

# Project Title: Customer Shopping Behavior Analysis

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## 1. Executive Summary

This project analyzes transactional data from **3,900 purchases** across various product categories. The objective is to identify spending patterns, customer segments, and the impact of subscriptions to drive strategic business growth.

## 2. Technical Workflow

### Step A: Data Engineering & Cleaning (Python)

Using **Pandas**, the data was refined to ensure accuracy for the database:

- **Missing Value Imputation:** Addressed 37 missing values in the **Review Rating** column by using the median rating for each product category.
- **Standardization:** Converted column names to **snake\_case** for SQL compatibility.
- **Feature Engineering:** Created an **age\_group** column to segment customers into Young Adult, Middle-aged, Adult, and Senior categories.
- **Database Integration:** Exported the cleaned data into **PostgreSQL** using sqlalchemy.

### Step B: Business Intelligence (SQL Queries)

Complex queries were executed to extract deep insights:

- **Customer Loyalty:** Segmented the database into **Loyal (3,116)**, **Returning (701)**, and **New (83)** segments.
- **Subscription Analysis:** Compared spending and found that non-subscribers accounted for **\$170,436** in revenue vs. **\$62,645** from subscribers.
- **Top Products:** Ranked the top items per category, identifying **Jewelry** and **Blouse** as top performers in Accessories and Clothing.

### 3. The Interactive Dashboard (Power BI)

The final phase involved building a high-impact dashboard to visualize key metrics:

- **KPI Overview:** Displays total customers (**3.9K**), average purchase amount (**\$59.76**), and average review rating (**3.75**).
- **Revenue by Category:** Clothing is the dominant category in terms of both sales volume and revenue.
- **Demographic Insights:** **Young Adults** represent the highest revenue-generating age group at **\$62,143**.



### 4. Strategic Recommendations

Based on the data, the following actions are recommended:

- **Boost Subscriptions** – Promote exclusive benefits for subscribers.
- **Customer Loyalty Programs** – Reward repeat buyers to move them into the “Loyal” segment.
- **Review Discount Policy** – Balance sales boosts with margin control.
- **Product Positioning** – Highlight top-rated and best-selling products in campaigns.
- **Targeted Marketing** – Focus efforts on high-revenue age groups and express-shipping users.