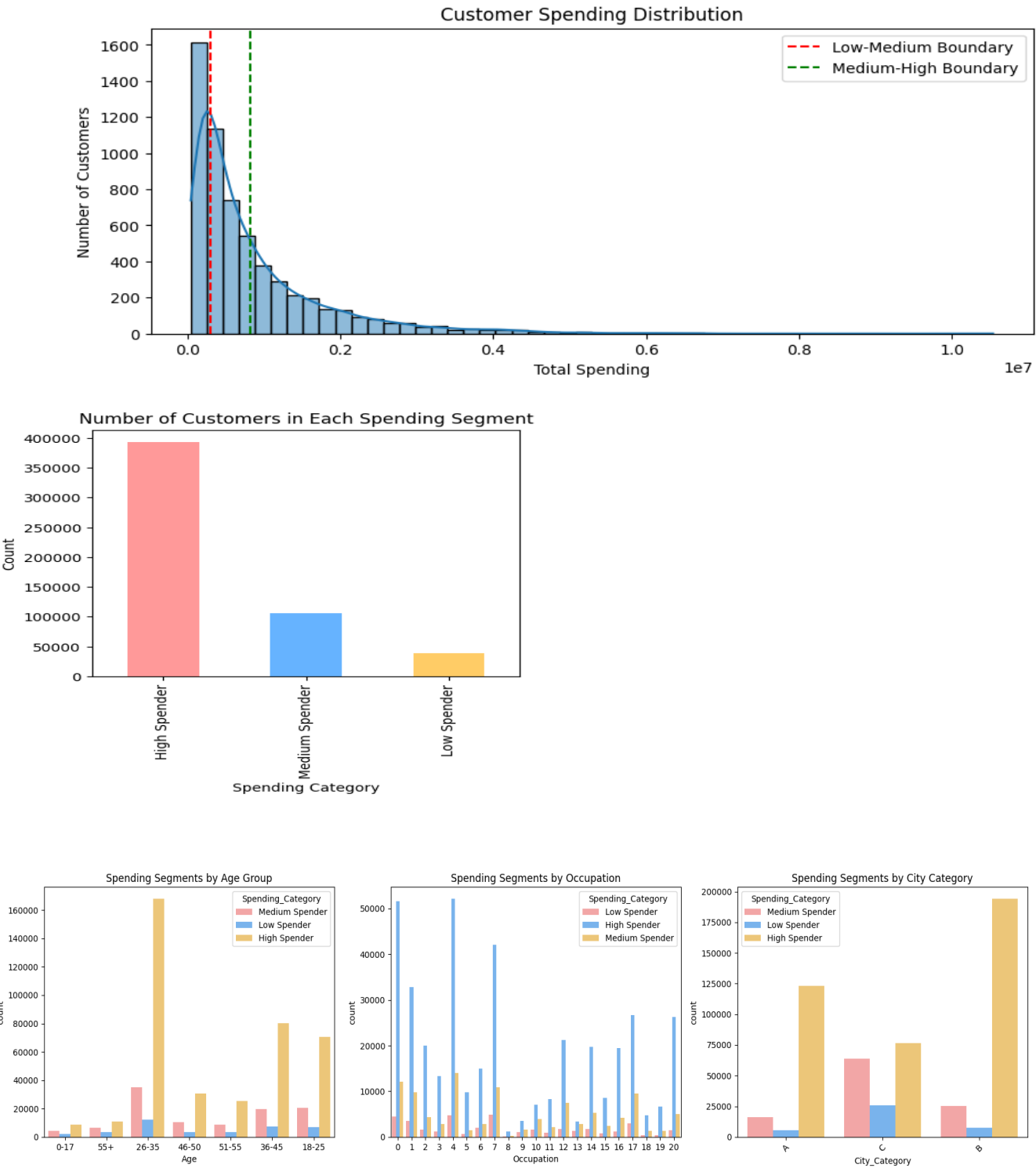
1. High-Spending Customers

- **Observation:** Top 5 high-spending customers are **1004277**, **1001680**, **1002909**, **1001941**, and **1000424**.



2. Customer Spending Segmentation

- **Observation:** Customers were segmented into **Low, Medium, and High Spenders** using percentile thresholds.



4. Recommendations

1. Targeted Marketing Campaigns:

- Focus on male customers and individuals aged **26-35**, as they contribute the most to total spending.
- Design city-specific promotions for **City B** residents.

2. Product Strategy:

- Stock more of **P00265242** since it is a high-demand product across multiple segments.
- Adjust pricing and marketing for high-revenue products like **P00025442**, **P00110742**, **P00255842**.

3. Loyalty Programs for High Spenders:

- Engage **top customers (User_IDs 1004277, 1001680, etc.)** with exclusive discounts.
- Create reward programs for **Medium Spenders** to encourage higher spending.

4. New Customer Acquisition:

- Convert **Low Spenders** into **Medium Spenders** by offering bundle discounts.
- Offer special deals to **new customers** in City A and City C.

5. Conclusion

This analysis provides a detailed understanding of customer behavior during Black Friday sales. By focusing on high-value segments and optimizing marketing strategies, businesses can maximize revenue and improve customer engagement.