Customer Shopping Trend Analysis

From Data to Dashboard: Leveraging Python, SQL, and Power BI for Actionable Insights

Project Overview & Objectives

- **Analyze Sales Drivers:** Use 3,500 transactions to understand core sales performance and retention.
- **Segment Customers:** Dissect purchase behaviors to identify high-value customer segments.
- **Evaluate Subscription Model:** Assess the effectiveness of the current subscription program.
- **Provide Actionable Insights:** Optimize marketing spend and product placement for growth.

Dataset at a Glance

Scope & Structure

Rows: 3,500

Columns: 18

Missing Data: 37 (Review Rating)

Key Features

Demographics (Age, Gender, Location)

Purchase Details (Item, Category, Amount)

Behavior (Discount, Frequency, Rating)

Data Preparation Pipeline (Python)

Load & Clean

Imported data with pandas, checked `df.info()`, and imputed missing 'Review Rating' values using the category median.

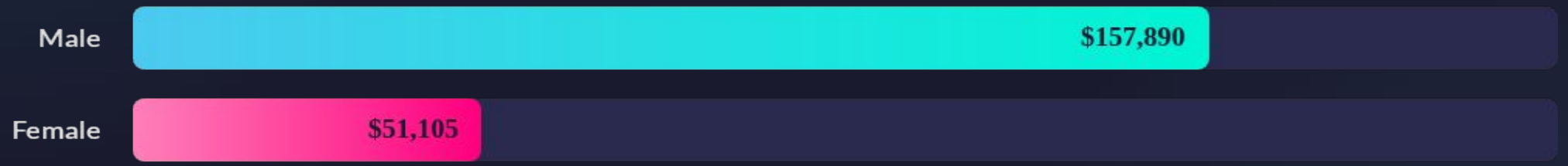
Standardize

Renamed columns to snake_case for readability. Checked for and removed the redundant 'promo_code_used' column.

Engineer & Load

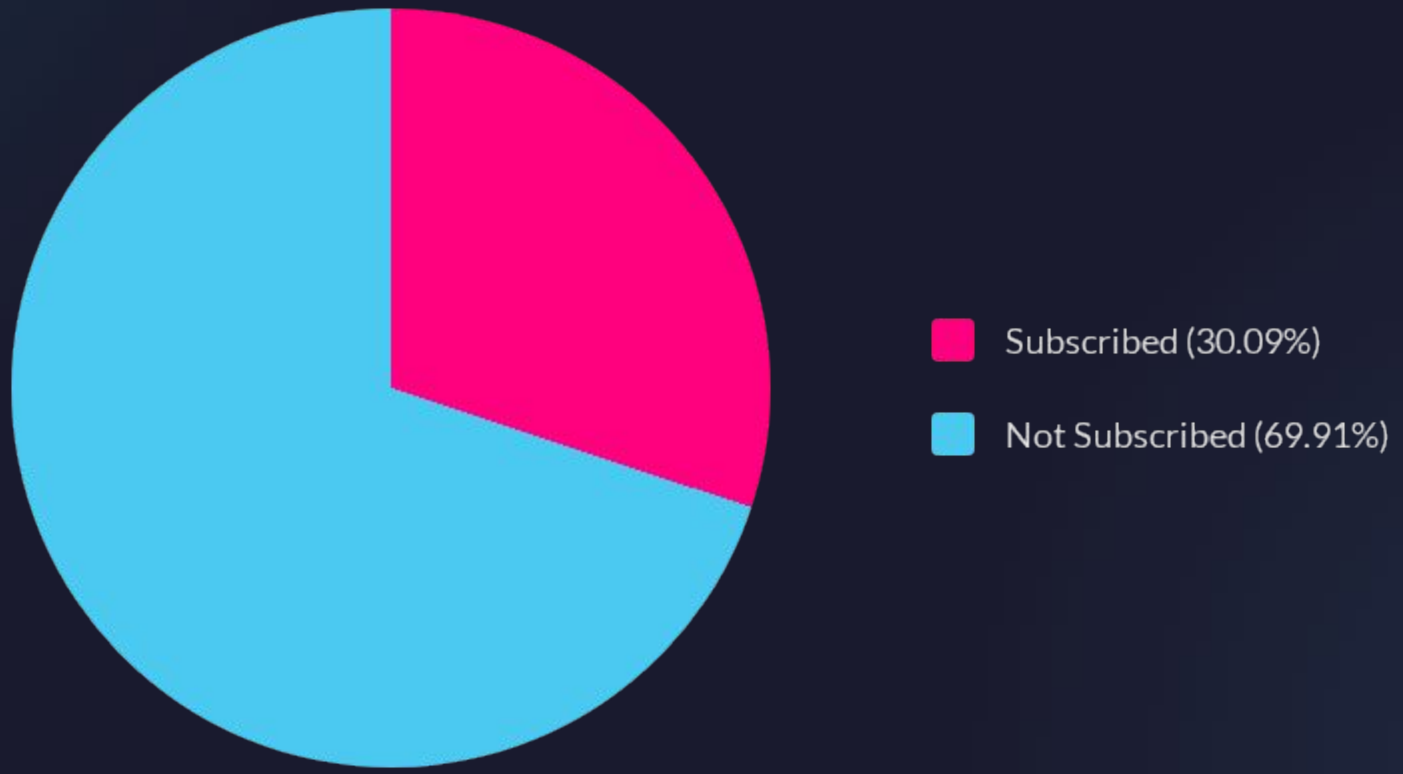
Created 'age_group' from customer ages. Loaded the final cleaned Data Frame into a PostgreSQL database for SQL analysis.

