

Pass Task 7.1P: K-Means and Hierarchical Clustering

Task description:

In machine learning, clustering is used for analyzing and grouping data which does not include pre-labeled class or even a class attribute at all. K-Means clustering and hierarchical clustering are all unsupervised learning algorithms.

K-means is a collection of objects which are “similar” between them and are “dissimilar” to the objects belonging to other clusters. It is a division of objects into clusters such that each object is in exactly one cluster, not several.

In Hierarchical clustering, clusters have a tree like structure or a parent child relationship. Here, the two most similar clusters are combined together and continue to combine until all objects are in the same cluster.

In this task, you use K-Means and Agglomerative Hierarchical algorithms to cluster a given dataset and compare their difference.

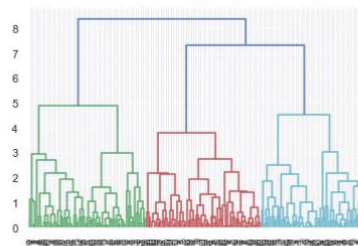
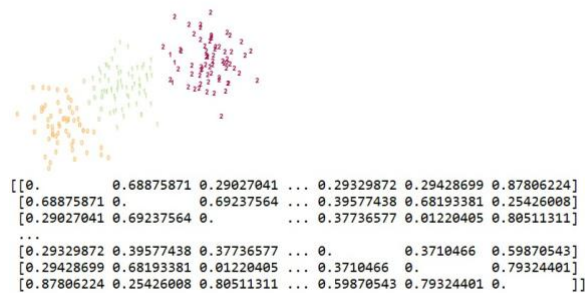
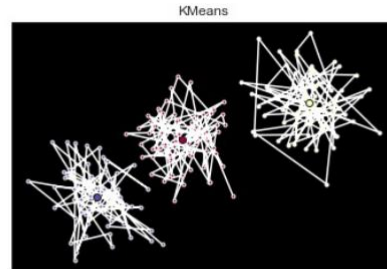
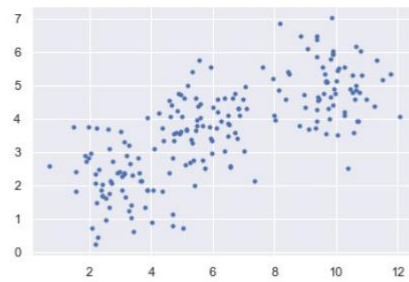
You are given:

- `np.random.seed(0)`
- `make_blobs` class with input:
 - `n_samples: 200`
 - `centers: [3,2], [6, 4], [10, 5]`
 - `cluster_std: 0.9`
- `KMeans()` function with setting: `init = "k-means++", n_clusters = 3, n_init = 12`
- `AgglomerativeClustering()` function with setting: `n_clusters = 3, linkage = 'average'`
- Other settings of your choice

You are asked to:

- plot your created dataset
- plot the two clustering models for your created dataset
- set the K-Mean plot with title “KMeans”
- set the Agglomerative Hierarchical plot with “Agglomerative Hierarchical”
- calculate distance matrix for Agglomerative Clustering using the input feature matrix (`linkage = complete`)
- display dendrogram

Sample output as shown in the following figure is **for demonstration purposes only**. Yours might be different from the provided.



Submission:

Submit the following files:

1. Your program source code (e.g. task7_1.ipynb)
2. A screen shot of your program running

Check the following things before submitting:

1. Add proper comments to your code