

Market Basket Analysis Report

Objective

To discover associations between products using Market Basket Analysis and provide actionable insights for marketing strategies and product placement.

1. Dataset Overview

This is a transnational data set which contains all the transactions occurring between 01/12/2010 and 09/12/2011 for a UK-based and registered non-store online retail. The company mainly sells unique all-occasion gifts.

The dataset consisted with the following key columns:

- InvoiceNo: A unique identifier helps distinguish each invoice from the others.
- StockCode: A unique for Each stock item is assigned.
- Quantity: The number of units purchased in each transaction.
- CustomerID: A unique identifier for each customer.
- Country: The country where the customer is located.

2. Methodology

1-Data Preprocessing:

- We cleaned the data by delete any option that contains a negative option (may indicate a return of products) , and missing(Customer ID)Because it is not useful for analysis we need to analyze customer purchasing behavior.
- We created a binary array where each row represents a transaction ,and each column represented a product (Stock Code).

2-Frequent Itemsets:

- Using the Apriori algorithm, we identified itemsets frequent items that appear together in transactions. A minimum support threshold ($\text{min_support}=0.05$) is set, meaning that items must appear in at least 5% of the transactions to be considered frequent

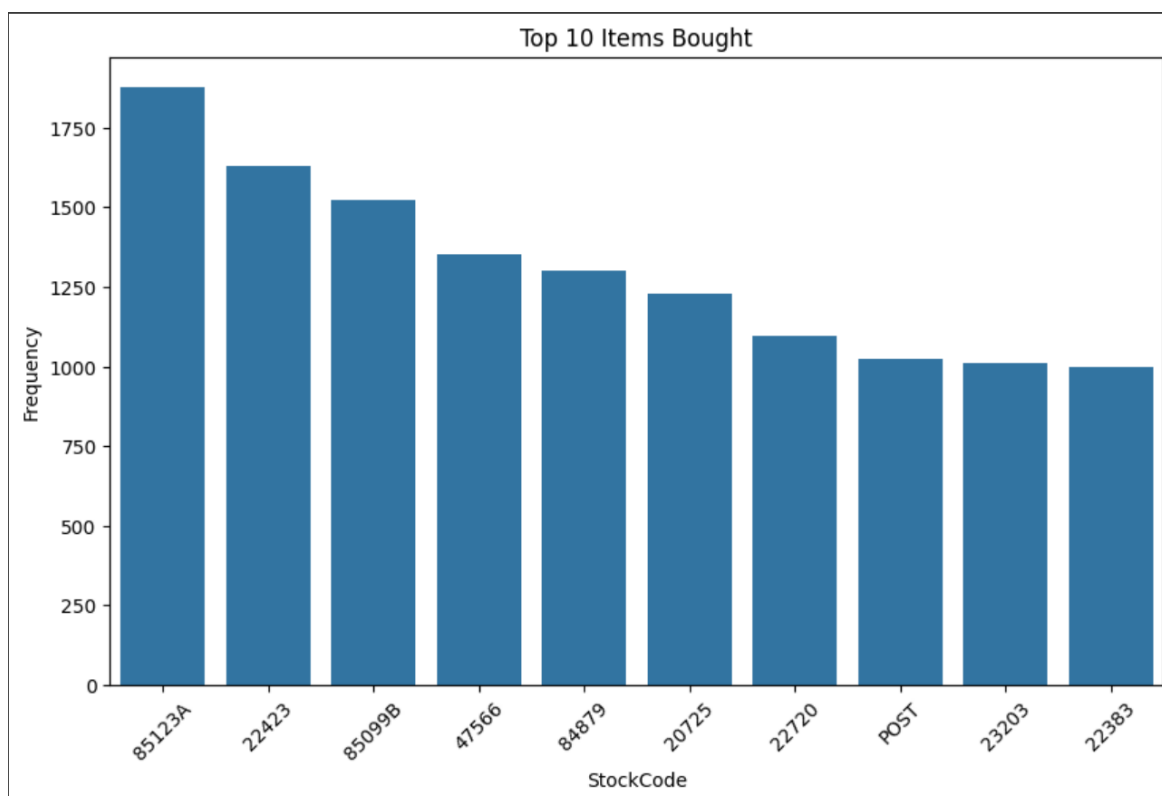
3-Association Rules Generation:

We generated association rules Association rules help identify relationships between items in the dataset.

- lift metric will be used to evaluate the strength of the rules , how much more likely two items are to be purchased together compared to being purchased independently with minimum threshold 50%.

4-Data visualization:

- Element frequency chart for Top 10 Items Bought



3. Benefits of Market Basket Analysis:

Personalizing Customer Experience :

- Insights gained can be used to customize the shopping experience, such as providing personalized product recommendations based on previous purchasing behavior.

Increasing Sales:

- retailer can bundle frequently bought-together products into packages or deals, making it easier for customers to purchase related products in one go.

Evaluating Marketing Campaign Effectiveness:

- It allows for the assessment of how marketing campaigns have influenced purchasing behavior.

4. Conclusion:

Shopping basket analysis is a powerful tool for understanding consumer behavior, improving business strategies, and increasing efficiency in inventory management, ultimately enhancing the shopping experience and boosting profits.

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