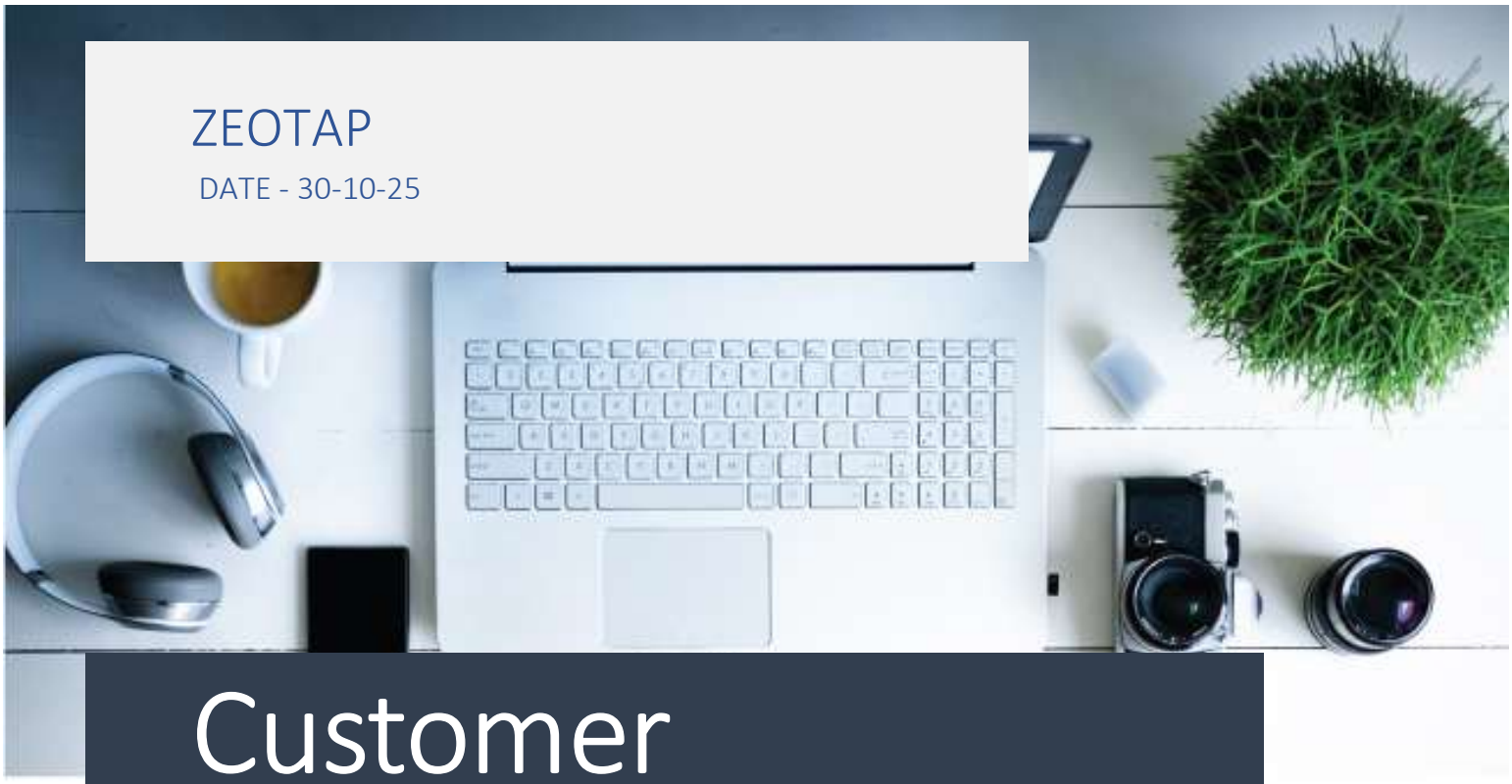


ZEOTAP

DATE - 30-10-25

Customer Segmentation Report

Introduction

In today's competitive market, understanding customer behavior and preferences is paramount for businesses to succeed. Customer segmentation is a powerful technique that enables businesses to group customers based on shared characteristics, allowing for targeted marketing efforts and personalized customer experiences. This report presents a comprehensive customer segmentation analysis conducted on an eCommerce transaction dataset, comprising Customers.csv and Transactions.csv. The primary objective is to identify distinct customer segments based on their purchasing behaviors and provide actionable insights for targeted marketing strategies and improved customer relationship management.

Business Context

Effective customer segmentation provides numerous benefits for businesses, including:

- **Targeted Marketing:** Tailoring marketing campaigns to specific customer segments increases relevance and effectiveness, leading to higher conversion rates and improved return on investment.
- **Personalized Recommendations:** Recommending products or services based on segment preferences enhances customer satisfaction and encourages repeat purchases.
- **Improved Customer Retention:** Understanding segment-specific needs and pain points allows for proactive measures to address concerns and improve customer loyalty.
- **New Product Development:** Identifying unmet needs and preferences within segments can guide the development of new products or services that cater to specific customer groups.

