Data Analysis Showcase

Customer Shopping Behavior Analysis

A comprehensive analytical project exploring customer demographics, purchasing patterns, and feedback to drive strategic business decisions and marketing excellence.

OVERVIEW

Project Scope & Methodology

Dataset Foundation

Analyzed comprehensive customer shopping behavior dataset including demographics, purchase details, and product feedback metrics.

Core Objective

Uncover actionable patterns and insights to inform targeted marketing strategies and optimize business performance.

Technical Stack

Leveraged Python ecosystem: pandas for data manipulation, NumPy for numerical operations, matplotlib and seaborn for sophisticated visualizations.

DATA PREPARATION

Data Cleaning & Quality Assurance

Rigorous Data Processing

Implemented comprehensive data cleaning procedures to ensure analytical accuracy and reliability:

- **Missing Values:** Identified 37 missing Review Rating entries and imputed using category-specific median values
- **Duplicate Detection:** Verified dataset integrity with zero duplicate records found
- **Type Validation:** Confirmed appropriate data types across all columns for seamless analysis
- **Quality Check:** Performed final verification ensuring 100% data completeness

ANALYSIS

Comprehensive Exploratory Analysis

01

Univariate Analysis

Examined individual variable distributions across categorical features (Category, Gender, Season, Payment Methods) and numerical metrics (Age, Purchase Amount, Review Rating).

02

Bivariate Relationships

Analyzed correlations between key variables including Age vs. Purchase Amount, Review Ratings across categories, and purchasing patterns by demographics.

03

Multivariate Patterns

Created comprehensive correlation heatmaps, pairplots, and advanced visualizations to uncover complex interdependencies within the dataset.

Key Statistical Insights

3.75

Average Review Rating

Strong customer satisfaction across all product categories

1

Top Category

Clothing dominates with highest purchase volume

3

Peak Season

Spring drives maximum quarterly sales

+

Positive Correlation

Previous Purchases strongly predict Purchase Amount

FINDINGS

Customer Behavior Patterns

Product Preferences

Clothing emerges as the most popular category, followed by Accessories and Footwear. Electronics shows lower engagement, presenting optimization opportunities.

Demographics

Male customers represent the majority demographic, with purchasing behavior showing distinct patterns across age groups and seasonal preferences.

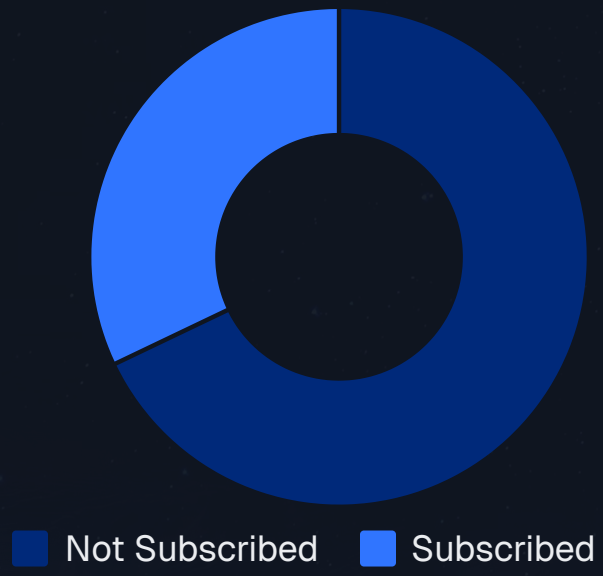
Seasonal Trends

Spring and Winter drive peak purchasing activity, with "Every 3 Months" being the most common purchase frequency among active customers.

Payment Methods

PayPal dominates as the preferred payment option, indicating strong preference for digital and convenient payment solutions.

Subscription Status Analysis



Significant Growth Opportunity

The majority of customers remain unsubscribed, representing a **substantial untapped revenue stream** for subscription-based offerings.

Converting even a fraction of non-subscribers through targeted incentives could dramatically increase customer lifetime value and revenue predictability.

RECOMMENDATIONS

Strategic Business Recommendations

Targeted Marketing Campaigns

Focus promotional efforts on **Clothing category** and **male customer segments** where engagement is highest. Develop personalized messaging for peak seasons.

Seasonal Optimization

Capitalize on **Spring and Winter peaks** with strategic inventory planning, seasonal collections, and time-sensitive promotional campaigns to maximize revenue.

Subscription Conversion

Implement attractive **incentive programs** including exclusive discounts, early access, and loyalty rewards to convert the 68% non-subscribed customer base.

Experience Enhancement

Address lower-rated categories like **Footwear and Electronics** through quality improvements, better product descriptions, and enhanced customer service protocols.

Project Impact & Next Steps

Analytical Excellence

Demonstrated proficiency in end-to-end data analysis pipeline: from data cleaning and quality assurance to sophisticated exploratory analysis and actionable insights generation.

Business Value

Delivered concrete, data-driven recommendations that directly address revenue optimization, customer retention, and strategic marketing opportunities worth significant potential ROI.

Technical Mastery

Showcased advanced Python data science skills including pandas, NumPy, matplotlib, seaborn, and statistical analysis techniques applied to real-world business challenges.

Key Takeaway: This comprehensive analysis transforms raw customer data into strategic intelligence, demonstrating both technical expertise and business acumen essential for data-driven decision making.