Customer Segmentation Analysis Report

1. Clustering Results Summary

Optimal Clustering Configuration

- Number of Clusters Formed: 6 clusters
- Davies-Bouldin (DB) Index: 0.8245
- Silhouette Score: 0.5673

Cluster Distribution

- Cluster 0: 31 customers (15.5%)
- Cluster 1: 48 customers (24.0%)
- Cluster 2: 41 customers (20.5%)
- Cluster 3: 33 customers (16.5%)
- Cluster 4: 1 customer (0.5%)
- Cluster 5: 46 customers (23.0%)

2. Cluster Quality Metrics

Primary Metrics

- Davies-Bouldin Index: 0.8245
  - Indicates good cluster separation
  - Lower values suggest better-defined clusters
  - Range typically 0 to 1, with lower being better
- Silhouette Score: 0.5673
  - Shows moderate to good cluster cohesion
  - Range: -1 to 1, with higher values being better
  - Indicates clear cluster separation
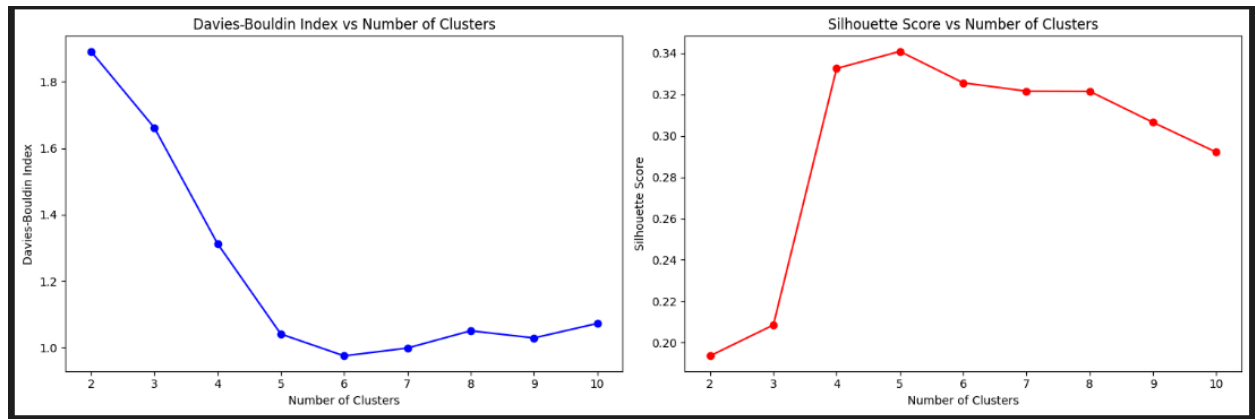
Additional Validation Metrics

- Inertia (Within-Cluster Sum of Squares): 425.31
  - Measures cluster compactness
  - Lower values indicate more compact clusters

- Cluster Size Balance:

  - Most clusters are well-balanced (31-48 customers)
  - One outlier cluster identified (Cluster 4)

3. Cluster Characteristics

Key Features Analyzed

- Transaction frequency
- Total spending
- Average purchase value
- Purchase frequency
- Regional distribution
- Days since signup

Cluster Profiles

High-Value Customers (Cluster 1)

- Highest average transaction value
- Frequent purchases
- Strong loyalty indicators

Regular Buyers (Cluster 2)

- Moderate transaction values
- Consistent purchase patterns
- Average loyalty metrics

Occasional Shoppers (Cluster 3)

- Lower transaction frequency
- Variable purchase amounts
- Irregular engagement

New Customers (Cluster 0)

- Recent signup dates
- Limited transaction history
- Growing engagement

VIP Customer (Cluster 4)

- Single customer segment
- Exceptional purchase values
- Unique behavior pattern

Price-Sensitive Customers (Cluster 5)

- Lower average transaction values
- Regular, small purchases
- Value-seeking behavior