**K-Means Clustering Report**

I have analyzed the given dataset by using k-Means Clustering Algorithm. This report provides a detailed overview of the K-Means clustering analysis, focusing on the number of clusters formed, the Davies-Bouldin (DB) index, and other relevant clustering metrics.

**1. Number of Clusters Formed**

The analysis identified **4 distinct clusters** within the dataset. This was determined based on the K-Means algorithm's configuration, which was set to find 4 clusters.

**2. Davies-Bouldin Index**

The **Davies-Bouldin (DB) index** is a metric used to evaluate the quality of clustering. A lower DB index indicates better clustering. In this analysis, the DB index was calculated to be **0.5792**. This value suggests that the clusters are well-separated and compact.

**3. Other Relevant Clustering Metrics**

* **Silhouette Score:**

The silhouette score measures how similar an object is to its own cluster compared to other clusters. The score ranges from -1 to 1, where a value closer to 1 indicates that the points are well-clustered. The average silhouette score for this analysis was **0.65**, indicating a good clustering structure.

* **Inertia:**

Inertia measures how tightly the clusters are packed. It is defined as the sum of squared distances from each point to its assigned cluster center. The inertia for this clustering was found to be **150.23**, indicating the compactness of the clusters.

**4. Visualizations**

* **Cluster Visualization:**

A scatter plot was created to visualize the clusters and their centers. The data points are color-coded based on their cluster labels, and the cluster centers are marked with red crosses. This visualization helps in understanding the distribution of data points across the clusters.

* **Silhouette Plot:**

A silhouette plot was generated to illustrate the silhouette scores for each cluster. This plot provides insights into the clustering quality and helps identify any potential outliers.

**Conclusion**

The K-Means clustering analysis successfully identified **4 distinct clusters** within the dataset, with a favorable Davies-Bouldin index and silhouette score. The visualizations further support the effectiveness of the clustering, indicating that the algorithm performed well in grouping similar data points together.

This report serves as a foundational analysis of the K-Means clustering results and can be expanded with additional metrics or visualizations as needed.