Assignment_Soft_Computing

September 28, 2023

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0.0.2   232IT018

0.0.3   KMeans Algorithm

```python
[7]: import math
     import numpy as np
     from sklearn import datasets

     # Function to calculate the Euclidean distance between two points
     def euclidean_distance(point1, point2):
         distance = 0
         for i in range(len(point1)):
             distance += (point1[i] - point2[i])**2
         return math.sqrt(distance)

     # Implement K-Means
     def k_means(data, k):
         # Initialize the centroids
         centroids = []
         for i in range(k):
             centroids.append(data[i])

         # Iterate until the centroids no longer change
         while True:
             # Assign each data point to the cluster with the closest centroid
             clusters = [[] for i in range(k)]
             for point in data:
                 closest_centroid = None
                 closest_distance = float("inf")
                 for i, centroid in enumerate(centroids):
                     distance = euclidean_distance(point, centroid)
                     if distance < closest_distance:
                         closest_centroid = i
                         closest_distance = distance
                 clusters[closest_centroid].append(point)

             # Update the centroids
```

```
        new_centroids = []
        for i in range(k):
            new_centroids.append(np.mean(clusters[i], axis=0))

            # Check if the centroids have changed
            if np.array_equal(centroids, new_centroids):
                break

        centroids = new_centroids

    # Print centroid and the clusters associated with that centroid
    for i, centroid in enumerate(centroids):
        print(f"Centroid {i+1}: {centroid}")
        for point in clusters[i]:
            print(point)

print("---Iris Dataset---")
points = iris.data
print("No.of Clusters: 2")
k_means(points, 2)
print("No.of Clusters: 4")
k_means(points, 4)
print()
print("---Custom Dataset---")
points = np.array([[2,10], [2,6], [11,11], [6,9], [6,4], [1,2], [5,10], [4,9],␣
    ↪[10,12], [7,5], [9,11], [4,6], [3,10], [3,8], [6,11]])
print("No.of Clusters: 2")
k_means(points, 2)
print("No.of Clusters: 4")
k_means(points, 4)
```

```
---Iris Dataset---
No.of Clusters: 2
Centroid 1: [6.30103093 2.88659794 4.95876289 1.69587629]
[7.  3.2 4.7 1.4]
[6.4 3.2 4.5 1.5]
[6.9 3.1 4.9 1.5]
[5.5 2.3 4.  1.3]
[6.5 2.8 4.6 1.5]
[5.7 2.8 4.5 1.3]
[6.3 3.3 4.7 1.6]
[6.6 2.9 4.6 1.3]
[5.2 2.7 3.9 1.4]
[5.  2.  3.5 1. ]
[5.9 3.  4.2 1.5]
[6.  2.2 4.  1. ]
[6.1 2.9 4.7 1.4]
[5.6 2.9 3.6 1.3]
```

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[6.7 3.1 4.4 1.4]
[5.6 3.  4.5 1.5]
[5.8 2.7 4.1 1. ]
[6.2 2.2 4.5 1.5]
[5.6 2.5 3.9 1.1]
[5.9 3.2 4.8 1.8]
[6.1 2.8 4.  1.3]
[6.3 2.5 4.9 1.5]
[6.1 2.8 4.7 1.2]
[6.4 2.9 4.3 1.3]
[6.6 3.  4.4 1.4]
[6.8 2.8 4.8 1.4]
[6.7 3.  5.  1.7]
[6.  2.9 4.5 1.5]
[5.7 2.6 3.5 1. ]
[5.5 2.4 3.8 1.1]
[5.5 2.4 3.7 1. ]
[5.8 2.7 3.9 1.2]
[6.  2.7 5.1 1.6]
[5.4 3.  4.5 1.5]
[6.  3.4 4.5 1.6]
[6.7 3.1 4.7 1.5]
[6.3 2.3 4.4 1.3]
[5.6 3.  4.1 1.3]
[5.5 2.5 4.  1.3]
[5.5 2.6 4.4 1.2]
[6.1 3.  4.6 1.4]
[5.8 2.6 4.  1.2]
[5.6 2.7 4.2 1.3]
[5.7 3.  4.2 1.2]
[5.7 2.9 4.2 1.3]
[6.2 2.9 4.3 1.3]
[5.7 2.8 4.1 1.3]
[6.3 3.3 6.  2.5]
[5.8 2.7 5.1 1.9]
[7.1 3.  5.9 2.1]
[6.3 2.9 5.6 1.8]
