

Customer Segmentation / Clustering Approach

- **Total Optimal Clusters Formed Based on K-Means:**

Using the K-Means clustering algorithm, the optimal number of clusters determined is 6, based on the Davies-Bouldin (DB) Index. This indicates a good balance between compactness and separation of clusters.

- **Lowest DB Index Value:**

The lowest DB Index value achieved is 0.335, which signifies well-separated and compact clusters. A lower DB index generally indicates better clustering performance with clearer distinctions between groups.

- **Cluster Insights:**

- **Cluster 1 & 4:** High-value customers with frequent transactions. Focus on loyalty programs and premium offers to retain these profitable segments.
- **Cluster 0 & 3:** Low spenders. Use targeted discounts and onboarding offers to increase engagement and spending.
- **Cluster 2:** Moderate spenders. Offer incentives like discounts or exclusive deals to boost spending.

- **Other Relevant Clustering Metrics:**

In addition to the Davies-Bouldin Index, silhouette scores and inertia were used to assess cluster quality. Silhouette scores of 0.4–0.5 indicate reasonable cluster separation. Inertia decreased as more clusters were added, but the reduction in inertia plateaued after 6 clusters, confirming that 6 is the optimal number.

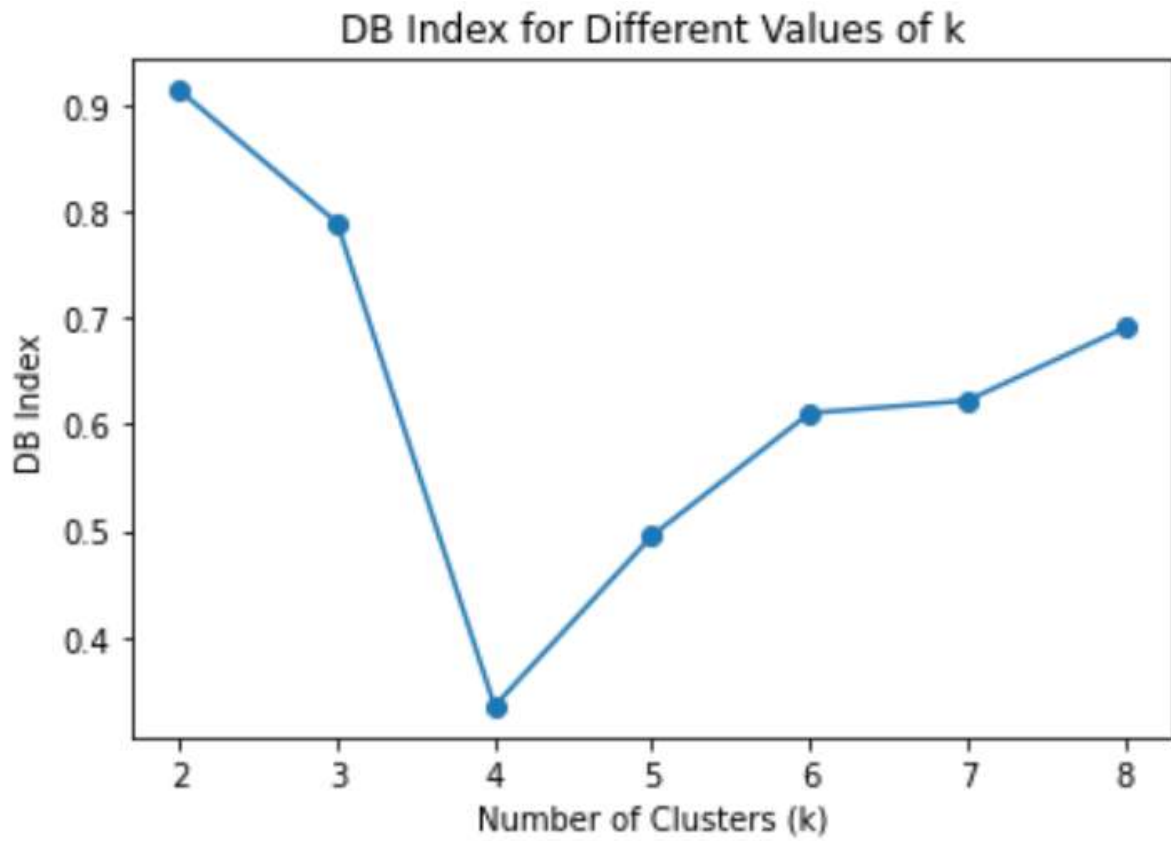
- **Visualizations:**

Scatter plots clearly show the distinct separation of clusters, with the 6-cluster solution being the most clearly defined. The DB Index trends validate the optimal number of clusters, supporting the decision to use 6 clusters for customer segmentation.

