* **Data Preprocessing**:
  + The initial data is standardized to normalize feature values, followed by polynomial feature transformation to enhance feature interactions.
* **Dimensionality Reduction**:
  + PCA (Principal Component Analysis) reduces dimensionality, facilitating visualization and enhancing clustering efficiency.
* **Clustering Algorithms**:
  + **K-Means Clustering**: Different values of *k*(clusters) were tested using the elbow method, silhouette scores, Davies-Bouldin Index, and Calinski-Harabasz Score to determine the optimal number of clusters.
  + **Agglomerative Clustering**: Used for comparison with K-Means to understand clustering consistency and efficacy across different methods.
* **Optimal Cluster Count**:
  + Using K-Means clustering, an optimal number of clusters, k=6, was chosen based on a balance of the silhouette score, Davies-Bouldin Index, and Calinski-Harabasz Score:
    - **Silhouette Score**: 0.2171895893163682
    - **Davies-Bouldin Index**: 1.2492901113817467
    - **Calinski-Harabasz Score**: 1836.7370919310051
* **Visualization Insights**:
  + PCA-based scatter plots show the cluster separations visually, with some clusters appearing more distinct than others. This representation aids in observing the natural groupings and overlap among clusters.
* **K-Means Evaluation Metrics**:
  + **Silhouette Score**: Reflects how similar points in a cluster are compared to other clusters. The score of 0.2171895893163682 indicates moderate separation.
  + **Davies-Bouldin Index**: The score of 1.2492901113817467 suggests a relatively compact clustering with decent separation.
  + **Calinski-Harabasz Score**: Higher values imply better-defined clusters; 1836.7370919310051 supports the quality of the selected clusters.

1. **Agglomerative Clustering**:
   1. **Silhouette Score**: 0.3659198595506239, slightly better than K-Means, indicating similar cluster quality.
   2. **Davies-Bouldin Index**: 1.2071744221391711, marginally better than K-Means, showing slightly more compact clusters.
   3. **Calinski-Harabasz Score**: 1801.565301709295, similar to K-Means, suggesting a consistent cluster structure.

The comparison shows that both K-Means and Agglomerative Clustering achieve comparable clustering quality, with Agglomerative Clustering offering slightly more compact clusters based on these metrics.