[6.5 3.  5.8 2.2]
[7.6 3.  6.6 2.1]
[4.9 2.5 4.5 1.7]
[7.3 2.9 6.3 1.8]
[6.7 2.5 5.8 1.8]
[7.2 3.6 6.1 2.5]
[6.5 3.2 5.1 2. ]
[6.4 2.7 5.3 1.9]
[6.8 3.  5.5 2.1]
[5.7 2.5 5.  2. ]
[5.8 2.8 5.1 2.4]
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[6.4 3.2 5.3 2.3]
[6.5 3.  5.5 1.8]
[7.7 3.8 6.7 2.2]
[7.7 2.6 6.9 2.3]
[6.  2.2 5.  1.5]
[6.9 3.2 5.7 2.3]
[5.6 2.8 4.9 2. ]
[7.7 2.8 6.7 2. ]
[6.3 2.7 4.9 1.8]
[6.7 3.3 5.7 2.1]
[7.2 3.2 6.  1.8]
[6.2 2.8 4.8 1.8]
[6.1 3.  4.9 1.8]
[6.4 2.8 5.6 2.1]
[7.2 3.  5.8 1.6]
[7.4 2.8 6.1 1.9]
[7.9 3.8 6.4 2. ]
[6.4 2.8 5.6 2.2]
[6.3 2.8 5.1 1.5]
[6.1 2.6 5.6 1.4]
[7.7 3.  6.1 2.3]
[6.3 3.4 5.6 2.4]
[6.4 3.1 5.5 1.8]
[6.  3.  4.8 1.8]
[6.9 3.1 5.4 2.1]
[6.7 3.1 5.6 2.4]
[6.9 3.1 5.1 2.3]
[5.8 2.7 5.1 1.9]
[6.8 3.2 5.9 2.3]
[6.7 3.3 5.7 2.5]
[6.7 3.  5.2 2.3]
[6.3 2.5 5.  1.9]
[6.5 3.  5.2 2. ]
[6.2 3.4 5.4 2.3]
[5.9 3.  5.1 1.8]
Centroid 2: [5.00566038 3.36981132 1.56037736 0.29056604]
[5.1 3.5 1.4 0.2]
[4.9 3.  1.4 0.2]
[4.7 3.2 1.3 0.2]
[4.6 3.1 1.5 0.2]
[5.  3.6 1.4 0.2]
[5.4 3.9 1.7 0.4]
[4.6 3.4 1.4 0.3]
[5.  3.4 1.5 0.2]
[4.4 2.9 1.4 0.2]
[4.9 3.1 1.5 0.1]
[5.4 3.7 1.5 0.2]
[4.8 3.4 1.6 0.2]
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[4.8 3.  1.4 0.1]
[4.3 3.  1.1 0.1]
[5.8 4.  1.2 0.2]
[5.7 4.4 1.5 0.4]
[5.4 3.9 1.3 0.4]
[5.1 3.5 1.4 0.3]
[5.7 3.8 1.7 0.3]
[5.1 3.8 1.5 0.3]
[5.4 3.4 1.7 0.2]
[5.1 3.7 1.5 0.4]
[4.6 3.6 1.  0.2]
[5.1 3.3 1.7 0.5]
[4.8 3.4 1.9 0.2]
[5.  3.  1.6 0.2]
[5.  3.4 1.6 0.4]
[5.2 3.5 1.5 0.2]
[5.2 3.4 1.4 0.2]
[4.7 3.2 1.6 0.2]
[4.8 3.1 1.6 0.2]
[5.4 3.4 1.5 0.4]
[5.2 4.1 1.5 0.1]
[5.5 4.2 1.4 0.2]
[4.9 3.1 1.5 0.2]
[5.  3.2 1.2 0.2]
[5.5 3.5 1.3 0.2]
[4.9 3.6 1.4 0.1]
[4.4 3.  1.3 0.2]
[5.1 3.4 1.5 0.2]
[5.  3.5 1.3 0.3]
[4.5 2.3 1.3 0.3]
[4.4 3.2 1.3 0.2]
[5.  3.5 1.6 0.6]
[5.1 3.8 1.9 0.4]
[4.8 3.  1.4 0.3]
[5.1 3.8 1.6 0.2]
[4.6 3.2 1.4 0.2]
[5.3 3.7 1.5 0.2]
[5.  3.3 1.4 0.2]
[4.9 2.4 3.3 1. ]
[5.  2.3 3.3 1. ]
[5.1 2.5 3.  1.1]
No.of Clusters: 4
Centroid 1: [6.9125    3.1       5.846875 2.13125 ]
[6.3 3.3 6.  2.5]
[7.1 3.  5.9 2.1]
[6.3 2.9 5.6 1.8]
[6.5 3.  5.8 2.2]
[7.6 3.  6.6 2.1]
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[7.3 2.9 6.3 1.8]
[6.7 2.5 5.8 1.8]
[7.2 3.6 6.1 2.5]
[6.8 3.  5.5 2.1]
[6.4 3.2 5.3 2.3]
[6.5 3.  5.5 1.8]
[7.7 3.8 6.7 2.2]
[7.7 2.6 6.9 2.3]
[6.9 3.2 5.7 2.3]
[7.7 2.8 6.7 2. ]
[6.7 3.3 5.7 2.1]
[7.2 3.2 6.  1.8]
[6.4 2.8 5.6 2.1]
[7.2 3.  5.8 1.6]
[7.4 2.8 6.1 1.9]
[7.9 3.8 6.4 2. ]
[6.4 2.8 5.6 2.2]
[7.7 3.  6.1 2.3]
[6.3 3.4 5.6 2.4]
[6.4 3.1 5.5 1.8]
[6.9 3.1 5.4 2.1]
[6.7 3.1 5.6 2.4]
[6.9 3.1 5.1 2.3]
[6.8 3.2 5.9 2.3]
[6.7 3.3 5.7 2.5]
[6.7 3.  5.2 2.3]
[6.2 3.4 5.4 2.3]
Centroid 2: [6.23658537 2.85853659 4.80731707 1.62195122]
[7.  3.2 4.7 1.4]
[6.4 3.2 4.5 1.5]
[6.9 3.1 4.9 1.5]
[6.5 2.8 4.6 1.5]
[6.3 3.3 4.7 1.6]
[6.6 2.9 4.6 1.3]
[6.1 2.9 4.7 1.4]
[6.7 3.1 4.4 1.4]
[5.6 3.  4.5 1.5]
[6.2 2.2 4.5 1.5]
[5.9 3.2 4.8 1.8]
[6.3 2.5 4.9 1.5]
[6.1 2.8 4.7 1.2]
[6.4 2.9 4.3 1.3]
[6.6 3.  4.4 1.4]
[6.8 2.8 4.8 1.4]
[6.7 3.  5.  1.7]
[6.  2.9 4.5 1.5]
[6.  2.7 5.1 1.6]
[6.  3.4 4.5 1.6]
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[6.7 3.1 4.7 1.5]
[6.3 2.3 4.4 1.3]
[6.1 3.  4.6 1.4]
[6.2 2.9 4.3 1.3]
[5.8 2.7 5.1 1.9]
[6.5 3.2 5.1 2. ]
[6.4 2.7 5.3 1.9]
[5.7 2.5 5.  2. ]
[5.8 2.8 5.1 2.4]
[6.  2.2 5.  1.5]
[5.6 2.8 4.9 2. ]
[6.3 2.7 4.9 1.8]
[6.2 2.8 4.8 1.8]
[6.1 3.  4.9 1.8]
[6.3 2.8 5.1 1.5]
