

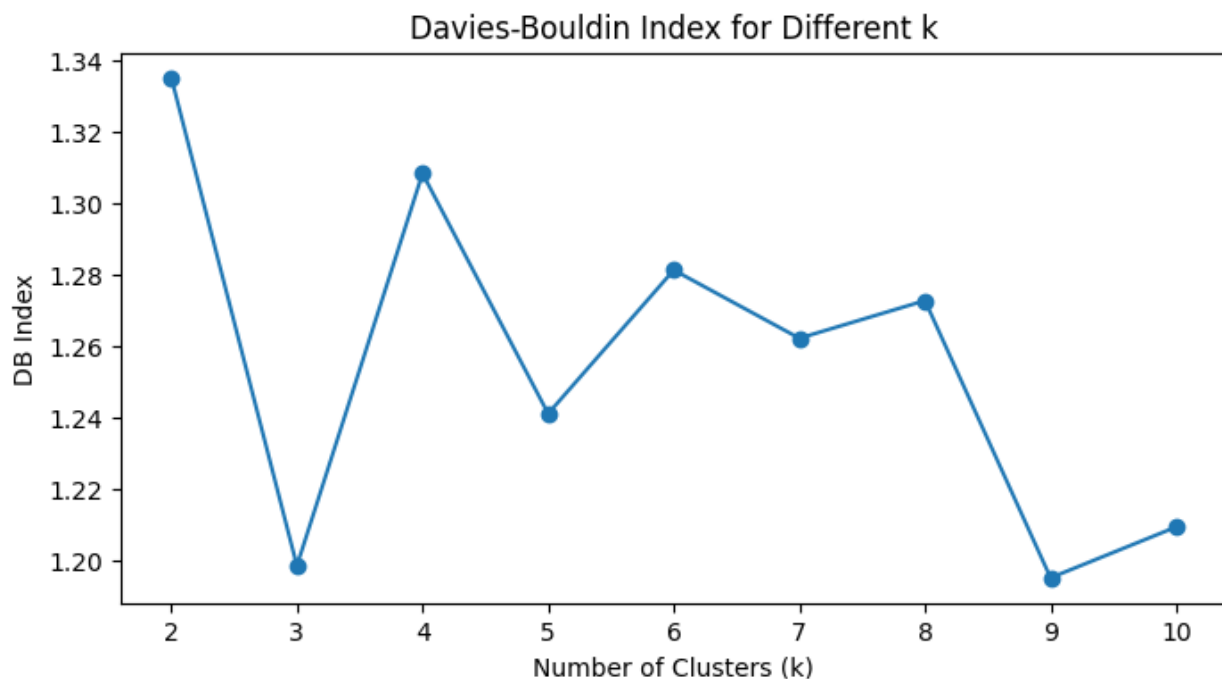
# Customer Segmentation Report

## 1. Overview

A customer segmentation analysis was conducted using both profile (region, sign-up date) and transaction data (spend, quantity, recency, etc.). The primary aim was to identify meaningful clusters for targeted marketing and strategic decision-making.

