Artificial Intelligence and Machine Learning

LAB 6

Name: PUNEETH L

USN: 1BM24MC069

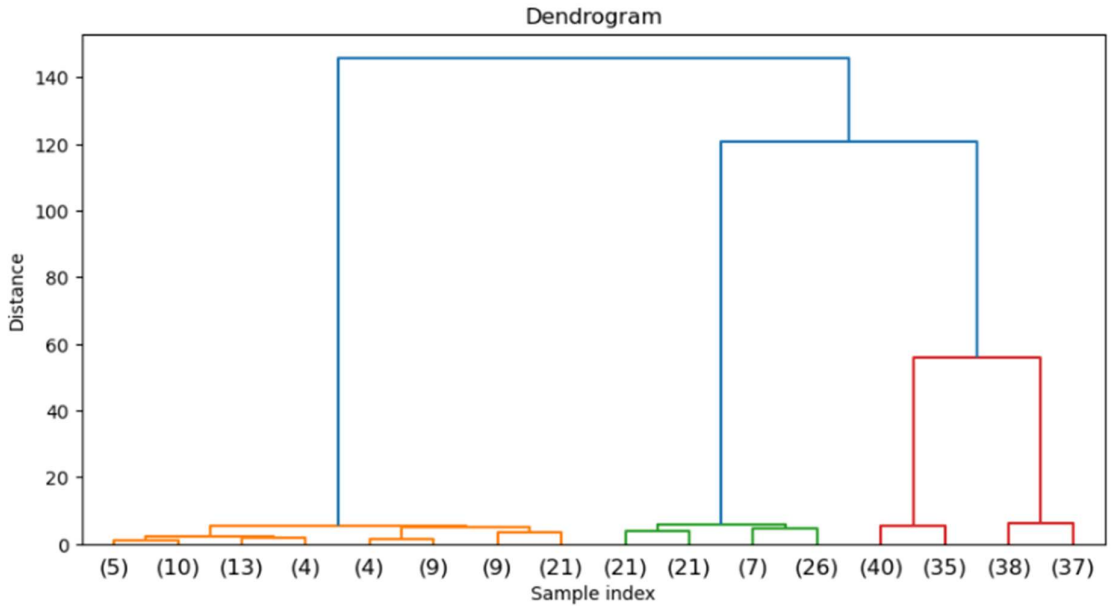
6. For a dataset implement Agglomerative clustering algorithm and visualize the clusters.

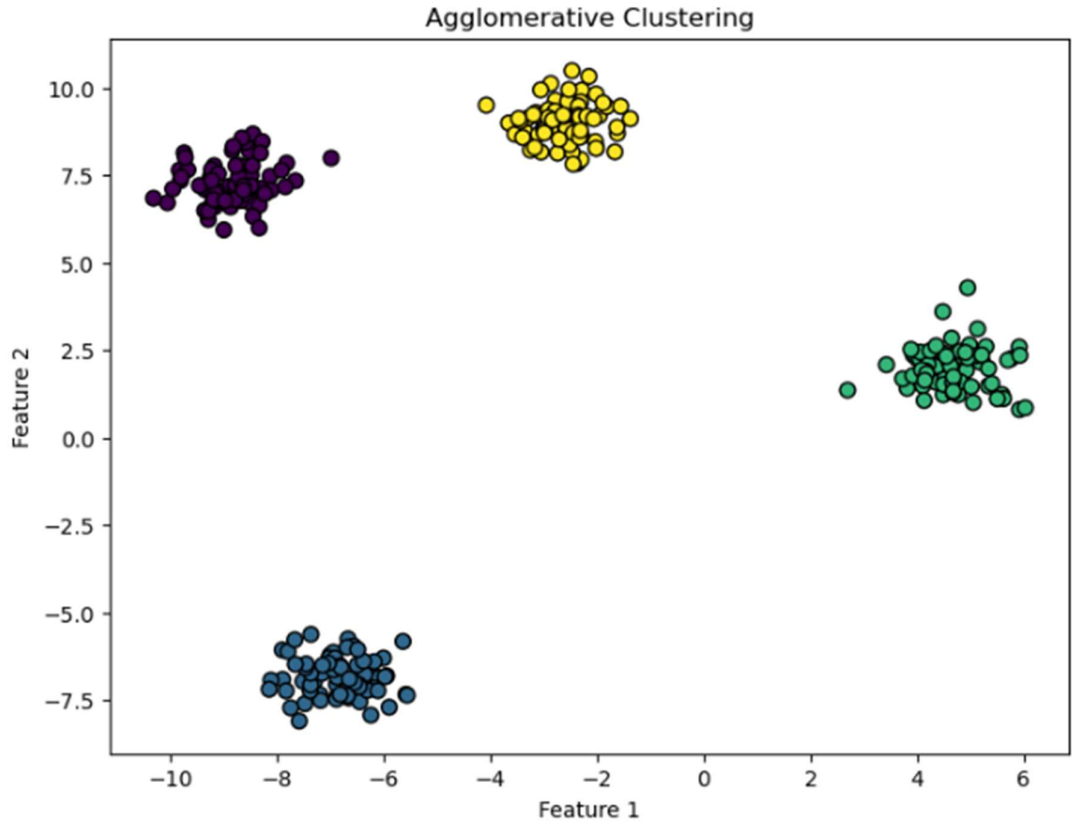
Program:

Agglomerative clustering

```
import numpy as np
import matplotlib.pyplot as plt
from sklearn.datasets import make_blobs
from sklearn.cluster import AgglomerativeClustering
from scipy.cluster.hierarchy import dendrogram, linkage

X, y_true = make_blobs(n_samples=300, centers=4, cluster_std=0.60, random_state=42)

agg_cluster = AgglomerativeClustering(n_clusters=4, metric='euclidean', linkage='ward')
labels = agg_cluster.fit_predict(X)

linked = linkage(X, method='ward')

plt.figure(figsize=(10, 5))
dendrogram(linked, truncate_mode='level', p=3)
plt.title('Dendrogram')
plt.xlabel('Sample index')
plt.ylabel('Distance')
plt.show()

plt.figure(figsize=(8, 6))
plt.scatter(X[:, 0], X[:, 1], c=labels, cmap='viridis', marker='o', edgecolor='k', s=50)
plt.title('Agglomerative Clustering')
plt.xlabel('Feature 1')
plt.ylabel('Feature 2')
plt.show()
```

Output:


Dendrogram
Distance
140
120
100
80
60
40
20
0
(5) (10) (13) (4) (4) (9) (9) (21) (21) (21) (7) (26) (40) (35) (38) (37)
Sample index


Agglomerative Clustering
Feature 2
10.0
7.5
5.0
2.5
0.0
−2.5
−5.0
−7.5
−10
−8
−6
−4
−2
0
2
4
6
Feature 1