

Exploratory Data Analysis (EDA) for eCommerce Transactions

Introduction:

Introduction to the dataset and the objective of the analysis:

- This report summarizes an exploratory data analysis (EDA) conducted on a dataset consisting of three files: Customers.csv, Products.csv, and Transactions.csv.
- The primary goal of this analysis is to uncover patterns, identify key trends, and derive actionable business insights to support data-driven decision-making.

Datasets Overview

- **Customers.csv:**
 - Contains customer demographics, regions, and signup dates.
- **Products.csv:**
 - Details products with their categories and prices.
- **Transactions.csv:**
 - Tracks transaction details such as purchase date, quantity, and total value.

Exploratory Data Analysis

5.1 Customers Analysis

- **Region Distribution:**
 - Plot a bar chart showing the number of customers in each region.
 - Key finding: The majority of customers come from [Region A], while [Region B] has the least representation.
- **Customer Signup Trends:**
 - Plot a time series of signups by year or month.
 - Insight: The platform saw a peak in customer signups during [specific period], likely due to marketing campaigns or product launches.

5.2 Products Analysis

- **Product Categories:**
 - Bar chart of the number of products in each category.
 - Insight: The most extensive product category is [Category A], accounting for X% of the total.

- **Price Distribution:**
 - Histogram of product prices.
 - Insight: Most products are priced between \$X and \$Y, with few high-end products priced above \$Z.
- **Top 5 Most Expensive Products:**
 - List the top 5 products with their names, categories, and prices.

5.3 Transactions Analysis

- **Revenue Analysis:**
 - Total revenue.
 - Average transaction value.
- **Seasonality/Time Trends:**
 - Plot monthly or quarterly revenue trends.
 - Insight: Revenue peaks during [specific periods], likely due to holidays or sales events.
- **Top Selling Products:**
 - Table of the top 5 products by quantity sold and revenue generated.
- **Customer Purchase Behavior:**
 - Average transactions per customer.
 - Average spend per customer.

Business Insights

Provide at least **5 concise insights** from the EDA. Each insight should be actionable and relevant to business goals. Example:

1. **Top Revenue-Generating Customers:**
 - The top 5% of customers contribute to over 50% of the revenue.
 - Actionable Insight: Introduce loyalty programs to retain these high-value customers.
2. **Seasonal Sales Trends:**
 - Revenue spikes in Q4, indicating high holiday demand.
 - Actionable Insight: Increase marketing and inventory during this period to maximize sales.

3. Product Pricing Observation:

- Products priced between \$50-\$100 generate the most revenue.
- Actionable Insight: Focus on this price range when launching new products.

4. Underperforming Product Categories:

- Category X accounts for only 5% of total sales, despite having 20% of products.
- Actionable Insight: Reassess inventory for this category or optimize pricing and marketing.

5. Low Engagement in Specific Regions:

- Region Y has the lowest customer representation and transaction volume.
- Actionable Insight: Implement targeted campaigns and partnerships in this region.

Conclusion

- This analysis highlights customer and product trends that influence overall revenue.
- Insights can be used to optimize marketing strategies, product offerings, and regional outreach efforts.
- Future work could include predictive modeling to better understand customer behavior and improve recommendations.