

E-commerce Sales & Customer Behavior Analysis

Deriving meaningful business insights from shopping data.





Project Overview

End-to-end analysis for data-driven decision-making.

01

Data Cleaning & Transformation

02

Database Integration

03

SQL-based Analysis

04

Interactive Dashboard Creation (Power BI)

Project Objectives

1

Understand Customer Behavior

Age, gender, subscription status.

2

Identify High-Value Segments

And repeat buyers.

3

Analyze Product & Seasonal Performance

4

Evaluate Promotional Effectiveness

5

Study Payment & Shipping Preferences

6

Visualize KPIs & Trends



Dataset Attributes

- Customer Details: ID, Age, Gender, Location, Subscription
- Purchase Info: Item, Category, Amount, Color, Size, Season
- Marketing: Discount Applied, Promo Code Used
- Payment & Shipping: Method, Preferred, Type
- Customer Engagement: Review Rating, Previous Purchases, Frequency
- Time Dimensions: Date, Month, Year

Tools & Technologies



Python

Pandas, NumPy for data manipulation.



Google Colab / Jupyter

Data cleaning, preprocessing.



MySQL

Data storage, SQL analysis.



Power BI

Visualization, interactive dashboards.

Data Cleaning & Preprocessing

Initial Inspection

Imported into Google Colab.

Handle Missing Values

Critical fields (purchase amount, customer ID).

Correct Data Types

Numeric, categorical, date formats.

Standardize Column Names

For SQL compatibility.

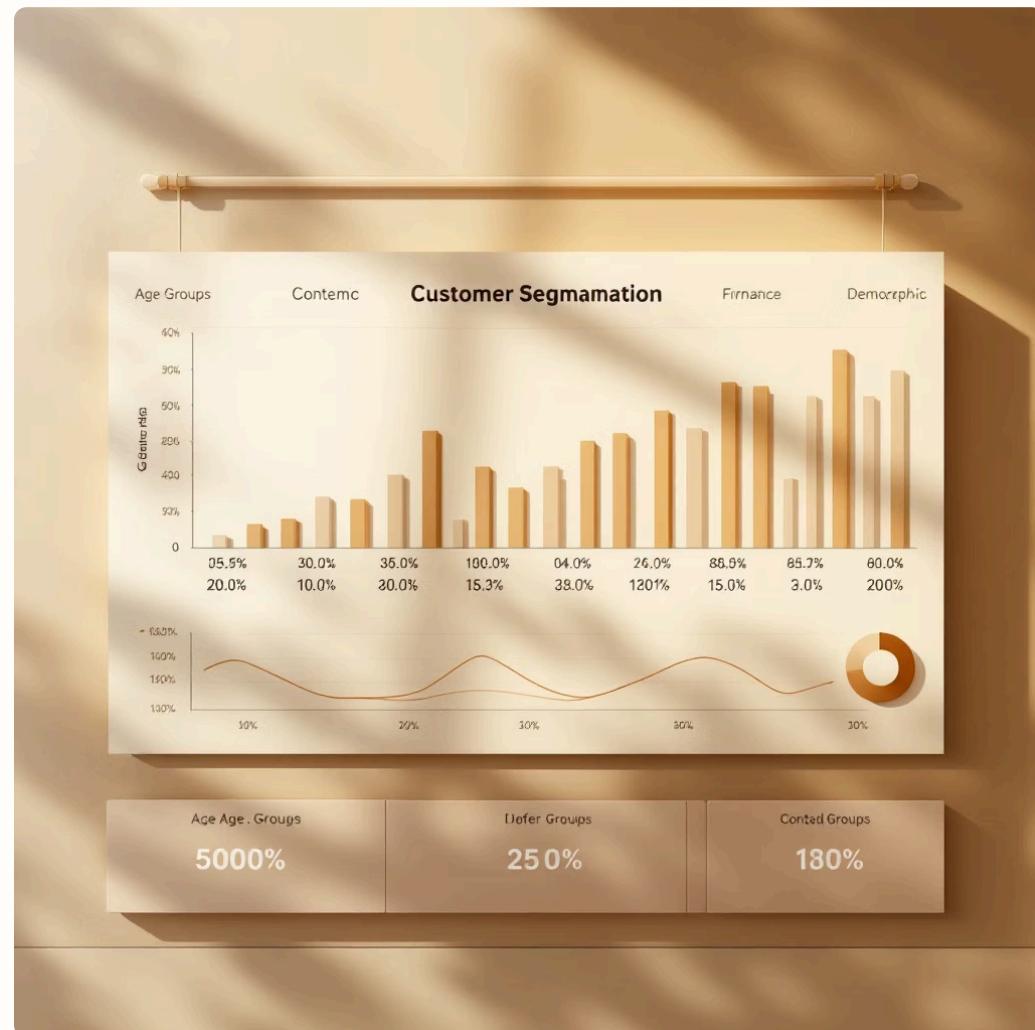
Clean Categorical Values

Gender, season, payment, subscription.

