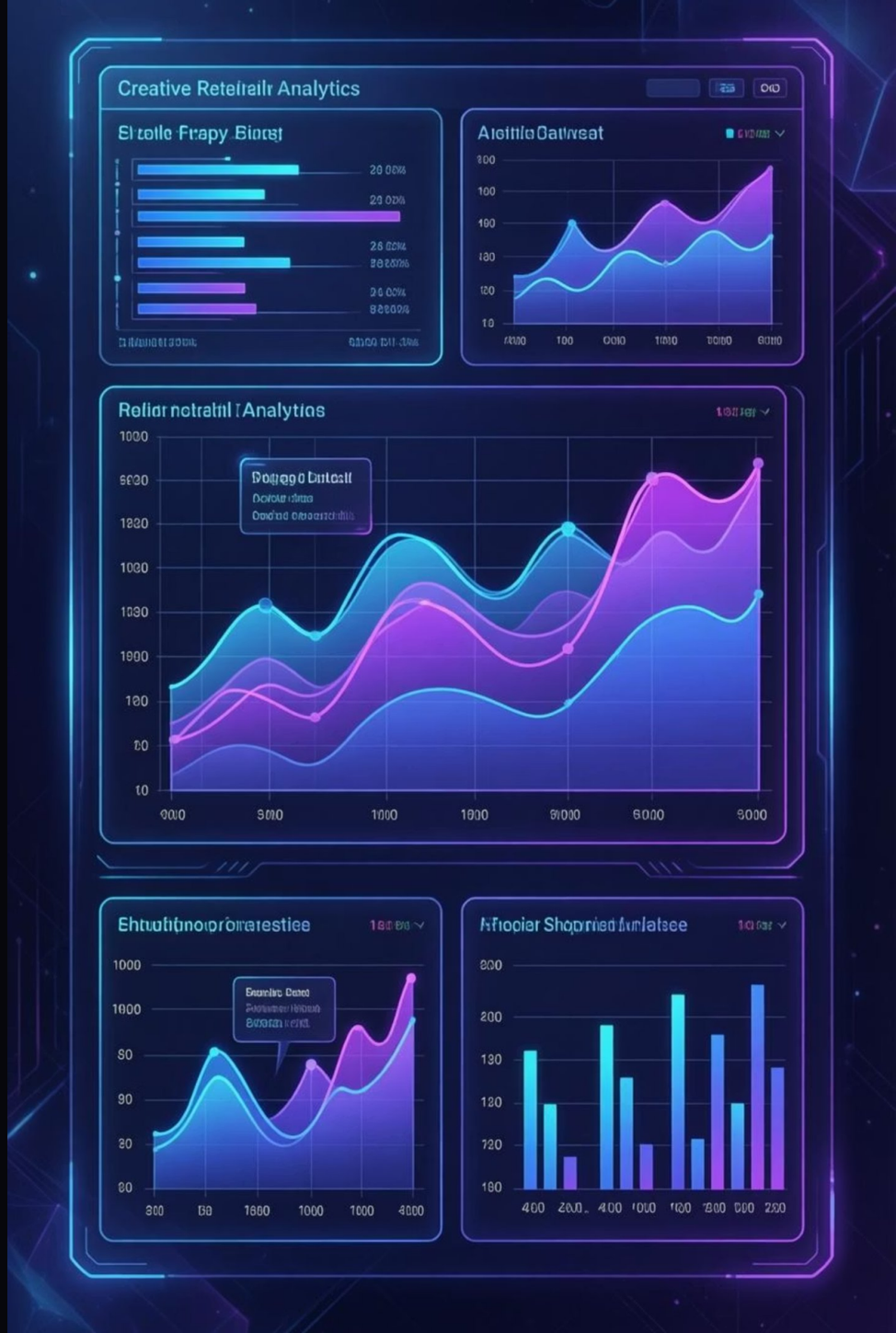
DATA ANALYTICS

Customer Shopping Behavior Analysis

Analyzing transactional retail data to understand spending patterns, customer segments, and product performance through Python, SQL, and Power BI.



