Customer Segmentation – Executive Insights Report

A Machine Learning–Driven Customer Profiling Analysis

Author: Sahro Haji

Date: December 2025

1. Overview

This report presents a customer segmentation analysis using the Mall Customers dataset. The goal is to identify distinct customer groups using K-Means clustering based on Annual Income and Spending Score. These insights support targeted marketing, customer experience improvements, and strategic business planning.

2. Methodology

• Performed exploratory data analysis
• Selected features: Annual Income (k$) and Spending Score (1–100)
• Scaled features using StandardScaler
• Applied the Elbow Method to determine optimal cluster count
• Trained K-Means clustering model (k = 5)

Elbow Method

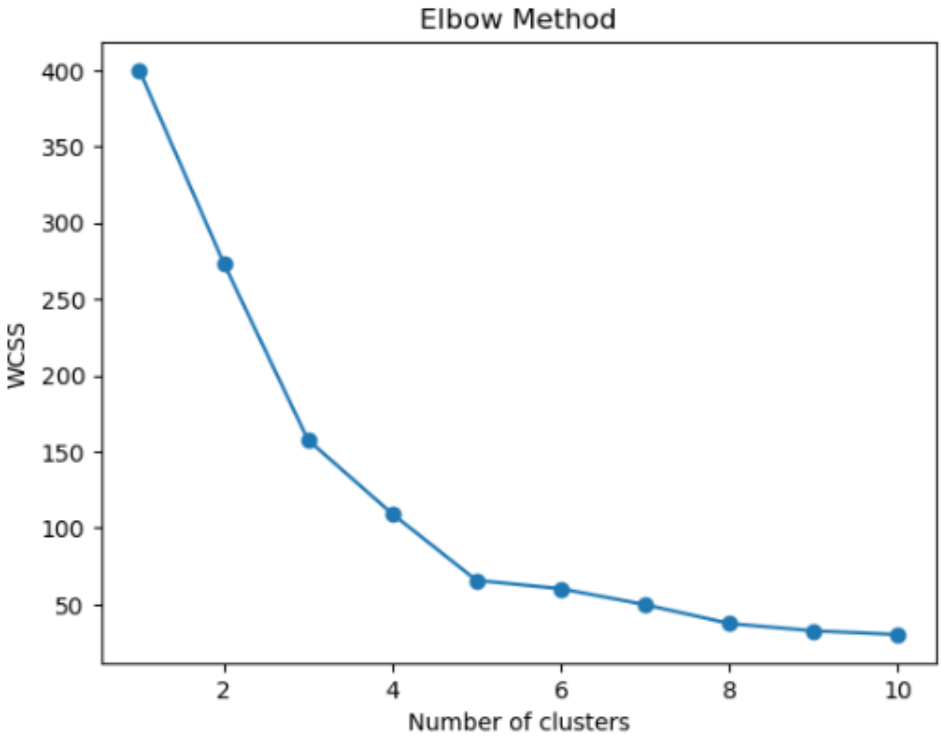

Figure 1. Elbow Method showing optimal cluster count at k = 5.

Customer Segmentation Visualization

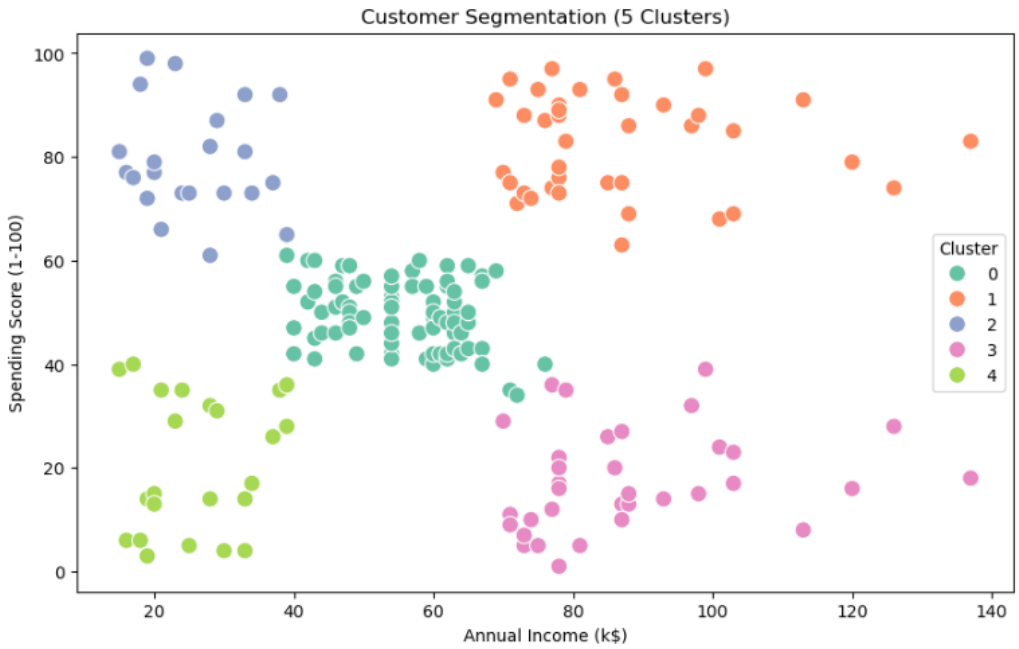

Figure 2. Customer segmentation results showing five distinct clusters.

3. Cluster Summary

Cluster	Annual Income (k$)	Spending Score (1-100)
0	55.296296	49.518519
1	86.538462	82.128205
2	25.727273	79.363636
3	88.200000	17.114286
4	26.304348	20.913043

Table 1. Average Annual Income and Spending Score for each cluster.

4. Key Findings

• Cluster 1 represents high-income, high-spending VIP customers.
• Cluster 3 includes high-income but low-spending customers—possible upsell opportunities.
• Cluster 0 contains balanced spenders with moderate income.

• Cluster 2 includes low-spending but moderate-income individuals—likely disengaged.
• Cluster 4 has low income and low spending—price-sensitive segment.

5. Business Insights & Recommendations

• VIP customers should receive premium loyalty programs and exclusive offers.
• Low-spending customers may respond well to personalized promotions.
• High-income, low-spending customers should be targeted with curated product bundles.
• Marketing strategies should differ based on spending behavior rather than income alone.

6. Next Steps

Future enhancements may include:
• Incorporating demographics such as age, gender, and tenure
• Building an interactive dashboard using Power BI or Tableau
• Applying advanced clustering methods such as DBSCAN or Gaussian Mixture Models