The quality of the models trained using KMeans and Hierarchical clustering algorithms has been evaluated using the Adjusted Rand Index (ARI) and Silhouette Score. Here are the results:

* **KMeans Adjusted Rand Index**: 0.4655
* **KMeans Silhouette Score**: 0.1439
* **Hierarchical Adjusted Rand Index**: 0.6643
* **Hierarchical Silhouette Score**: 0.1253

**Interpretation:**

* **Adjusted Rand Index (ARI)**: This metric measures the similarity between the predicted clusters and the true labels, adjusted for chance. The ARI score ranges from -1 to 1, where a score closer to 1 indicates a good agreement between the clusters and the true labels. In this case, Hierarchical clustering (0.6643) performed better than KMeans (0.4655).
* **Silhouette Score**: This metric measures how similar an object is to its own cluster compared to other clusters. The Silhouette Score ranges from -1 to 1, where a higher value indicates better-defined clusters. In this case, KMeans (0.1439) performed slightly better than Hierarchical clustering (0.1253).

Overall, while KMeans has a slightly better silhouette score, Hierarchical clustering shows a significantly better ARI, indicating a better match with the true digit labels. If you have any further analysis or questions, feel free to ask! ​

o assign a label to each cluster, we can follow these steps:

1. For each cluster, find the majority label of the digits within that cluster.
2. Assign this majority label as the representative label for the cluster.