Customer Shopping Behavior Analysis

This project analyzes customer shopping behavior using transactional data from 3,900 purchases. Our goal is to uncover insights into spending patterns, customer segments, product preferences, and subscription behavior to guide strategic business decisions.

Project Overview

1

Data-Driven Insights

Uncover spending patterns and customer segments.

2

Product Preferences

Identify popular products and categories.

3

Subscription Behavior

Analyze trends in customer subscriptions.

4

Strategic Decisions
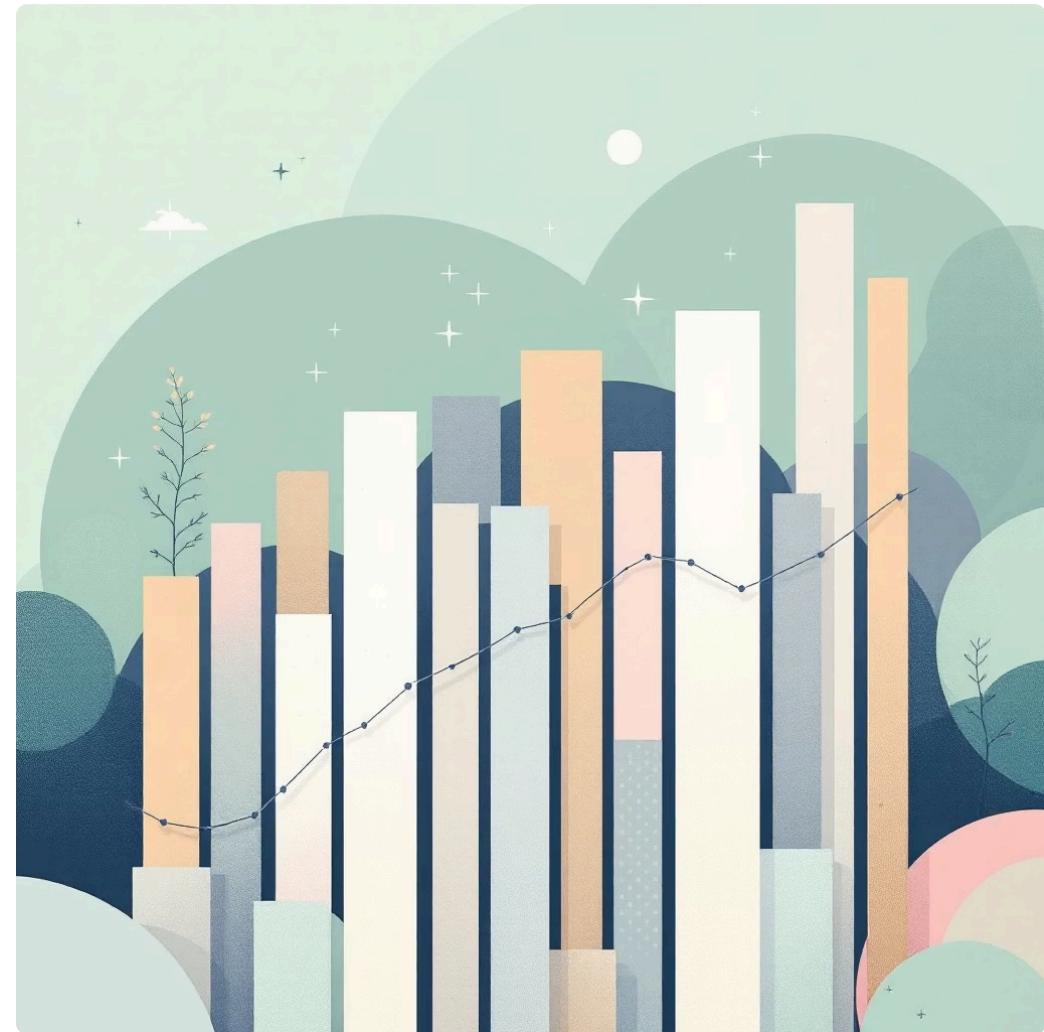
Guide business strategies with actionable data.

Dataset Summary

Our dataset comprises 3,900 rows and 18 columns, offering a comprehensive view of customer interactions. Key features include:

- **Customer Demographics:** Age, Gender, Location, Subscription Status.
- **Purchase Details:** Item, Category, Amount, Season, Size, Color.
- **Shopping Behavior:** Discount, Promo Code, Previous Purchases, Frequency, Review Rating, Shipping Type.

Only 37 values were missing in the Review Rating column, which were handled during data preparation.

