

# **Customer Segmentation Analysis**

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## **Executive Summary**

This analysis employed various clustering techniques to segment our customer base using data on age, annual income, and spending scores. Key findings include:

1. Identification of 5-6 distinct customer segments across different clustering methods.
2. Clear differentiation between high-spending young professionals and conservative older customers.
3. Discovery of niche segments such as high-income, low-spending individuals.
4. Presence of outliers or unique customer profiles that don't fit neatly into clusters.

These insights provide a foundation for targeted marketing strategies and personalized customer experiences.

## **Introduction**

Understanding customer segments is crucial for effective marketing and business strategy. This analysis aims to identify distinct groups within our customer base to tailor our approach and improve customer satisfaction and revenue.

### **Objectives:**

- Identify distinct customer segments based on demographic and behavioral data.
- Understand the characteristics of each segment.
- Provide actionable insights for marketing and business strategy.

## **Methodology**

Data was analyzed using three clustering algorithms:

1. K-means Clustering

2. Hierarchical Clustering
3. DBSCAN (Density-Based Spatial Clustering of Applications with Noise)

#### **Data Preparation:**

- Features used: Age, Annual Income, Spending Score
- Data normalization using StandardScaler

#### **Algorithm Application:**

- K-means: Optimal number of clusters determined using the elbow method
- Hierarchical: Dendrogram used to determine number of clusters
- DBSCAN: Epsilon parameter determined using k-distance graph

#### **Results Summary**

##### **K-means Clustering:**

- Identified 5 distinct clusters
- Clear separation between high-income, high-spending and low-income, low-spending groups

##### **Hierarchical Clustering:**

- Resulted in 4 main clusters
- Highlighted the relationship between age and spending habits

##### **DBSCAN:**

- Identified 6 clusters and a significant number of noise points
- Effectively separated high spenders from low spenders
- Revealed niche segments such as young, low-income, high-spenders

##### **Key Segments Identified:**

1. Young, affluent, high-spenders
2. Older, moderate income and spending
3. Young, low-income, high-spenders
4. Middle-aged, high-income, low-spenders

## **Conclusion**

The clustering analysis revealed distinct customer segments with unique characteristics. These insights can be leveraged to:

1. Tailor marketing strategies for each segment
2. Develop targeted product offerings
3. Improve customer experience through personalization
4. Allocate resources more effectively for customer acquisition and retention

Future work could include:

- Incorporating additional customer data for more nuanced segmentation
- Conducting time-series analysis to understand segment evolution