Customer Purchase Pattern Analysis

1. Project Overview

This project provides an end-to-end analysis of customer purchasing patterns using real-world retail transaction data. The goal is to uncover insights into buying behavior, spending trends, and product preferences, helping businesses make data-driven strategic decisions.

2. Dataset Summary

Total Records: 3,900

Features: 18 columns covering demographics, purchase details, and shopping behaviors

Key Attributes:

- Customer demographics - Age, Gender, Location, Subscription Status

- Purchase details - Item Purchased, Category, Amount, Size, Color, and Season

- Shopping behavior - Discounts, Promo Codes, Previous Purchases, Review Ratings, and Shipping Type

Missing Values: 37 in the Review Rating column, handled via median imputation.

3. Data Processing & Analysis (Python)

- Data Cleaning: Checked for nulls and standardized column names.

- Feature Engineering: Created new fields like 'age_group' (based on age bins) and 'purchase_frequency_days' to capture shopping frequency.

- Data Validation: Removed redundant columns and ensured logical consistency between discount-related fields.

- Database Integration: Loaded cleaned data into SQL Server for further analysis.

4. SQL Business Analysis

Key insights derived using SQL queries:

1. Revenue by Gender

2. High-Spending Discount Users

3. Top 5 Products by Rating

4. Shipping Preference Analysis

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5. Subscriber vs. Non-Subscriber Revenue

6. Discount-Dependent Products

7. Customer Segmentation

8. Top Products per Category

9. Repeat Buyers & Subscriptions

10. Revenue by Age Group

5. Dashboard Development (Power BI)

An interactive Power BI dashboard was created for management reporting - visualizing sales by demographics, product category, shipping preference, and discount impact, enabling actionable insights at a glance.

6. Business Recommendations

- Boost Subscriptions: Offer personalized benefits for subscribers.

- Enhance Loyalty Programs: Reward repeat buyers to increase retention.

- Refine Discount Strategy: Balance discounts with profitability.

- Promote Top Products: Focus marketing campaigns on high-rated and best-selling items.

- Targeted Marketing: Focus on top-performing age and customer segments.