Exploratory Data Analysis (EDA) in Python

Data Loading & Initial Exploration
Imported dataset using `pandas` and used `df.info()` and `.describe()` for structural and statistical summaries.

Column Standardization & Feature Engineering
Renamed columns to snake case, created `age_group` and `purchase_frequency_days`.

Missing Data Handling
Imputed missing `Review Rating` values using the median rating per product category.

Data Consistency & Integration
Verified `discount_applied` and `promo_code_used`, then loaded cleaned data into PostgreSQL for SQL analysis.

SQL Data Analysis: Key Business Transactions

Structured analysis in PostgreSQL revealed critical insights into customer behavior:

- **Revenue by Gender:** Male customers generated $157,890, Female $75,191.

- **High-Spending Discount Users:** Identified 839 customers who used discounts but spent above average.

- **Top 5 Products by Rating:** Gloves (3.86), Sandals (3.84), Boots (3.82), Hat (3.80), Skirt (3.78).

- **Shipping Type Comparison:** Express shipping had a higher average purchase amount ($60.48) than Standard ($58.46).

- **Subscribers vs. Non-Subscribers:** Non-subscribers had higher total revenue ($170,436) and average spend ($59.87).

- **Discount-Dependent Products:** Hat (50%), Sneakers (49.66%), Coat (49.07%), Sweater (48.17%), Pants (47.37%) had highest discount rates.

- **Customer Segmentation:** Loyal (3116), Returning (701), New (83).

- **Revenue by Age Group:** Young Adult ($62,143), Middle-aged ($59,197), Adult ($55,978), Senior ($55,763).

Top Products & Customer Segments

Top-Rated: Gloves

With an average rating of 3.86, gloves are a customer favorite.

Loyal Customers
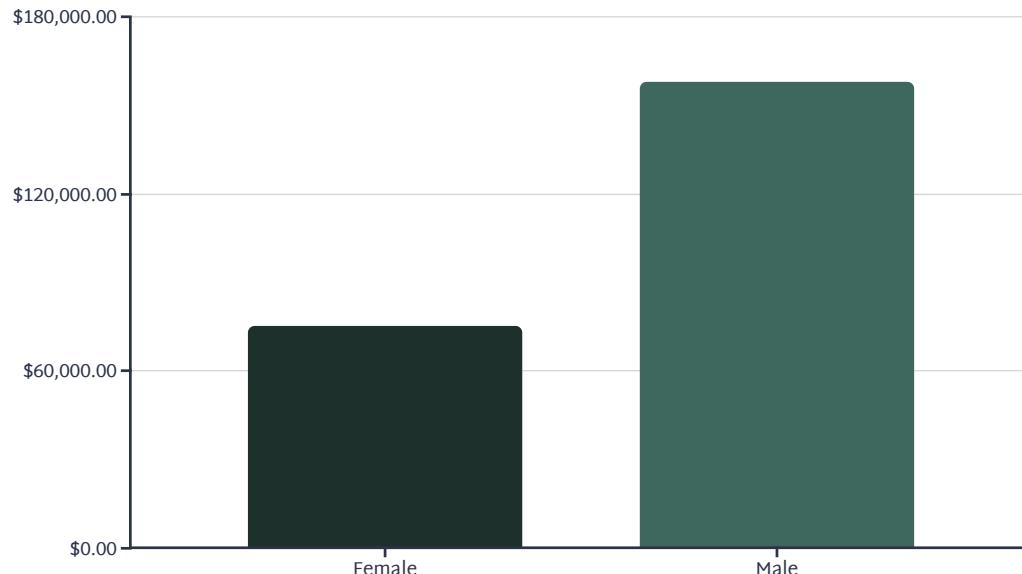
Our largest segment, with 3,116 loyal buyers.
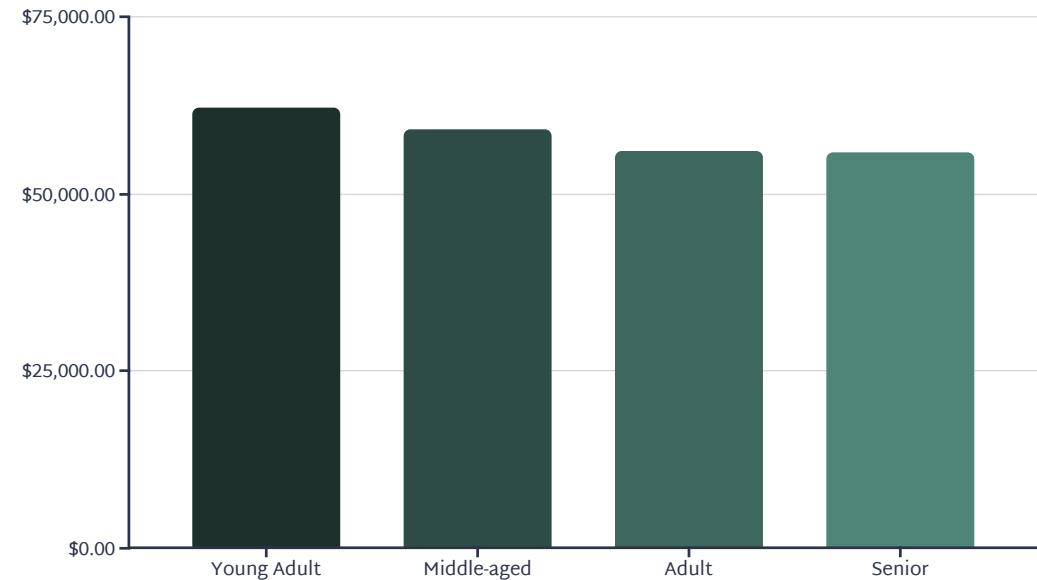
Discount-Dependent: Hat