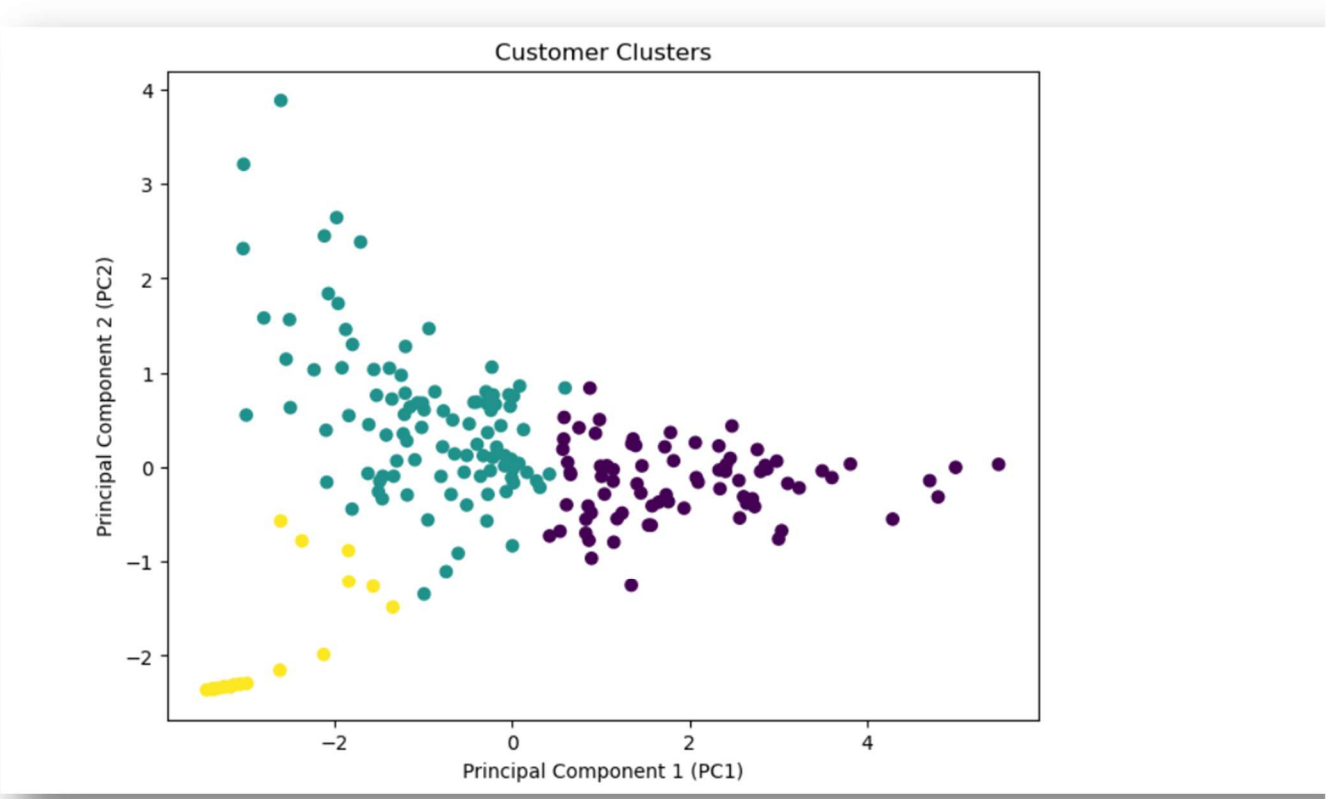
Methodology

The analysis employed a combination of data preprocessing, feature engineering, dimensionality reduction, and clustering techniques. The following steps were undertaken:

1. **Data Loading and Preparation:** The Customers.csv and Transactions.csv files were loaded into Pandas DataFrames. The TransactionDate column was converted to datetime format.
2. **Feature Engineering:**
    - The datasets were merged on the CustomerID column.
    - Features were engineered to capture purchasing behavior:
        - Number of transactions per customer (N_Transactions)
        - Total quantity of items purchased (Total_Quantity)
        - Total value of transactions (Total_Value)
        - Average days between transactions (Avg_Days_Between_Transactions)
        - Number of unique products purchased (N_Unique_Products)
3. **Data Preprocessing:**
    - Numerical features were standardized using StandardScaler.
4. **Clustering with K-means:**
    - The optimal number of clusters was determined using the Davies-Bouldin Index (DBI).
    - The K-means algorithm was applied to segment customers.
5. **Cluster Analysis:**
    - Mean values for each feature were calculated for each cluster.
    - The top 5 customers closest to each cluster's centroid were identified.
6. **Visualization:**
    - Dimensionality reduction was performed using PCA to reduce the number of features to 2 for visualization purposes.
    - A scatter plot was generated using matplotlib to visualize the clusters based on the first two principal components.

Results

- The optimal number of clusters identified was 3, with a **Davies-Bouldin Index of 0.7489**.
- Three distinct customer segments were identified, exhibiting different purchasing behaviors:
    - **Cluster 0 (High-Value Customers):** 31 customers (15.58%)
        - Characterized by frequent purchases, a high quantity of items purchased, high total value of transactions, and a higher number of unique products purchased.
    - **Cluster 1 (Average Customers):** 132 customers (66.33%)
        - Moderate purchasing behavior across all metrics.
    - **Cluster 2 (Low-Value Customers):** 36 customers (18.09%)
        - Lowest engagement, with infrequent purchases, low quantity and value of transactions, and fewer unique products purchased.



Recommendations

- **Cluster 0 (High-Value Customers):**
  - **Implement loyalty programs to reward and retain these customers.**
  - **Offer personalized product recommendations.**
  - **Grant early access to new products or sales.**
- **Cluster 1 (Average Customers):**
  - **Use targeted promotions to incentivize increased purchase frequency and value.**
  - **Offer personalized recommendations to enhance their experience.**
  - **Implement engagement campaigns to maintain their interest.**
- **Cluster 2 (Low-Value Customers):**
  - **Improve onboarding to ensure a positive first impression.**
  - **Develop reactivation campaigns to re-engage these customers.**
  - **Offer targeted recommendations to stimulate their interest.**