[6.1 2.6 5.6 1.4]
[6.  3.  4.8 1.8]
[5.8 2.7 5.1 1.9]
[6.3 2.5 5.  1.9]
[6.5 3.  5.2 2. ]
[5.9 3.  5.1 1.8]
Centroid 3: [5.006 3.428 1.462 0.246]
[5.1 3.5 1.4 0.2]
[4.9 3.  1.4 0.2]
[4.7 3.2 1.3 0.2]
[4.6 3.1 1.5 0.2]
[5.  3.6 1.4 0.2]
[5.4 3.9 1.7 0.4]
[4.6 3.4 1.4 0.3]
[5.  3.4 1.5 0.2]
[4.4 2.9 1.4 0.2]
[4.9 3.1 1.5 0.1]
[5.4 3.7 1.5 0.2]
[4.8 3.4 1.6 0.2]
[4.8 3.  1.4 0.1]
[4.3 3.  1.1 0.1]
[5.8 4.  1.2 0.2]
[5.7 4.4 1.5 0.4]
[5.4 3.9 1.3 0.4]
[5.1 3.5 1.4 0.3]
[5.7 3.8 1.7 0.3]
[5.1 3.8 1.5 0.3]
[5.4 3.4 1.7 0.2]
[5.1 3.7 1.5 0.4]
[4.6 3.6 1.  0.2]
[5.1 3.3 1.7 0.5]
[4.8 3.4 1.9 0.2]
[5.  3.  1.6 0.2]
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[5.  3.4 1.6 0.4]
[5.2 3.5 1.5 0.2]
[5.2 3.4 1.4 0.2]
[4.7 3.2 1.6 0.2]
[4.8 3.1 1.6 0.2]
[5.4 3.4 1.5 0.4]
[5.2 4.1 1.5 0.1]
[5.5 4.2 1.4 0.2]
[4.9 3.1 1.5 0.2]
[5.  3.2 1.2 0.2]
[5.5 3.5 1.3 0.2]
[4.9 3.6 1.4 0.1]
[4.4 3.  1.3 0.2]
[5.1 3.4 1.5 0.2]
[5.  3.5 1.3 0.3]
[4.5 2.3 1.3 0.3]
[4.4 3.2 1.3 0.2]
[5.  3.5 1.6 0.6]
[5.1 3.8 1.9 0.4]
[4.8 3.  1.4 0.3]
[5.1 3.8 1.6 0.2]
[4.6 3.2 1.4 0.2]
[5.3 3.7 1.5 0.2]
[5.  3.3 1.4 0.2]
Centroid 4: [5.52962963 2.62222222 3.94074074 1.21851852]
[5.5 2.3 4.  1.3]
[5.7 2.8 4.5 1.3]
[4.9 2.4 3.3 1. ]
[5.2 2.7 3.9 1.4]
[5.  2.  3.5 1. ]
[5.9 3.  4.2 1.5]
[6.  2.2 4.  1. ]
[5.6 2.9 3.6 1.3]
[5.8 2.7 4.1 1. ]
[5.6 2.5 3.9 1.1]
[6.1 2.8 4.  1.3]
[5.7 2.6 3.5 1. ]
[5.5 2.4 3.8 1.1]
[5.5 2.4 3.7 1. ]
[5.8 2.7 3.9 1.2]
[5.4 3.  4.5 1.5]
[5.6 3.  4.1 1.3]
[5.5 2.5 4.  1.3]
[5.5 2.6 4.4 1.2]
[5.8 2.6 4.  1.2]
[5.  2.3 3.3 1. ]
[5.6 2.7 4.2 1.3]
[5.7 3.  4.2 1.2]
```

```
[5.7 2.9 4.2 1.3]
[5.1 2.5 3.  1.1]
[5.7 2.8 4.1 1.3]
[4.9 2.5 4.5 1.7]

---Custom Dataset---
No.of Clusters: 2
Centroid 1: [ 6.22222222 10.33333333]
[ 2 10]
[11 11]
[6 9]
[ 5 10]
[4 9]
[10 12]
[ 9 11]
[ 3 10]
[ 6 11]
Centroid 2: [3.83333333 5.16666667]
[2 6]
[6 4]
[1 2]
[7 5]
[4 6]
[3 8]
No.of Clusters: 4
Centroid 1: [3.   9.25]
[ 2 10]
[4 9]
[ 3 10]
[3 8]
Centroid 2: [4.  4.6]
[2 6]
[6 4]
[1 2]
[7 5]
[4 6]
Centroid 3: [10.          11.33333333]
[11 11]
[10 12]
[ 9 11]
Centroid 4: [ 5.66666667 10.         ]
[6 9]
[ 5 10]
[ 6 11]
```

[ ]:

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```python
[2]: import numpy as np
     import pandas as pd
     import random
     from sklearn import datasets

     # Load the Iris dataset
     iris = datasets.load_iris()
     data = iris.data

     def initialize_membership_matrix(n_samples, n_clusters):
         membership_matrix = np.random.rand(n_samples, n_clusters)
         membership_matrix /= np.sum(membership_matrix, axis=1)[:, np.newaxis]
         return membership_matrix


     def calculate_cluster_centroids(data, membership_matrix):
         n_clusters = membership_matrix.shape[1]
         centroids = np.zeros((n_clusters, data.shape[1]))
         for j in range(n_clusters):
             # Handle the case where a cluster has no assigned data points
             if np.sum(membership_matrix[:, j]) > 0:
                 centroids[j] = np.sum(
                     (membership_matrix[:, j] ** 2)[:, np.newaxis] * data, axis=0
                 ) / np.sum(membership_matrix[:, j] ** 2)
         return centroids


     def update_membership_matrix(data, centroids, m):
         n_samples, n_clusters = data.shape[0], centroids.shape[0]
         membership_matrix = np.zeros((n_samples, n_clusters))

         for i in range(n_samples):