SQL Insight: Revenue by Gender



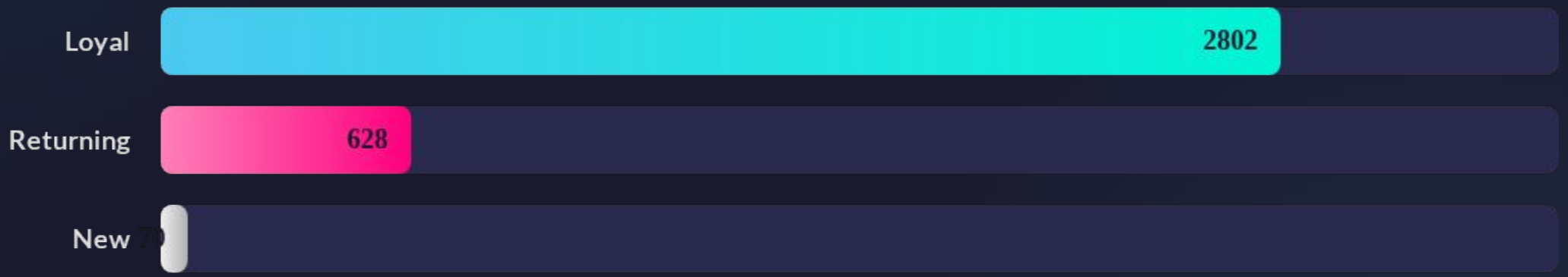
The analysis shows that Male customers generate significantly higher total revenue ($157,890) compared to Female customers ($51,105).

SQL Insight: Subscription Status Distribution



A significant majority of the customer base (69.91%) are non-subscribers, highlighting a major opportunity for conversion.

