Detailed Clustering Analysis Report

Introduction

This report summarizes the results of clustering analysis performed using three algorithms: KMeans, Gaussian Mixture Model (GMM), and DBSCAN. The analysis evaluates cluster quality using Davies-Bouldin Index and Silhouette Score metrics.

Clustering Results

Clustering Algorithm	DB Index	Silhouette Score
KMeans	1.0898	0.2655
GMM	1.1818	0.1978
DBSCAN	1.8180	-0.2583

Evaluation and Insights

The clustering performance was evaluated using the following metrics:

-Davies-Bouldin Index (DB Index): Measures the average similarity ratio between clusters. Lower values indicate better-defined clusters.
-Silhouette Score: Measures how similar data points are to their own cluster compared to other clusters. Higher scores indicate better-defined clusters.

From the results:
- KMeans performed best with the lowest DB Index (1.0898) and a moderate Silhouette Score (0.2655).
- GMM had a slightly higher DB Index (1.1818) and a lower Silhouette Score (0.1978).

- DBSCAN struggled with cluster separation, yielding the highest DB Index (1.8180) and a negative Silhouette Score (-0.2583).