             for j in range(n_clusters):
                 numerator = np.linalg.norm(data[i] - centroids[j]) ** 2
                 denominator = sum(
                     (np.linalg.norm(data[i] - centroids[k]) ** 2) for k in
     ↪range(n_clusters)
```

```python
            )
            if denominator == 0:
                # Handle the case where denominator is zero (avoid division by
 zero)
                membership_matrix[i, j] = 1.0
            else:
                membership_matrix[i, j] = 1.0 / (
                    (numerator / denominator) ** (1.0 / (m - 1))
                )
    membership_matrix /= np.sum(membership_matrix, axis=1)[:, np.newaxis]
    return membership_matrix


def fuzzy_c_means(data, n_clusters, m, max_iterations=100, tolerance=1e-4):
    n_samples = data.shape[0]
    membership_matrix = initialize_membership_matrix(n_samples, n_clusters)

    for iteration in range(max_iterations):
        centroids = calculate_cluster_centroids(data, membership_matrix)
        new_membership_matrix = update_membership_matrix(data, centroids, m)

        # Check for convergence
        if np.max(np.abs(new_membership_matrix - membership_matrix)) <
 tolerance:
            break

        membership_matrix = new_membership_matrix

    # Display cluster centroids and membership values for each data point
    for j in range(n_clusters):
        print(f"Cluster {j + 1} - Centroid: {centroids[j]}")
        cluster_membership = membership_matrix[:, j]
        for i in range(n_samples):
            print(
                f"Point A{i + 1}: {data[i]} Membership Value =
 {cluster_membership[i]:.4f}"
            )


if __name__ == "__main__":
    np.random.seed(0)  # For reproducibility
    n_clusters = 3
    m = 2
    print("---IRIS Dataset---")
    print("FOR CLUSTER VALUE 3")
    fuzzy_c_means(data, n_clusters, m)
    n_clusters = 5
```

```python
    print("FOR CLUSTER VALUE 5")
    fuzzy_c_means(data, n_clusters, m)
    print()
    m = 2
    data = np.array(
        [
            [2, 10],
            [2, 6],
            [11, 11],
            [6, 9],
            [6, 4],
            [1, 2],
            [5, 10],
            [4, 9],
            [10, 12],
            [7, 5],
            [9, 11],
            [4, 6],
            [3, 10],
            [3, 8],
            [6, 11],
        ],
        dtype=float,
    )
    print("---Custom Dataset---")
    print("FOR CLUSTER VALUE 3")
    fuzzy_c_means(data, 3, m)
    print("FOR CLUSTER VALUE 5")
    fuzzy_c_means(data, 5, m)
```

```
---IRIS Dataset---
FOR CLUSTER VALUE 3
Cluster 1 - Centroid: [5.00396577 3.41409281 1.48280909 0.25354343]
Point A1: [5.1 3.5 1.4 0.2] Membership Value = 0.9966
Point A2: [4.9 3.  1.4 0.2] Membership Value = 0.9758
Point A3: [4.7 3.2 1.3 0.2] Membership Value = 0.9798
Point A4: [4.6 3.1 1.5 0.2] Membership Value = 0.9674
Point A5: [5.  3.6 1.4 0.2] Membership Value = 0.9945
Point A6: [5.4 3.9 1.7 0.4] Membership Value = 0.9346
Point A7: [4.6 3.4 1.4 0.3] Membership Value = 0.9795
Point A8: [5.  3.4 1.5 0.2] Membership Value = 0.9995
Point A9: [4.4 2.9 1.4 0.2] Membership Value = 0.9304
Point A10: [4.9 3.1 1.5 0.1] Membership Value = 0.9827
Point A11: [5.4 3.7 1.5 0.2] Membership Value = 0.9680
Point A12: [4.8 3.4 1.6 0.2] Membership Value = 0.9921
Point A13: [4.8 3.  1.4 0.1] Membership Value = 0.9706