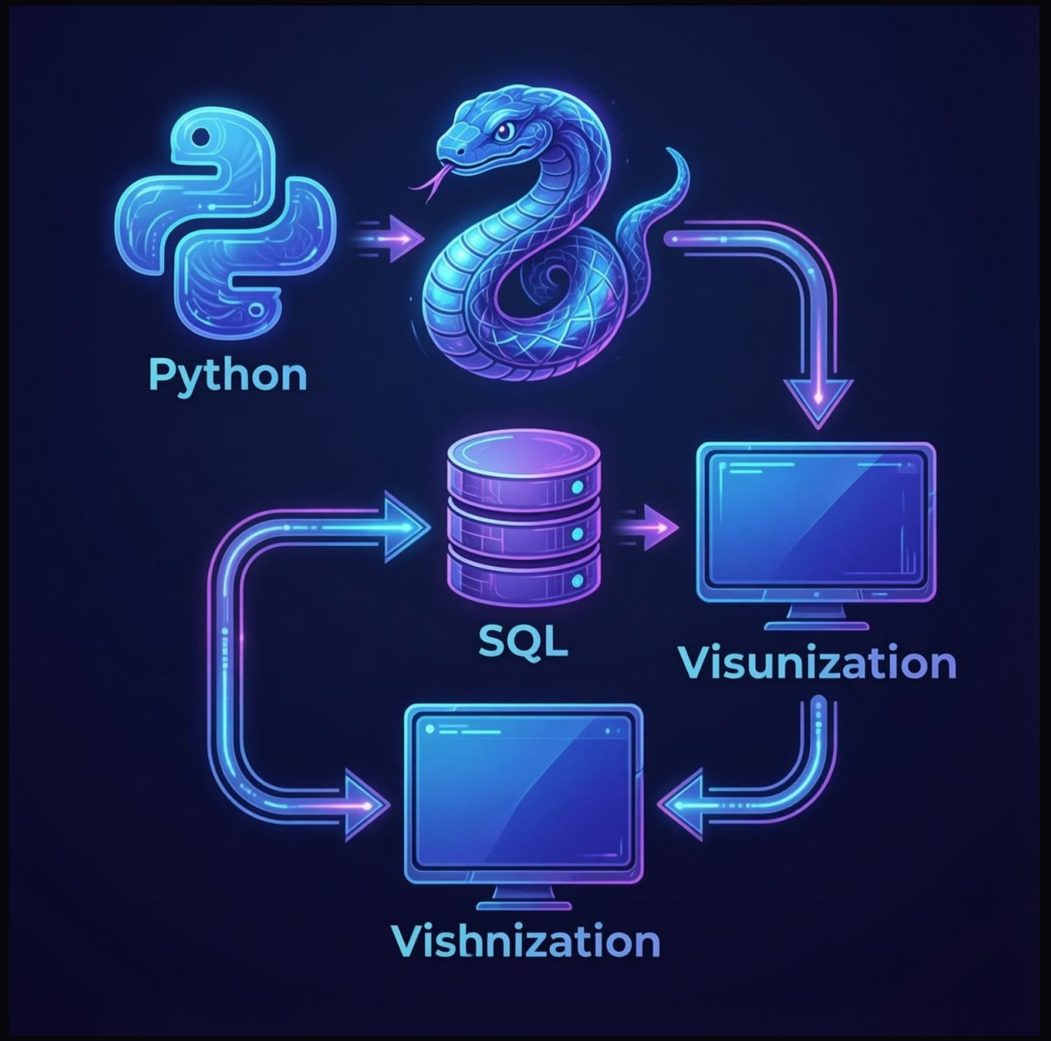
Project Overview

Objective

Replicate real-world analytics to generate insights supporting pricing strategy, customer retention, and product positioning decisions.

Workflow

- Data cleaning in Python
- Database integration with SQL
- Business-focused analysis
- Visual dashboard creation



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Dataset at a Glance

3,900

Total Records

Customer transactions analyzed

18

Data Features

Columns tracking behavior and demographics

37

Missing Values

In Review Rating column only

Customer Demographics

Age, Gender, Location, Subscription Status

Purchase Details

Item, Category, Amount, Season, Size, Color

Shopping Behavior

Discounts, Promo Codes, Purchase History, Reviews, Shipping

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Data Preparation Process

01

Data Loading & Exploration

Imported dataset using pandas, checked structure with df.info() and summary statistics

02

Missing Data Handling

Imputed missing Review Rating values using median rating per product category

03

Column Standardization

Renamed columns to snake_case for better readability and documentation

04

Feature Engineering

Created age_group and purchase_frequency_days columns from existing data

05

Data Consistency

Verified redundancy between discount_applied and promo_code_used, dropped duplicate