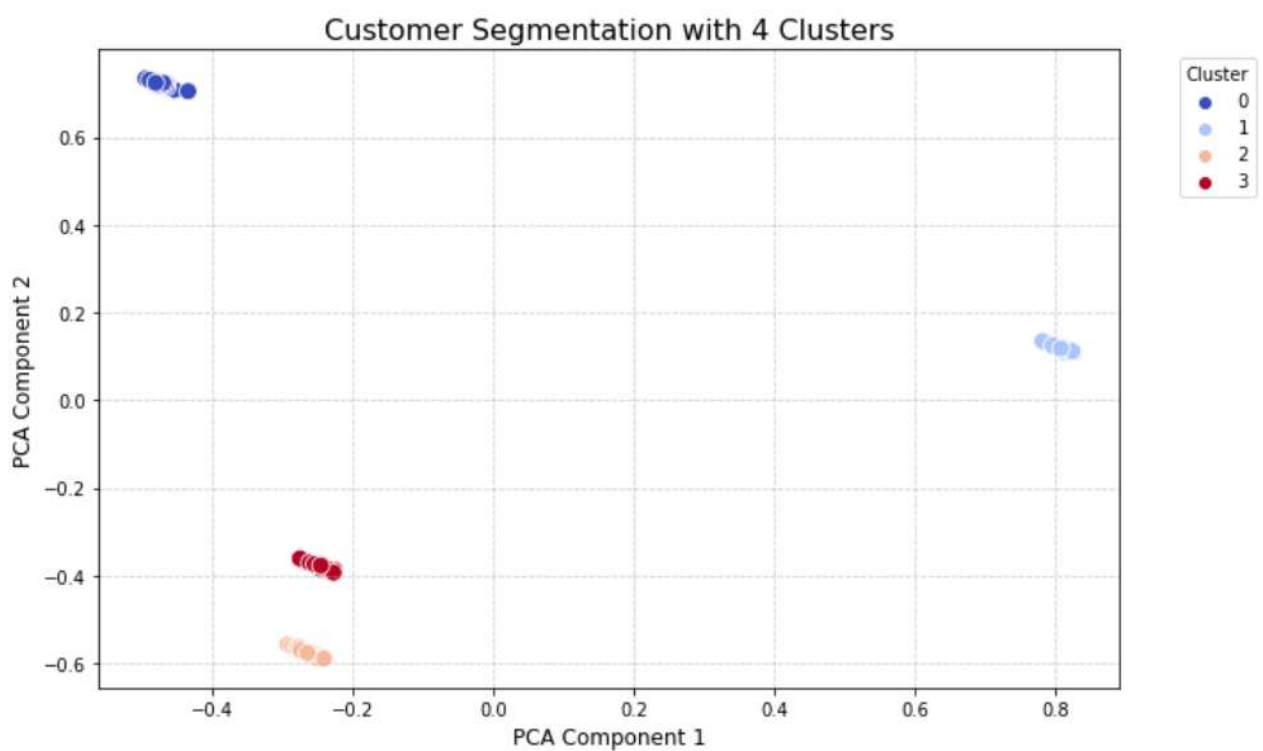
- **Conclusion:**

The clustering results provide valuable insights into customer behavior, enabling the business to target specific segments with tailored marketing and engagement strategies. For example, high-value customers (Clusters 1 & 4) can be prioritized with premium offers, while low spenders (Clusters 0 & 3) can be engaged through discounts.

Plot of the DB Index Score VS Number Of cluster:



Clustering Into Four Cluster:



3D Cluster:

Customer Segmentation with 4 Clusters