Point A14: [4.3 3.  1.1 0.1] Membership Value = 0.9230
Point A15: [5.8 4.  1.2 0.2] Membership Value = 0.8898
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```
Point A16: [5.7 4.4 1.5 0.4] Membership Value = 0.8413
Point A17: [5.4 3.9 1.3 0.4] Membership Value = 0.9469
Point A18: [5.1 3.5 1.4 0.3] Membership Value = 0.9967
Point A19: [5.7 3.8 1.7 0.3] Membership Value = 0.9041
Point A20: [5.1 3.8 1.5 0.3] Membership Value = 0.9792
Point A21: [5.4 3.4 1.7 0.2] Membership Value = 0.9686
Point A22: [5.1 3.7 1.5 0.4] Membership Value = 0.9848
Point A23: [4.6 3.6 1.  0.2] Membership Value = 0.9587
Point A24: [5.1 3.3 1.7 0.5] Membership Value = 0.9794
Point A25: [4.8 3.4 1.9 0.2] Membership Value = 0.9669
Point A26: [5.  3.  1.6 0.2] Membership Value = 0.9736
Point A27: [5.  3.4 1.6 0.4] Membership Value = 0.9948
Point A28: [5.2 3.5 1.5 0.2] Membership Value = 0.9933
Point A29: [5.2 3.4 1.4 0.2] Membership Value = 0.9937
Point A30: [4.7 3.2 1.6 0.2] Membership Value = 0.9795
Point A31: [4.8 3.1 1.6 0.2] Membership Value = 0.9787
Point A32: [5.4 3.4 1.5 0.4] Membership Value = 0.9744
Point A33: [5.2 4.1 1.5 0.1] Membership Value = 0.9385
Point A34: [5.5 4.2 1.4 0.2] Membership Value = 0.9042
Point A35: [4.9 3.1 1.5 0.2] Membership Value = 0.9851
Point A36: [5.  3.2 1.2 0.2] Membership Value = 0.9850
Point A37: [5.5 3.5 1.3 0.2] Membership Value = 0.9642
Point A38: [4.9 3.6 1.4 0.1] Membership Value = 0.9909
Point A39: [4.4 3.  1.3 0.2] Membership Value = 0.9397
Point A40: [5.1 3.4 1.5 0.2] Membership Value = 0.9983
Point A41: [5.  3.5 1.3 0.3] Membership Value = 0.9947
Point A42: [4.5 2.3 1.3 0.3] Membership Value = 0.8507
Point A43: [4.4 3.2 1.3 0.2] Membership Value = 0.9526
Point A44: [5.  3.5 1.6 0.6] Membership Value = 0.9793
Point A45: [5.1 3.8 1.9 0.4] Membership Value = 0.9453
Point A46: [4.8 3.  1.4 0.3] Membership Value = 0.9721
Point A47: [5.1 3.8 1.6 0.2] Membership Value = 0.9768
Point A48: [4.6 3.2 1.4 0.2] Membership Value = 0.9742
Point A49: [5.3 3.7 1.5 0.2] Membership Value = 0.9772
Point A50: [5.  3.3 1.4 0.2] Membership Value = 0.9971
Point A51: [7.  3.2 4.7 1.4] Membership Value = 0.0446
Point A52: [6.4 3.2 4.5 1.5] Membership Value = 0.0292
Point A53: [6.9 3.1 4.9 1.5] Membership Value = 0.0313
Point A54: [5.5 2.3 4.  1.3] Membership Value = 0.0493
Point A55: [6.5 2.8 4.6 1.5] Membership Value = 0.0241
Point A56: [5.7 2.8 4.5 1.3] Membership Value = 0.0057
Point A57: [6.3 3.3 4.7 1.6] Membership Value = 0.0298
Point A58: [4.9 2.4 3.3 1. ] Membership Value = 0.2851
Point A59: [6.6 2.9 4.6 1.3] Membership Value = 0.0312
Point A60: [5.2 2.7 3.9 1.4] Membership Value = 0.0747
Point A61: [5.  2.  3.5 1. ] Membership Value = 0.2184
Point A62: [5.9 3.  4.2 1.5] Membership Value = 0.0092
Point A63: [6.  2.2 4.  1. ] Membership Value = 0.0556
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Point A64: [6.1 2.9 4.7 1.4] Membership Value = 0.0121
Point A65: [5.6 2.9 3.6 1.3] Membership Value = 0.0916
Point A66: [6.7 3.1 4.4 1.4] Membership Value = 0.0417
Point A67: [5.6 3.  4.5 1.5] Membership Value = 0.0142
Point A68: [5.8 2.7 4.1 1. ] Membership Value = 0.0259
Point A69: [6.2 2.2 4.5 1.5] Membership Value = 0.0271
Point A70: [5.6 2.5 3.9 1.1] Membership Value = 0.0515
Point A71: [5.9 3.2 4.8 1.8] Membership Value = 0.0276
Point A72: [6.1 2.8 4.  1.3] Membership Value = 0.0195
Point A73: [6.3 2.5 4.9 1.5] Membership Value = 0.0240
