E-Commerce Return Risk Analysis Dashboard Report

Introduction

Product returns pose significant challenges in e-commerce, affecting customer satisfaction and operational costs. This project explores customer-level return behaviour to understand return patterns across different categories, regions, and marketing campaigns.

Abstract

The aim of the project is to identify high-risk return behaviours using historical data. We built a logistic regression model to predict return probabilities and designed an interactive Power BI dashboard with drill-through capabilities for decision-makers.

Tools Used

- Python (pandas, scikit-learn, matplotlib)
- Power BI
- Excel

Steps Involved

1. Cleaned and merged customer and order datasets.
2. Conducted exploratory data analysis (EDA) to uncover return patterns.
3. Built a logistic regression model to classify returns and predict probabilities.
4. Exported model outputs and return metrics as CSVs.
5. Designed a 2-page interactive dashboard in Power BI with KPIs, maps, charts, and drill-throughs.

Key Insights

- Categories like 'Apparel' and 'Accessories' have a significantly higher return rate.
- West and Central regions show more frequent returns than others.
- Gender and campaign schema correlate with return behaviour patterns.
- Logistic regression helps classify risky orders and assign return probabilities.
- High-risk products identified based on return percentage thresholds can be targeted for review.

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Conclusion

This return risk analysis helps identify where and why product returns are occurring. Predictive modelling and Power BI visualisation enable proactive strategies to reduce future returns and improve business performance.