Feature Engineering & Database Integration

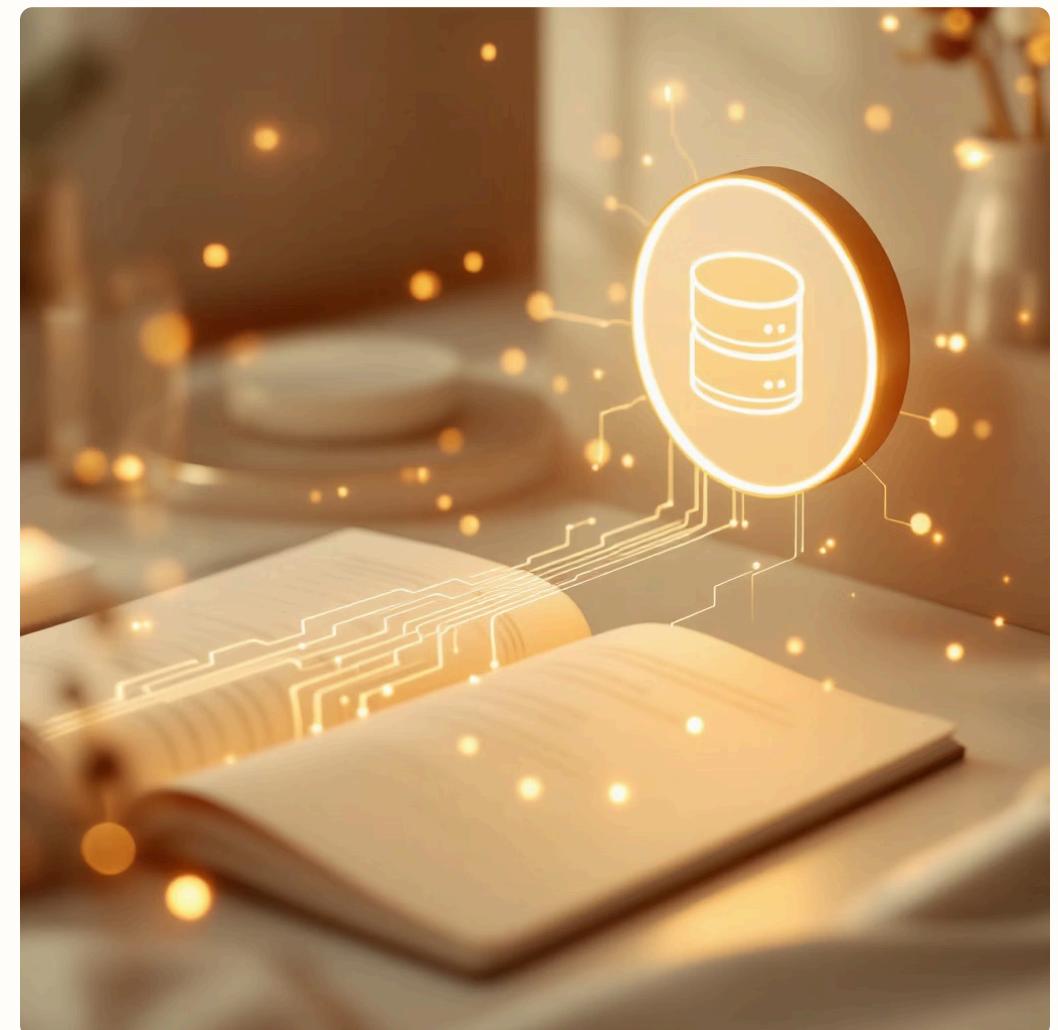
Feature Engineering

Created age groups (Young Adult, Adult, Middle-aged, Senior) for deeper segmentation.



Database Integration

Exported cleaned data to CSV, created MySQL database, imported data, verified integrity.



SQL Analysis: Key Insights

→ Revenue & Purchase Value

Total revenue, average purchase value.

→ Customer Demographics

Revenue by age, gender.

→ Product & Seasonal Trends

Top categories, seasonal sales.

→ Promotional Impact

Promo codes on purchase value.

→ Payment & Shipping

Common methods, shipping vs. review ratings.

→ Monthly Revenue Trends

Power BI Dashboard Development

1

KPI Cards

Revenue, AOV, Customers, Promo Usage.

2

Customer Analysis

Revenue by Age/Gender.

3

Product Analysis

Revenue by Category/Season.

4

Payment & Shipping

Method distribution, Shipping vs. Review.

5

Trend Analysis

Monthly Revenue Chart.

6

Interactive Slicers

Year, Season, Buyer/Spender Type.

Key Insights & Conclusion

Key Insights

- Adults drive highest revenue.
- Top product categories outperform.
- Seasonal patterns influence behavior.
- Promo codes boost purchase values.
- Digital payments preferred.
- Faster shipping = higher ratings.

Conclusion

Complete data analytics workflow: cleaning to actionable insights. Python, SQL, Power BI enhance customer understanding, optimize marketing, and improve operations.