50% of hat purchases involved a discount.

Revenue by Gender and Age Group

Male customers contribute significantly more to overall revenue.

Young Adults are the highest revenue-generating age group.
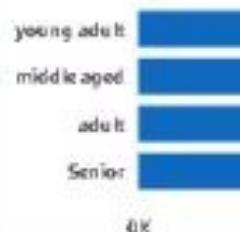
Customer Behavior Dashboard

$59.76
Average purchase amount

K
ustomers

y Subscribed

No 73%

Revenue by Category

100k

50k

0k

Clothing · Accessories · Footwear · Outerwear

Sales by age_group

young adult
middle aged
adult
Senior

500 · 1,000 · 0K
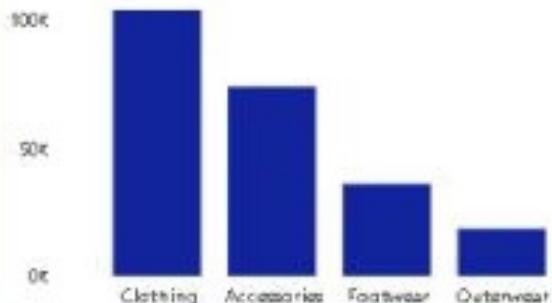
Power BI Dashboard: Visualizing Customer Behavior

An interactive Power BI dashboard was created to present these insights visually, featuring key metrics and dynamic filters.
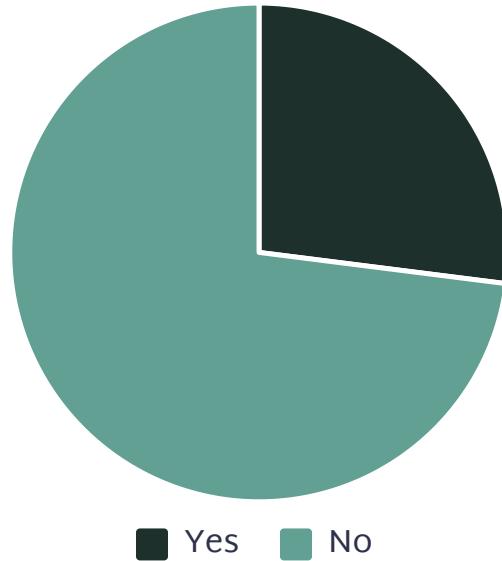
Key Metrics

- 3.9K Number of customers
- $59.76 Average purchase amount
- 3.75 Average review rating

Filters

Subscription Status, Gender, Category, Shipping Type for dynamic analysis.

Subscription & Shipping Insights

Yes **No**

Only 27% of customers are subscribers, indicating a growth opportunity.

Standard Shipping

Average purchase: $58.46

Express Shipping

Average purchase: $60.48

Customers using Express shipping tend to spend more per purchase.

Made with GAMMA

Business Recommendations

→ **Boost Subscriptions**

Promote exclusive benefits to increase subscriber base.

→ **Customer Loyalty Programs**

Reward repeat buyers to foster loyalty and move them into the "Loyal" segment.

→ **Review Discount Policy**

Optimize discount strategies to balance sales boosts with margin control.

→ **Product Positioning**

Highlight top-rated and best-selling products in marketing campaigns.

→ **Targeted Marketing**

Focus efforts on high-revenue age groups and express-shipping users for maximum impact.