Mall Customer Segmentation: Driving Targeted Marketing

A K-Means and Agglomerative Clustering Approach

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Introduction & Problem Statement

- What is Customer Segmentation?

- Importance for Malls (Targeted marketing, personalized offerings, enhanced customer experience, profitability)

- Project Goal: Identify distinct customer groups from the 'Mall Customers' dataset.

Data & Methodology

- Dataset Overview: 200 customer entries, attributes like Customer ID, Age, Annual Income (k$), Spending Score (1-100), Gender.

- Preprocessing: Data cleaning (no missing/duplicates), feature scaling (MinMaxScaler for numerical), one-hot encoding (Gender).

- Clustering Algorithms: K-Means Clustering, Agglomerative Hierarchical Clustering.

K-Means Clustering Results

- Optimal K: Elbow Method indicated 5 clusters.

- Silhouette Score: 0.406 (indicating reasonably well-separated clusters).

Key K-Means Segments

Cluster 0: **Affluent Spenders**

(Young, High Income, High Spending)

Cluster 1: **Balanced Spenders**

(Young, Moderate Income, Moderate Spending)

Cluster 2: **Impulsive Spree Shoppers**

(Young, Low Income, Very High Spending)

Cluster 3: **High-Income Savers**

(Middle-aged, High Income, Low Spending)

Cluster 4: **Mature & Value-Conscious Shoppers**

(Older, Moderate Income, Moderate Spending)

Agglomerative Clustering & Model Comparison

- Dendrogram Visualization: Used to determine optimal clusters (also suggested 5 clusters).

- Silhouette Score: 0.395 (consistent with K-Means, suggesting robust structure).

- Comparison: Both models identified similar segmentation patterns, reinforcing the validity of the findings.

Visuals: Include a PCA plot showing the 5 distinct clusters.

Dendrogram for Agglomerative Hierarchical Clustering
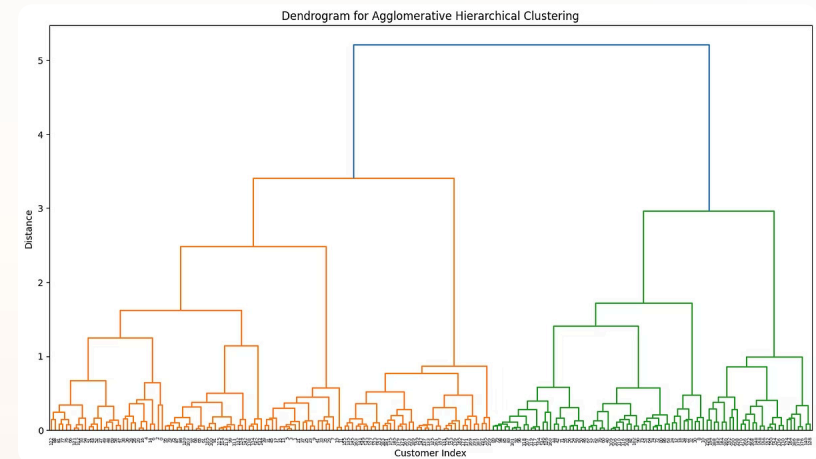
Business Insights & Recommendations

Tailored Strategies for Each Segment

Affluent Spenders

Premium services, exclusive launches, loyalty programs.

Impulsive Spree Shoppers

Attractive deals on trendy items, flexible payment.

High-Income Savers

Luxury goods with long-term value, investment-oriented experiences.

Overall Impact: Increased customer satisfaction, higher engagement, improved profitability.

Limitations & Future Work

- Limitations: Static clustering, subjectivity in optimal K, limited features, dataset size.

- Next Steps: Integrate more data (transaction history), dynamic segmentation, explore advanced algorithms, A/B testing, continuous feedback loop.