Project Report

E-commerce Return Rate Reduction Analysis

Introduction

This project aims to analyze and reduce product return rates in an e-commerce setting. Returns affect profit margins and customer satisfaction, so identifying patterns in return behavior is essential for proactive strategy and policy development.

Abstract

The project involves cleaning and analyzing e-commerce order data to understand return trends. Using Python, and Power BI, we explored key drivers of returns by category, location, and channel. A logistic regression model predicts the probability of a product being returned. The results are visualized in an interactive Power BI dashboard.

Tools Used

- **Python**: Data cleaning, feature engineering, logistic regression model.
- **Power BI**: Visualization and interactive dashboard creation.

Steps Involved in Building the Project

1. **Data Cleaning**: Loaded and cleaned dataset, handled missing values, and created new features.
2. **Exploratory Data Analysis**: Analyzed return rates by category, location, and marketing channel.
3. **Predictive Modeling**: Built a logistic regression model to calculate return risk score for each order.
4. **Risk Scoring**: Added a `Return_Risk_Score` column based on predicted probabilities.
5. **Dashboard Creation**: Built Power BI visuals including KPIs, risk distribution, return rates by segment, and a table of high-risk orders with slicers for drill-down analysis.

Conclusion

The project successfully identified key drivers of returns, built a return prediction model, and created a practical dashboard for monitoring. ~50% of orders were returned (based on non-null return data). These insights allow the company to reduce return-related losses through targeted improvements in product quality, marketing and logistics.