

Final 2-Page Project Report



E-Commerce Product Return Analysis Dashboard



Project Overview

This project aims to analyse return behaviour in an e-commerce business using a synthetic dataset from Kaggle. The objective is to identify patterns in returned orders and provide actionable insights that help reduce return rates and improve customer satisfaction.

The key focus areas include:

- Which product categories are returned the most?
- Are there trends in return behaviour by gender, payment method, or month?
- How long do customers take to return products?
- What is the overall and category-wise return rate?



Tools Used

- **Python (Jupyter Notebook):** Used for cleaning raw CSV data, creating calculated columns like `Days_to_Return`, converting `Return_Status` to a binary format.
- **Power BI:** Used for building the interactive return analysis dashboard.
- **SQL:** *Not used in this project as the dataset was in CSV format and all preprocessing was handled in Python.*







Dataset Description

- **Source:** Synthetic dataset for e-commerce return analysis (Kaggle)
- **Rows:** 10,000 orders
- **Key Columns:**
 - Product Category, Return Status, Return Date, Order Date
 - User Gender, User Age, Location, Payment Method, Shipping Method
 - Discount Applied, Order Quantity, Product Price

Data Cleaning (Python)

- Converted Order Date and Return Date to datetime
 - Created Days_to_Return column
 - Created binary flag IsReturned from Return_Status
 - Removed invalid or negative return days
 - Exported cleaned dataset as model_ready.csv for Power BI use
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Key Insights from Dashboard

-  **Total Orders:** 10,000
 -  **Total Returns:** 5,052
 -  **Return Rate:** 50.52%
 -  **Average Days to Return:** 244 days
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Visual Breakdown

- **Return Rate (%) by Product Category:**
Highest in Clothing and Electronics (nearly 60%)
 - **Return Count by Payment Method:**
Fairly equal among Gift Card, Debit Card, PayPal, and Credit Card
 - **Return Status by Gender:**
Slightly higher returns from female users (51%)
 - **Monthly Trend of Return Days:**
Highest return volume early in the year, declining steadily toward year-end
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Conclusion

This dashboard helps the business identify product categories and customer segments with high return risks. These insights can guide:

- Improved product quality control
- Marketing refinement for high-risk products
- Optimized shipping and return policies

This project demonstrates end-to-end data analytics skills, from data cleaning in Python to interactive reporting in Power BI.