# Task-3: Customer Segmentation / Clustering:

- Perform customer segmentation using clustering techniques. Use both profile information (from Customers.csv) and transaction information (from Transactions.csv).
- You have the flexibility to choose any clustering algorithm and any number of clusters in between(2 and 10)
- Calculate clustering metrics, including the DB Index
- Visualise your clusters using relevant plots.

**Clustering methods used:**

1.K-Means clustering

2..GMM(gaussian mix models)

**Clustering methods used:**

- **Silhouette Score**
- **Davies-Bouldin Index**
- **Calinski-Harabasz Index (Variance Ratio Criterion)**

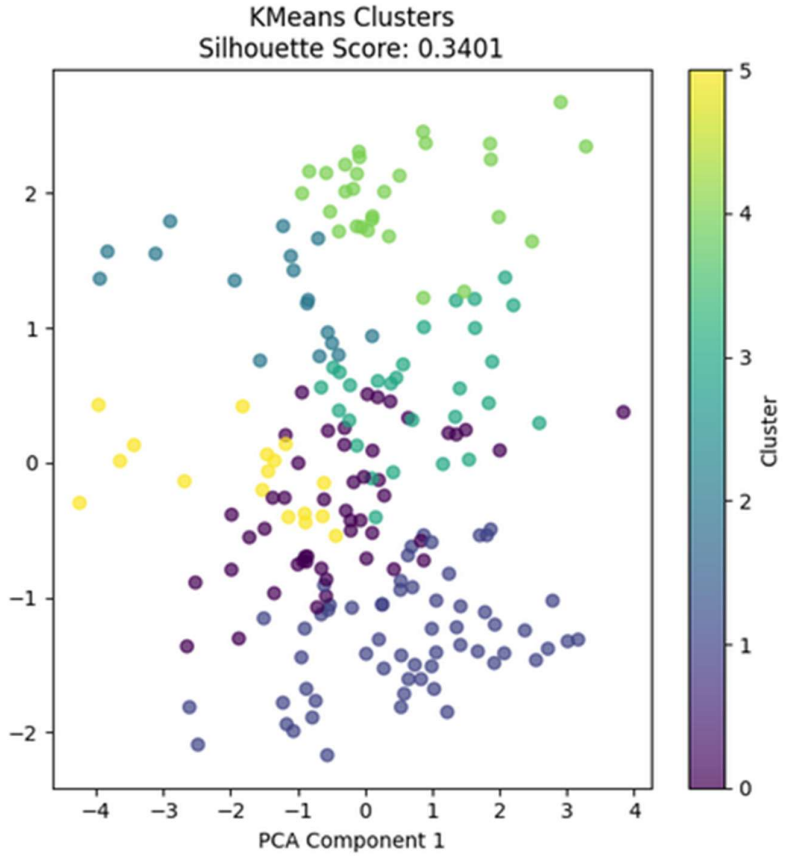
**1.K-means cluserting:**

**KMeans Metrics:**

Davies-Bouldin Index: 0.3476

Silhouette Score: 0.1401

Calinski-Harabasz Index: 55.5707




The image shows a visualization of KMeans clustering results, with data points grouped into clusters based on their similarity. The Silhouette Score of 0.3401 indicates moderate clustering quality. The x-axis represents PCA Component 1, a reduced dimension of the data, helping to visualize the clusters in a 2D space.

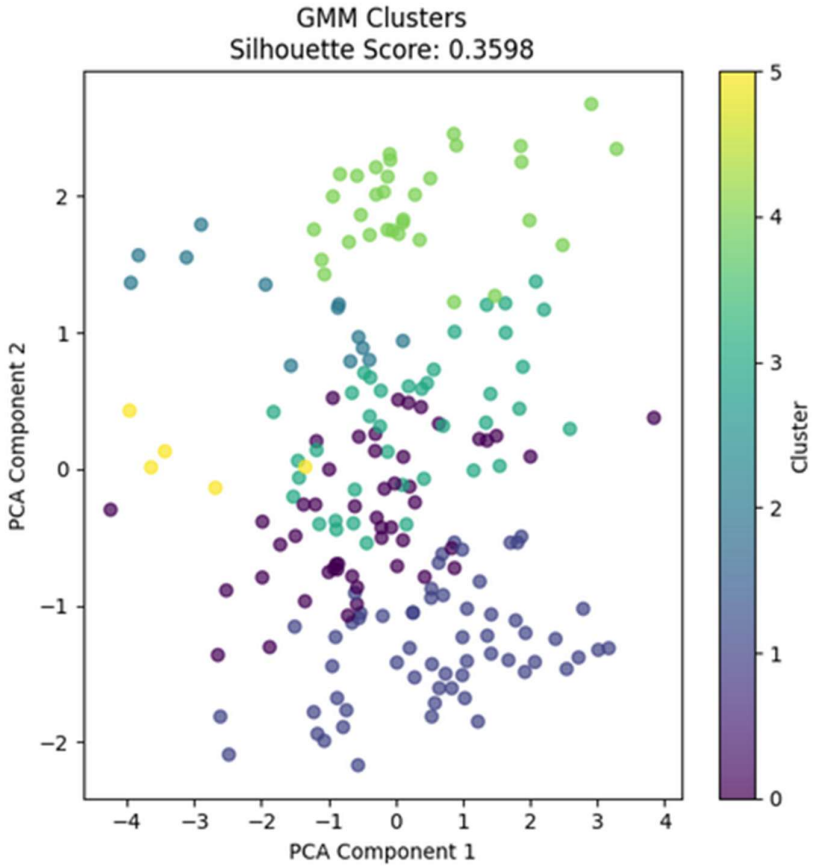
**2.Gaussian mix models:**

**GMM Metrics:**

Davies-Bouldin Index: 0.2433

Silhouette Score: 0.1598

Calinski-Harabasz Index: 53.8772




The image displays GMM clustering results, with data points grouped into clusters using Gaussian distributions. The Silhouette Score of 0.3598 suggests good clustering quality. The plot uses PCA Components 1 and 2 to visualize the clusters in 2D, with distinct groupings and a color-coded cluster legend.