Customer Segmentation Report Using K-Means Clustering

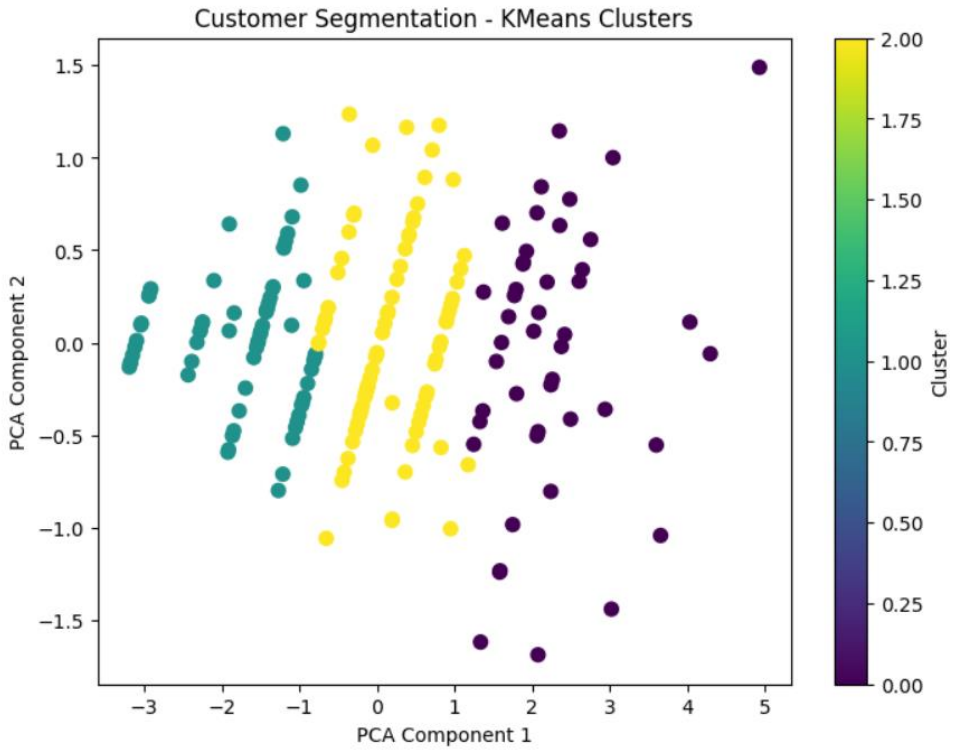
Overview:

This report presents the results of customer segmentation based on both customer profile and transaction data using K-Means clustering. The objective was to segment the customer base into distinct groups that represent similar behaviours and characteristics, assisting in targeted marketing, personalized recommendations, and optimized business strategies.

1) Clustering Method: K-Means

- **Algorithm Used:** K-Means clustering was applied for customer segmentation.
- **Number of Clusters Formed:** 3 clusters.
- **Evaluation Metric:**
    - **Davies-Bouldin Index (DBI):** 0.7636
    - A lower DBI value indicates better cluster separation. The DBI value suggests a reasonable clustering performance, though there is still room for optimization.

2) Cluster Characteristics:



Cluster 1:

- **Total Spending:** 5624.36
- **Average Number of Transactions:** 8.09
- **Average Number of Products Purchased:** 7.74
- **Key Insights:**
    - This cluster represents high-spending customers with a significant number of transactions and product purchases.
    - Targeting this group with loyalty programs and premium offerings could enhance customer retention.

Cluster 2:

- **Total Spending:** 1769.64
- **Average Number of Transactions:** 2.77
- **Average Number of Products Purchased:** 2.70
- **Key Insights:**
    - Customers in this cluster are low spenders with fewer transactions and product purchases.
    - Focus on improving engagement with personalized marketing strategies or discounts could help increase spending in this group.

Cluster 3:

- **Total Spending:** 3680.59
- **Average Number of Transactions:** 5.20
- **Average Number of Products Purchased:** 5.14
- **Key Insights:**
    - This group has moderate spending, with more transactions than Cluster 1 but fewer than Cluster 0.

- Businesses can target this cluster with mid-tier promotions or product recommendations to increase sales.

3) DB Index Value:

- **DB Index:** 0.7636
    - The value indicates moderate clustering performance, with room for improvement in terms of clearer segmentation.

4) Customer Profile Insights:

- **Cluster Distribution by Region:**
    - **Cluster 1:** Predominantly South American customers, with the highest total spending.
    - **Cluster 2:** A mix of customers from Asia and other regions, with the lowest spending.
    - **Cluster 3:** A balanced mix of customers from South America and Asia, showing moderate engagement.

5) PCA Analysis (for Visual Representation):

- **Principal Components Analysis (PCA) was applied to reduce the dimensionality of the data.**
    - The PCA1 and PCA2 values represent the transformed features, allowing better visual representation of customer segmentation.
- **Cluster Distribution:** Visualizing the clusters using PCA can help further understand customer separation in the feature space.

6) Recommendations:

- **Targeting High-Spending Customers (Cluster 0):**
    - Design exclusive offers, loyalty programs, and premium products to cater to high-spending customers.

- **Engaging Low-Spending Customers (Cluster 1):**
    - Implement personalized marketing campaigns with attractive discounts to increase engagement and spending.
- **Mid-Tier Engagement (Cluster 2):**
    - Offer product bundles or promotional discounts to this group to encourage higher purchases.

7) Conclusion:

- The customer segmentation analysis using K-Means clustering provides valuable insights into customer behaviour and spending patterns.
- The moderate DBI value suggests the clustering can be further refined, but the current segmentation provides a solid foundation for marketing and sales strategies.