

Customer Segmentation Using RFM Analysis

Prepared by: Muhammad Rameez, Data Analyst

Dataset: Online Retail Dataset (UCI Machine Learning Repository)

Tools Used: Python (Pandas, Seaborn, Matplotlib)

Objective

To analyze customer behavior using RFM (Recency, Frequency, Monetary) analysis and segment customers for targeted marketing strategies.

Step 1: Data Preparation

- Loaded the Online Retail dataset using `pandas.read_excel()`.
 - Cleaned the dataset by:
 - Removing rows with missing `CustomerID`
 - Excluding cancelled orders (Invoice numbers starting with 'C')
 - Filtering out negative or zero quantities and prices
 - Created a new column `TotalPrice = Quantity * UnitPrice`
-

Step 2: RFM Metric Calculation

Defined the **snapshot date** as one day after the latest invoice date. Aggregated the data by `CustomerID` to calculate: - **Recency:** Days since the last purchase - **Frequency:** Number of unique purchase invoices - **Monetary:** Total money spent (sum of `TotalPrice`)

Step 3: RFM Scoring

- Used `pd.qcut()` to assign scores (1 to 4) for each R, F, and M metric
 - To handle non-unique bin edges, implemented a robust binning function with `duplicates='drop'`
 - Calculated the overall `RFM_Score` by summing the individual scores
-

Step 4: Customer Segmentation

Segmented customers based on `RFM_Score` into the following categories: - **Champions (9-12):** Recent, frequent, high spenders - **Loyal Customers (7-8):** Frequent buyers - **Potential Loyalist (5-6):** New or less frequent buyers - **Needs Attention (3-4):** Low engagement - **At Risk (1-2):** Inactive, low spenders

Step 5: Visualization

- Used `Seaborn` to create:
 - Bar chart of customer count per segment
 - Heatmap of average R, F, M values by segment
-

Step 6: Business Recommendations

Segment	Strategy
Champions	Loyalty rewards, early access
Loyal Customers	Upsell, cross-sell campaigns
Potential Loyalist	Personalized offers, email nurturing
Needs Attention	Win-back emails, feedback collection
At Risk	Re-engagement campaigns, heavy discounts

Deliverables

- Cleaned dataset with RFM metrics and segments
 - Excel export of customer segments (`rfm_segments.xlsx`)
 - Jupyter Notebook with complete workflow and visuals
-

Next Steps: - Integrate with email marketing tool for targeted campaigns - Track segment migration monthly for retention analysis