

# Customer Segmentation Report

## Objective

The goal of this analysis was to segment customers using their profile and transaction data. Clustering was performed to identify patterns and group customers with similar behaviours.

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## Clustering Methodology

1. **Algorithm:** K-Means clustering was applied due to its simplicity and efficiency in segmenting numerical data.
  2. **Range of Clusters Tested:** The number of clusters ( $k$ ) was evaluated for values ranging from 2 to 10.
  3. **Evaluation Metric:**
    - **Davies-Bouldin Index (DB Index):** Measures the quality of clustering, with lower values indicating better-defined clusters.
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## Clustering Results

1. **Number of Clusters Formed:**
    - The optimal number of clusters determined was  $x$  (replace with the calculated value from the code).
  2. **Davies-Bouldin Index:**
    - The minimum DB Index achieved was  $y$  (replace with the calculated value).
  3. **Other Clustering Metrics:**
    - **Inertia (Sum of Squared Distances):** The total distance of points from their respective cluster centroids was minimized.
    - **Cluster Characteristics:**
      - Cluster 0: High spenders with frequent transactions.
      - Cluster 1: Moderate spenders with occasional purchases.
      - Cluster 2: Low spenders with infrequent activity.
      - (Descriptions depend on observed patterns in cluster features.)
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## Visualizations

1. **Davies-Bouldin Index:**
    - A line plot showed the DB Index across different  $k$  values, indicating the best value at  $k = x$ .
  2. **Cluster Scatter Plot:**
    - A scatter plot of `Total Spending` vs. `Average Spending` highlighted the separation among clusters.
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## Actionable Insights

1. **Target High-Value Customers:**
    - Cluster 0 represents customers with significant spending; personalized offers and loyalty programs could enhance retention.
  2. **Engage Moderate Buyers:**
    - Cluster 1 could be incentivized to increase spending through promotional campaigns.
  3. **Reactivate Dormant Customers:**
    - Cluster 2 includes infrequent buyers; targeted reactivation strategies could improve engagement.
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## Recommendations

1. Implement cluster-specific marketing strategies to maximize customer value.
  2. Continuously monitor clustering metrics to adapt strategies as customer behaviors evolve.
  3. Explore additional features, such as product categories or seasonal trends, for refined clustering.
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