06

Database Integration

Connected to MySQL and loaded cleaned DataFrame for SQL analysis

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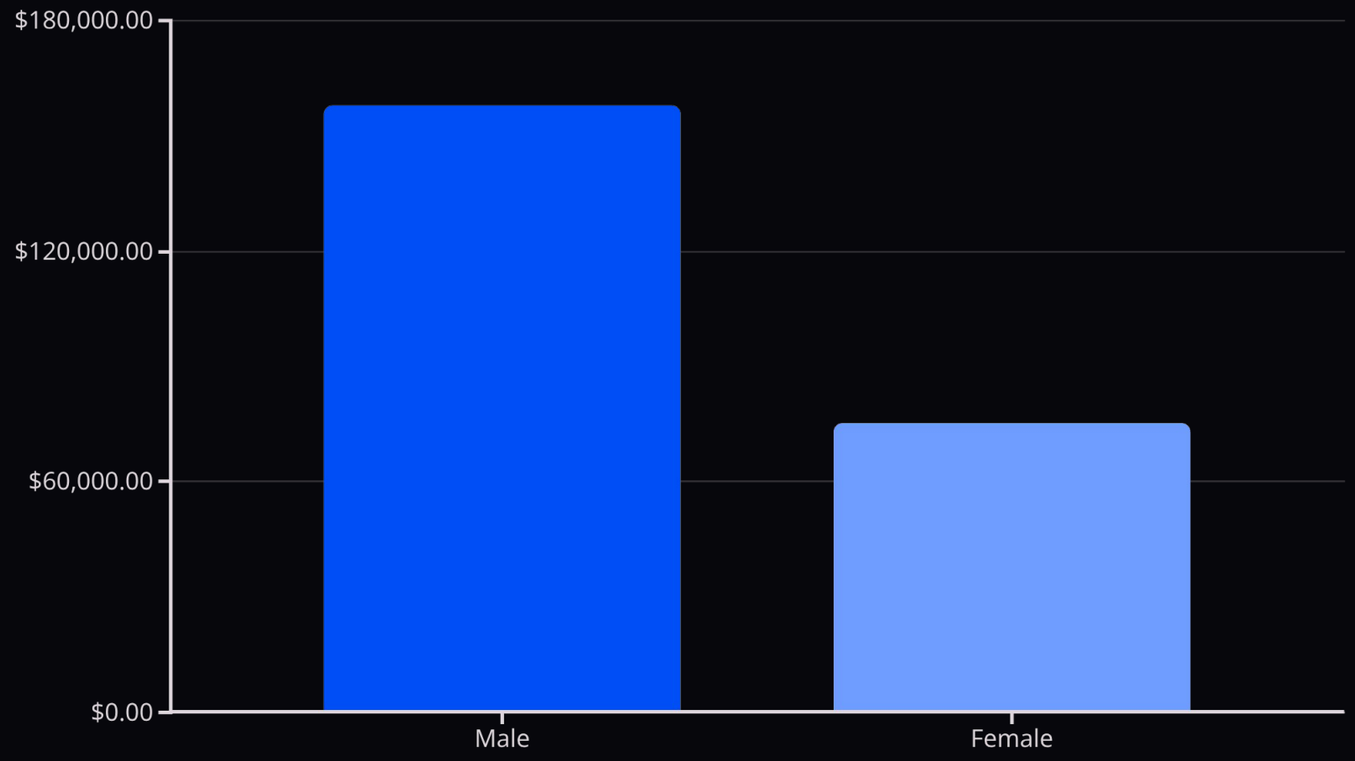
REVENUE INSIGHTS

Gender & Spending Patterns



Key Finding

Male customers generate 2.1x more revenue than female customers, representing a significant opportunity for targeted marketing strategies.

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Product Performance Analysis

Top 5 Products by Review Rating

- Gloves

  3.86 average rating

- Sandals

  3.84 average rating

- Boots

  3.82 average rating

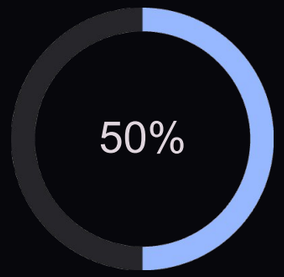
- Hat

  3.80 average rating

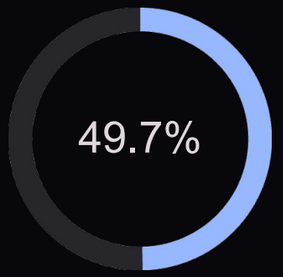
- Skirt

  3.78 average rating

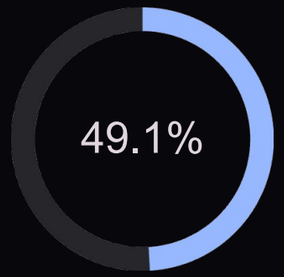
Highest Discount Usage



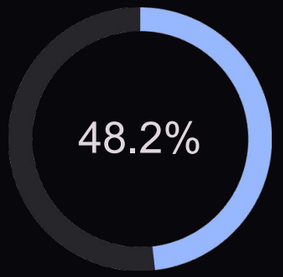
Hat



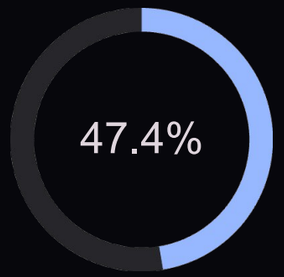
Sneakers



Coat



Sweater



Pants

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Shipping & Subscription Insights