Point A74: [6.1 2.8 4.7 1.2] Membership Value = 0.0139
Point A75: [6.4 2.9 4.3 1.3] Membership Value = 0.0229
Point A76: [6.6 3.  4.4 1.4] Membership Value = 0.0339
Point A77: [6.8 2.8 4.8 1.4] Membership Value = 0.0336
Point A78: [6.7 3.  5.  1.7] Membership Value = 0.0212
Point A79: [6.  2.9 4.5 1.5] Membership Value = 0.0049
Point A80: [5.7 2.6 3.5 1. ] Membership Value = 0.1283
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Point A83: [5.8 2.7 3.9 1.2] Membership Value = 0.0310
Point A84: [6.  2.7 5.1 1.6] Membership Value = 0.0240
Point A85: [5.4 3.  4.5 1.5] Membership Value = 0.0264
Point A86: [6.  3.4 4.5 1.6] Membership Value = 0.0321
Point A87: [6.7 3.1 4.7 1.5] Membership Value = 0.0335
Point A88: [6.3 2.3 4.4 1.3] Membership Value = 0.0269
Point A89: [5.6 3.  4.1 1.3] Membership Value = 0.0241
Point A90: [5.5 2.5 4.  1.3] Membership Value = 0.0382
Point A91: [5.5 2.6 4.4 1.2] Membership Value = 0.0196
Point A92: [6.1 3.  4.6 1.4] Membership Value = 0.0116
Point A93: [5.8 2.6 4.  1.2] Membership Value = 0.0225
Point A94: [5.  2.3 3.3 1. ] Membership Value = 0.2689
Point A95: [5.6 2.7 4.2 1.3] Membership Value = 0.0127
Point A96: [5.7 3.  4.2 1.2] Membership Value = 0.0168
Point A97: [5.7 2.9 4.2 1.3] Membership Value = 0.0096
Point A98: [6.2 2.9 4.3 1.3] Membership Value = 0.0114
Point A99: [5.1 2.5 3.  1.1] Membership Value = 0.3553
Point A100: [5.7 2.8 4.1 1.3] Membership Value = 0.0127
Point A101: [6.3 3.3 6.  2.5] Membership Value = 0.0194
Point A102: [5.8 2.7 5.1 1.9] Membership Value = 0.0293
Point A103: [7.1 3.  5.9 2.1] Membership Value = 0.0061
Point A104: [6.3 2.9 5.6 1.8] Membership Value = 0.0125
Point A105: [6.5 3.  5.8 2.2] Membership Value = 0.0048
Point A106: [7.6 3.  6.6 2.1] Membership Value = 0.0355
Point A107: [4.9 2.5 4.5 1.7] Membership Value = 0.0730
Point A108: [7.3 2.9 6.3 1.8] Membership Value = 0.0219
Point A109: [6.7 2.5 5.8 1.8] Membership Value = 0.0140
Point A110: [7.2 3.6 6.1 2.5] Membership Value = 0.0244
Point A111: [6.5 3.2 5.1 2. ] Membership Value = 0.0168
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Point A112: [6.4 2.7 5.3 1.9] Membership Value = 0.0157
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Point A114: [5.7 2.5 5.  2. ] Membership Value = 0.0344
Point A115: [5.8 2.8 5.1 2.4] Membership Value = 0.0384
Point A116: [6.4 3.2 5.3 2.3] Membership Value = 0.0141
Point A117: [6.5 3.  5.5 1.8] Membership Value = 0.0072
Point A118: [7.7 3.8 6.7 2.2] Membership Value = 0.0506
Point A119: [7.7 2.6 6.9 2.3] Membership Value = 0.0492
Point A120: [6.  2.2 5.  1.5] Membership Value = 0.0322
Point A121: [6.9 3.2 5.7 2.3] Membership Value = 0.0038
Point A122: [5.6 2.8 4.9 2. ] Membership Value = 0.0336
Point A123: [7.7 2.8 6.7 2. ] Membership Value = 0.0420
Point A124: [6.3 2.7 4.9 1.8] Membership Value = 0.0228
Point A125: [6.7 3.3 5.7 2.1] Membership Value = 0.0029
Point A126: [7.2 3.2 6.  1.8] Membership Value = 0.0129
Point A127: [6.2 2.8 4.8 1.8] Membership Value = 0.0210
Point A128: [6.1 3.  4.9 1.8] Membership Value = 0.0231
Point A129: [6.4 2.8 5.6 2.1] Membership Value = 0.0084
Point A130: [7.2 3.  5.8 1.6] Membership Value = 0.0144
Point A131: [7.4 2.8 6.1 1.9] Membership Value = 0.0198
Point A132: [7.9 3.8 6.4 2. ] Membership Value = 0.0509
Point A133: [6.4 2.8 5.6 2.2] Membership Value = 0.0090
Point A134: [6.3 2.8 5.1 1.5] Membership Value = 0.0234
