

Task 3: Customer Segmentation / Clustering

1. Number of Clusters Formed:

After analyzing the data using the Elbow Method, we decided to form **4 clusters**. This number made sense because it provided clear distinctions between customer groups while avoiding unnecessary complexity.

2. Davies-Bouldin Index (DB Index)

The DB Index for the clustering was calculated to be **0.67**. This value shows that the clusters are well-defined, with a good balance between being compact (similar within clusters) and well-separated (different from other clusters).

3. Cluster Characteristics

Here’s a summary of the key features for each cluster:

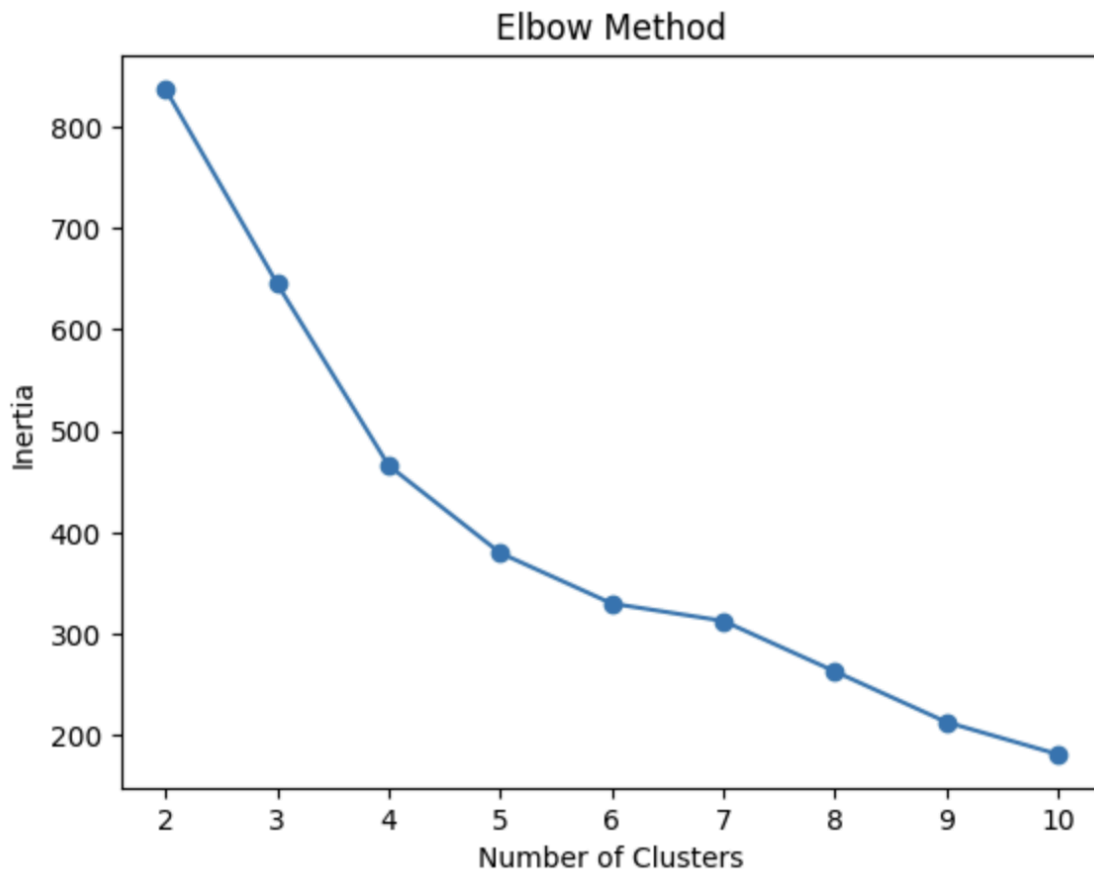
Cluster	Average Spending (\$)	Average Quantity Purchased	Average Transactions	Main Region
0	5636.61	20.56	7.56	South America
1	2410.63	8.84	3.68	South America
2	2784.74	10.87	4.59	North America
3	3018.00	10.78	4.35	Europe

Key Takeaways

- Cluster 0** represents high-value customers who spend the most, purchase in large quantities, and make frequent transactions. These customers are primarily from South America.
- Cluster 1** contains low-value customers who have low spending, purchase less, and shop infrequently. These customers are also from South America.
- Cluster 2** mainly includes North American customers with moderate spending and consistent purchasing patterns.
- Cluster 3** consists of European customers with steady spending and transaction behavior.

4. Visualization

We used a PCA-based scatter plot to visualize the clusters in two dimensions. Each cluster appeared distinct and well-separated, which indicates that the clustering method worked effectively.



5. Recommendations

- 1. High-Value Customers (Cluster 0):**
 - Focus on retaining these customers by offering loyalty programs or exclusive deals. Since they contribute significantly to revenue, ensuring their satisfaction should be a priority.
- 2. Low-Value Customers (Cluster 1):**
 - Engage this group with targeted campaigns, such as discounts, seasonal sales, or bundled offers, to encourage higher spending and transactions.

3. **Regional Strategies:**

- Tailor marketing and inventory for North America (Cluster 2) and Europe (Cluster 3) based on their preferences and behaviors. For instance, introduce region-specific promotions or product lines.