SQL Insight: Customer Segmentation by Purchase History

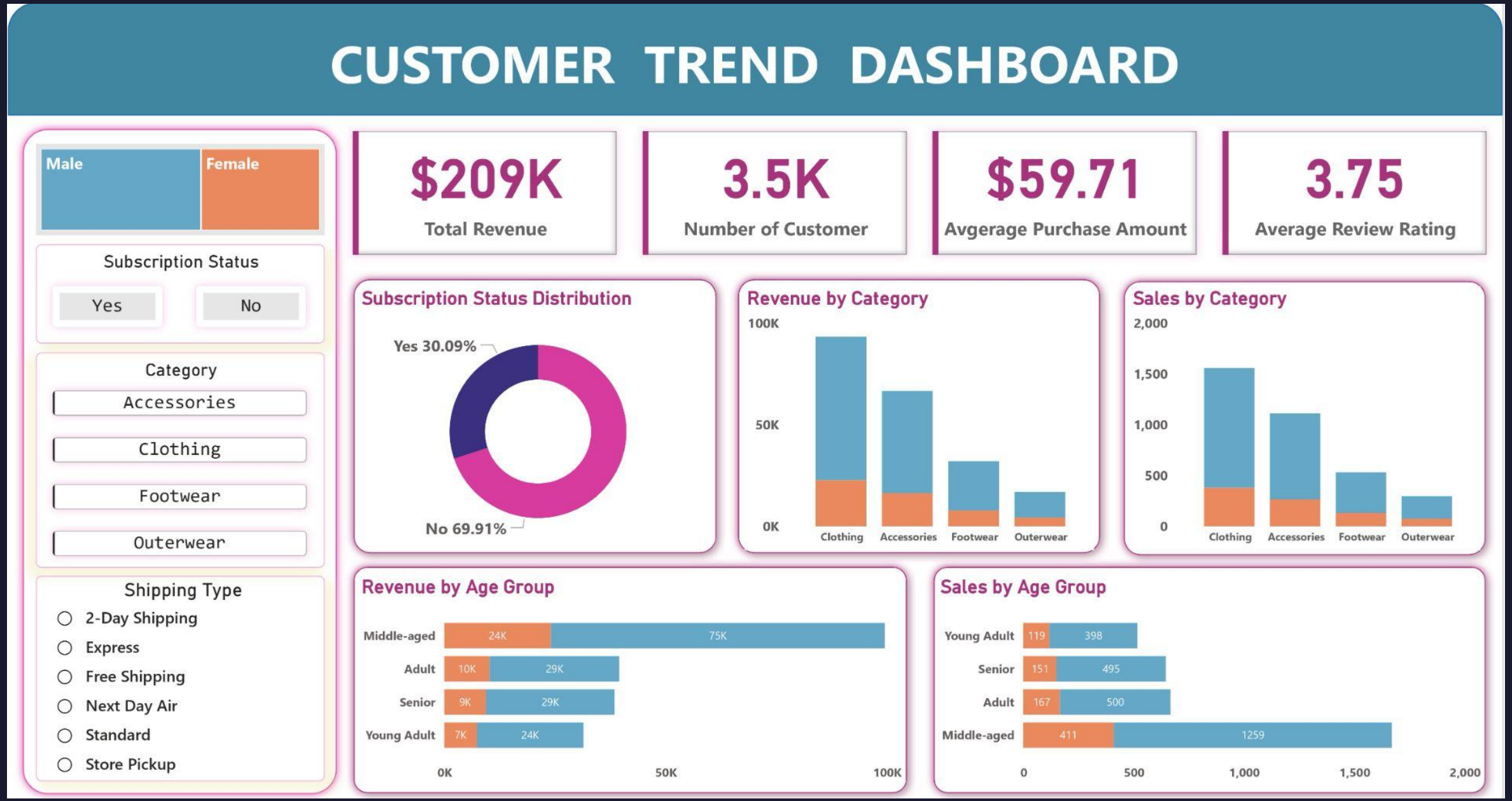


The customer base is overwhelmingly 'Loyal' (2802 customers), indicating strong retention. 'New' customer acquisition is a smaller segment (70 customers).

SQL Insight: Key Product Analysis

Analysis Type	Product	Value
Top Rated	1. Gloves	3.89 avg. rating
Top Rated	2. Sandals	3.85 avg. rating
Top Rated	3. Hat	3.84 avg. rating
Discount-Dependent	1. Hat	59.00% discount rate
Discount-Dependent	2. Sneakers	55.00% discount rate
Discount-Dependent	3. Coat	52.00% discount rate

Visualizing the Insights: Power BI Dashboard



Visualizing the Insights: Power BI Dashboard

All SQL analyses and data points were consolidated into this interactive Power BI dashboard.

Key Performance Indicators

Total Revenue: $209K

Total Customers: 3.5K

Avg. Purchase Amount: $59.71

Avg. Review Rating: 3.75

Business Recommendations

- **Monetize Subscribers:** Leverage higher AOV from subscribers by introducing tiered benefits and exclusive, higher-priced product lines.
- **Build Customer Loyalty:** Design targeted campaigns to convert 'Returning' customers into the 'Loyal' segment, capitalizing on their high subscription correlation.
- **Review Discount Policy:** Re-evaluate the discount strategy, especially for products like 'Hat', to balance sales volume with profit margin control.

Business Recommendations

Optimize Product Positioning: Prominently feature top-rated (Gloves, Sandals) and best-selling products in marketing campaigns and on the homepage.

Implement Targeted Marketing: Focus marketing efforts on the most valuable segments identified: high-revenue age groups (Middle-aged) and users who prefer Express shipping.

Thank you

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