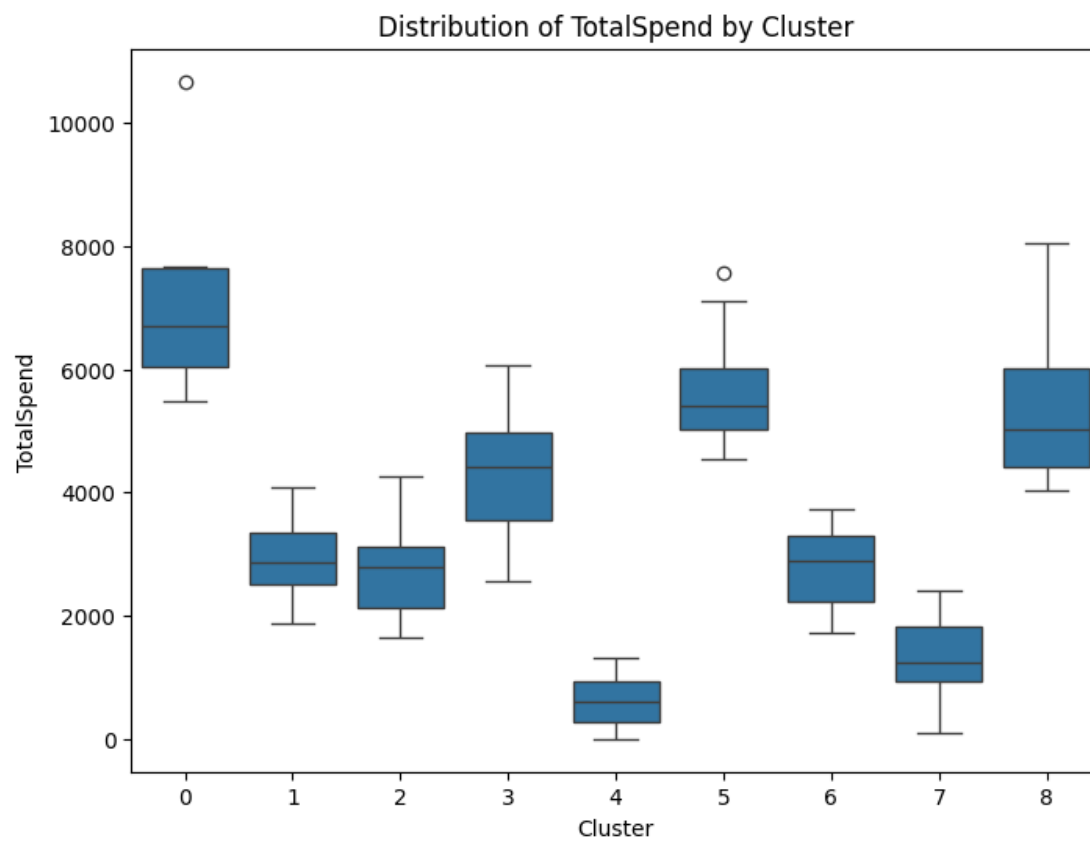
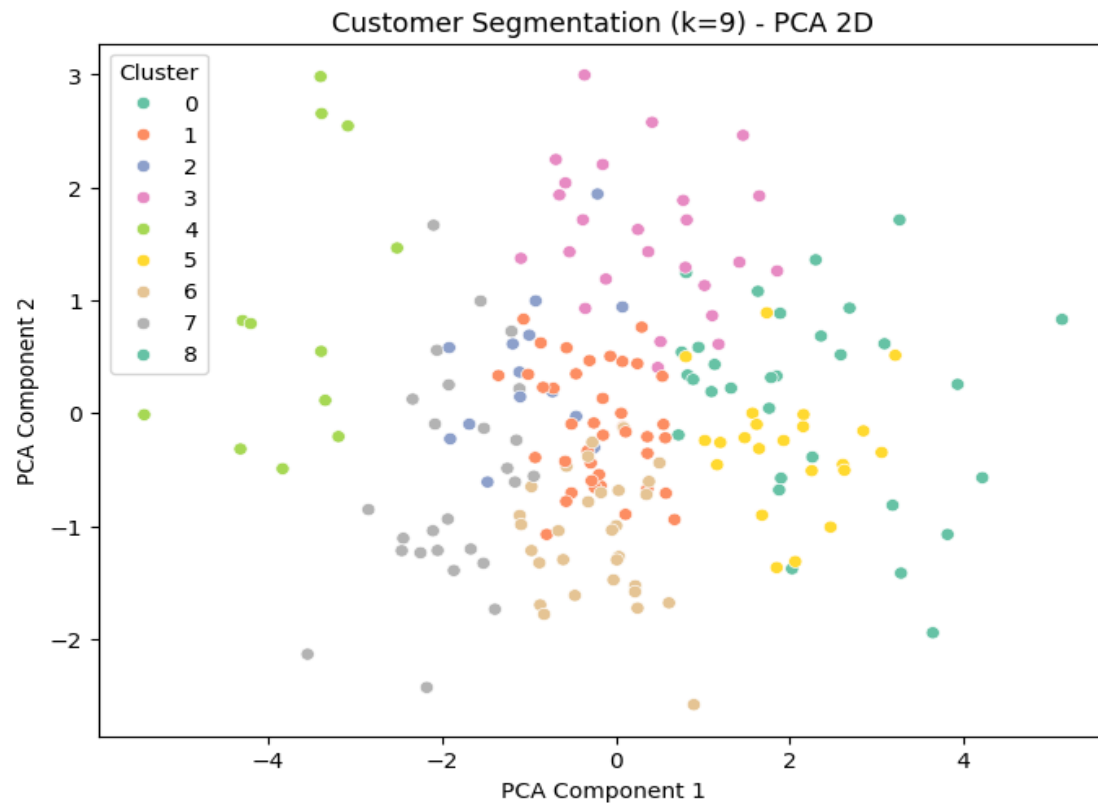
## 2. Clustering & Evaluation

- **K-Means** was applied to scaled numeric features.
- The **Davies-Bouldin Index** (DB Index) was calculated for (  $k$  ) ranging from 2 to 10.
- **Optimal (  $k = 9$  )** was determined based on the lowest DB Index, indicating the best separation among clusters.



## 3. Results & Key Observations

- **Cluster Assignments:** Customers were grouped into nine distinct clusters (0–8).
- **PCA Visualization:** A 2D scatter plot (via PCA) shows not very clear separation among the clusters and some of them are also shown to be overlapping.
- **Spending Patterns:** Box plots of **TotalSpend** highlight that some clusters exhibit notably higher spending (e.g., clusters 0 and 8), while others spend significantly less (e.g., clusters 2 and 4).



#### 4. Insights & Next Steps

- **High-Spend Segments:** Certain clusters have a higher median spend and could be prime targets for loyalty programs or upselling.
  - **Low-Spend Segments:** Other clusters indicate lower engagement; targeted reactivation campaigns may help increase revenue.
  - **Regional Differences:** Including region data allows for region-specific marketing or localized incentives.
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