Express Shipping

$60.48 average purchase

Higher spending customers prefer faster delivery options

Standard Shipping

$58.46 average purchase

Slight difference suggests shipping choice reflects urgency, not budget

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Subscription Status Comparison

Subscribers

1,053 customers

$59.49 avg spend

$62,645 revenue

Non-Subscribers

2,847 customers

$59.87 avg spend

$170,436 revenue

Insight

Similar spending patterns, but non-subscribers drive higher total revenue due to volume

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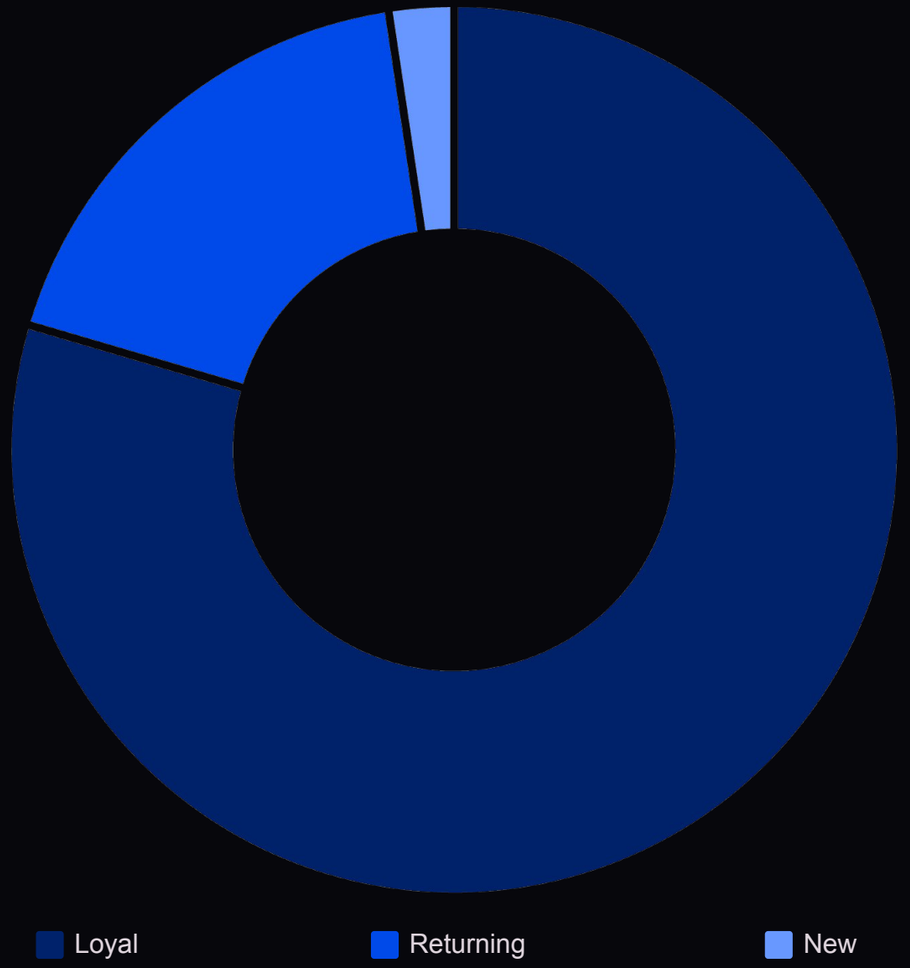
CUSTOMER SEGMENTS

Customer Loyalty Distribution



Critical Finding: Of 3,476 repeat buyers (5+ purchases), only 958 are subscribers while 2,518 are not—representing a major opportunity for subscription conversion.

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Revenue by Age Group

Young Adult

$62,143 revenue

Highest contributing segment

Middle Age

$59,197 revenue

Strong purchasing power

Adult

$55,978 revenue

Consistent spending

Senior

$55,763 revenue

Stable customer base

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STRATEGIC RECOMMENDATIONS

Business Recommendations

Boost Subscriptions

Promote exclusive benefits to convert 2,518 repeat buyers who aren't yet subscribers

Customer Loyalty Programs

Reward repeat buyers to accelerate movement from "Returning" to "Loyal" segment

Review Discount Policy

Balance sales boosts with margin control—nearly 50% discount usage on top products

Product Positioning

Highlight top-rated items (Gloves, Sandals, Boots) in marketing campaigns

Targeted Marketing

Focus on Young Adults and express-shipping users who demonstrate higher engagement

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