E-commerce Return Rate Reduction Analysis

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Company/Organization: Elevate Labs

Project Domain: Data Analytics & Visualization

Introduction

In the dynamic landscape of e-commerce, customer returns pose a major challenge impacting profitability and customer satisfaction. This project focuses on analyzing return behavior to uncover patterns and build data-driven strategies that can help reduce return rates.

Abstract

The objective of this project was to analyze a Brazilian e-commerce dataset to identify trends associated with product returns. Key focus areas included return percentages by product category, customer state, and payment method. A logistic regression model was developed to predict return risk, and findings were visualized in an interactive Power BI dashboard.

Tools Used

- Python (Google Colab): Data cleaning, preprocessing, modeling
- Power BI: Dashboard creation and visualization
- Pandas, Scikit-learn: For data handling and logistic regression
- Kaggle Olist Dataset: Source of e-commerce transactional data

Steps involved in building the project

1. Data Collection & Merging: Combined seven CSV files containing orders, customers, products, and payments.
2. Feature Engineering: Created a `return_flag` to classify high-risk return orders.
3. Exploratory Data Analysis (EDA): Identified top return categories and states.
4. Modeling: Applied logistic regression to predict return likelihood.
5. Dashboarding: Built an interactive Power BI report with KPIs, maps, and filters.

Learning Outcomes

- Understood the full data science pipeline: cleaning → modeling → storytelling

- Applied visual design best practices in Power BI

- Gained confidence in building beginner ML models

- Improved real-world analytical thinking and presentation

Conclusion

The analysis revealed high return rates in specific categories like fashion shoes and baby products, with geographical concentration in SP, RJ, and MG. The logistic regression model effectively highlighted high-risk orders, and the Power BI dashboard enabled intuitive exploration of return trends. This project enhanced my understanding of data analytics, storytelling, and visualization.

Dashboard Screenshot