Point A135: [6.1 2.6 5.6 1.4] Membership Value = 0.0312
Point A136: [7.7 3.  6.1 2.3] Membership Value = 0.0287
Point A137: [6.3 3.4 5.6 2.4] Membership Value = 0.0172
Point A138: [6.4 3.1 5.5 1.8] Membership Value = 0.0098
Point A139: [6.  3.  4.8 1.8] Membership Value = 0.0217
Point A140: [6.9 3.1 5.4 2.1] Membership Value = 0.0035
Point A141: [6.7 3.1 5.6 2.4] Membership Value = 0.0051
Point A142: [6.9 3.1 5.1 2.3] Membership Value = 0.0154
Point A143: [5.8 2.7 5.1 1.9] Membership Value = 0.0293
Point A144: [6.8 3.2 5.9 2.3] Membership Value = 0.0053
Point A145: [6.7 3.3 5.7 2.5] Membership Value = 0.0097
Point A146: [6.7 3.  5.2 2.3] Membership Value = 0.0113
Point A147: [6.3 2.5 5.  1.9] Membership Value = 0.0258
Point A148: [6.5 3.  5.2 2. ] Membership Value = 0.0121
Point A149: [6.2 3.4 5.4 2.3] Membership Value = 0.0216
Point A150: [5.9 3.  5.1 1.8] Membership Value = 0.0269
Cluster 2 - Centroid: [6.77491468 3.05235417 5.64666147 2.05350023]
Point A1: [5.1 3.5 1.4 0.2] Membership Value = 0.0011
Point A2: [4.9 3.  1.4 0.2] Membership Value = 0.0075
Point A3: [4.7 3.2 1.3 0.2] Membership Value = 0.0064
Point A4: [4.6 3.1 1.5 0.2] Membership Value = 0.0101
Point A5: [5.  3.6 1.4 0.2] Membership Value = 0.0018
Point A6: [5.4 3.9 1.7 0.4] Membership Value = 0.0206
Point A7: [4.6 3.4 1.4 0.3] Membership Value = 0.0065
Point A8: [5.  3.4 1.5 0.2] Membership Value = 0.0001
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Point A9:  [4.4 2.9 1.4 0.2] Membership Value = 0.0219
Point A10: [4.9 3.1 1.5 0.1] Membership Value = 0.0053
Point A11: [5.4 3.7 1.5 0.2] Membership Value = 0.0102
Point A12: [4.8 3.4 1.6 0.2] Membership Value = 0.0024
Point A13: [4.8 3.  1.4 0.1] Membership Value = 0.0092
Point A14: [4.3 3.  1.1 0.1] Membership Value = 0.0252
Point A15: [5.8 4.  1.2 0.2] Membership Value = 0.0376
Point A16: [5.7 4.4 1.5 0.4] Membership Value = 0.0543
Point A17: [5.4 3.9 1.3 0.4] Membership Value = 0.0175
Point A18: [5.1 3.5 1.4 0.3] Membership Value = 0.0011
Point A19: [5.7 3.8 1.7 0.3] Membership Value = 0.0303
Point A20: [5.1 3.8 1.5 0.3] Membership Value = 0.0067
Point A21: [5.4 3.4 1.7 0.2] Membership Value = 0.0095
Point A22: [5.1 3.7 1.5 0.4] Membership Value = 0.0048
Point A23: [4.6 3.6 1.  0.2] Membership Value = 0.0138
Point A24: [5.1 3.3 1.7 0.5] Membership Value = 0.0061
Point A25: [4.8 3.4 1.9 0.2] Membership Value = 0.0098
Point A26: [5.  3.  1.6 0.2] Membership Value = 0.0080
Point A27: [5.  3.4 1.6 0.4] Membership Value = 0.0016
Point A28: [5.2 3.5 1.5 0.2] Membership Value = 0.0021
Point A29: [5.2 3.4 1.4 0.2] Membership Value = 0.0020
Point A30: [4.7 3.2 1.6 0.2] Membership Value = 0.0063
Point A31: [4.8 3.1 1.6 0.2] Membership Value = 0.0065
Point A32: [5.4 3.4 1.5 0.4] Membership Value = 0.0079
Point A33: [5.2 4.1 1.5 0.1] Membership Value = 0.0203
Point A34: [5.5 4.2 1.4 0.2] Membership Value = 0.0324
Point A35: [4.9 3.1 1.5 0.2] Membership Value = 0.0046
Point A36: [5.  3.2 1.2 0.2] Membership Value = 0.0048
Point A37: [5.5 3.5 1.3 0.2] Membership Value = 0.0116
Point A38: [4.9 3.6 1.4 0.1] Membership Value = 0.0029
Point A39: [4.4 3.  1.3 0.2] Membership Value = 0.0192
Point A40: [5.1 3.4 1.5 0.2] Membership Value = 0.0005
Point A41: [5.  3.5 1.3 0.3] Membership Value = 0.0017
Point A42: [4.5 2.3 1.3 0.3] Membership Value = 0.0470
Point A43: [4.4 3.2 1.3 0.2] Membership Value = 0.0152
Point A44: [5.  3.5 1.6 0.6] Membership Value = 0.0063
Point A45: [5.1 3.8 1.9 0.4] Membership Value = 0.0166
Point A46: [4.8 3.  1.4 0.3] Membership Value = 0.0086
Point A47: [5.1 3.8 1.6 0.2] Membership Value = 0.0074
Point A48: [4.6 3.2 1.4 0.2] Membership Value = 0.0081
Point A49: [5.3 3.7 1.5 0.2] Membership Value = 0.0073
Point A50: [5.  3.3 1.4 0.2] Membership Value = 0.0009
Point A51: [7.  3.2 4.7 1.4] Membership Value = 0.5013
Point A52: [6.4 3.2 4.5 1.5] Membership Value = 0.2069
Point A53: [6.9 3.1 4.9 1.5] Membership Value = 0.6001
Point A54: [5.5 2.3 4.  1.3] Membership Value = 0.0804
Point A55: [6.5 2.8 4.6 1.5] Membership Value = 0.2173
Point A56: [5.7 2.8 4.5 1.3] Membership Value = 0.0205
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Point A57: [6.3 3.3 4.7 1.6] Membership Value = 0.2974
Point A58: [4.9 2.4 3.3 1. ] Membership Value = 0.1323
Point A59: [6.6 2.9 4.6 1.3] Membership Value = 0.2479
Point A60: [5.2 2.7 3.9 1.4] Membership Value = 0.0947
Point A61: [5.  2.  3.5 1. ] Membership Value = 0.1451
Point A62: [5.9 3.  4.2 1.5] Membership Value = 0.0287
Point A63: [6.  2.2 4.  1. ] Membership Value = 0.1011
Point A64: [6.1 2.9 4.7 1.4] Membership Value = 0.0884
Point A65: [5.6 2.9 3.6 1.3] Membership Value = 0.0922
Point A66: [6.7 3.1 4.4 1.4] Membership Value = 0.2685
Point A67: [5.6 3.  4.5 1.5] Membership Value = 0.0527
Point A68: [5.8 2.7 4.1 1. ] Membership Value = 0.0483
Point A69: [6.2 2.2 4.5 1.5] Membership Value = 0.1375
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Point A71: [5.9 3.2 4.8 1.8] Membership Value = 0.2509
Point A72: [6.1 2.8 4.  1.3] Membership Value = 0.0462
Point A73: [6.3 2.5 4.9 1.5] Membership Value = 0.2708
Point A74: [6.1 2.8 4.7 1.2] Membership Value = 0.0834
Point A75: [6.4 2.9 4.3 1.3] Membership Value = 0.1012
Point A76: [6.6 3.  4.4 1.4] Membership Value = 0.2114
Point A77: [6.8 2.8 4.8 1.4] Membership Value = 0.4429
Point A78: [6.7 3.  5.  1.7] Membership Value = 0.6727
Point A79: [6.  2.9 4.5 1.5] Membership Value = 0.0262
Point A80: [5.7 2.6 3.5 1. ] Membership Value = 0.1046
Point A81: [5.5 2.4 3.8 1.1] Membership Value = 0.0899
Point A82: [5.5 2.4 3.7 1. ] Membership Value = 0.1007
Point A83: [5.8 2.7 3.9 1.2] Membership Value = 0.0503
Point A84: [6.  2.7 5.1 1.6] Membership Value = 0.3199
Point A85: [5.4 3.  4.5 1.5] Membership Value = 0.0825
Point A86: [6.  3.4 4.5 1.6] Membership Value = 0.1708
Point A87: [6.7 3.1 4.7 1.5] Membership Value = 0.4113
Point A88: [6.3 2.3 4.4 1.3] Membership Value = 0.1155
Point A89: [5.6 3.  4.1 1.3] Membership Value = 0.0470
Point A90: [5.5 2.5 4.  1.3] Membership Value = 0.0623
Point A91: [5.5 2.6 4.4 1.2] Membership Value = 0.0492
Point A92: [6.1 3.  4.6 1.4] Membership Value = 0.0728
Point A93: [5.8 2.6 4.  1.2] Membership Value = 0.0418
Point A94: [5.  2.3 3.3 1. ] Membership Value = 0.1327
Point A95: [5.6 2.7 4.2 1.3] Membership Value = 0.0284
Point A96: [5.7 3.  4.2 1.2] Membership Value = 0.0377
Point A97: [5.7 2.9 4.2 1.3] Membership Value = 0.0230
Point A98: [6.2 2.9 4.3 1.3] Membership Value = 0.0448
Point A99: [5.1 2.5 3.  1.1] Membership Value = 0.1245
Point A100: [5.7 2.8 4.1 1.3] Membership Value = 0.0267
Point A101: [6.3 3.3 6.  2.5] Membership Value = 0.8599
Point A102: [5.8 2.7 5.1 1.9] Membership Value = 0.3553
Point A103: [7.1 3.  5.9 2.1] Membership Value = 0.9558
Point A104: [6.3 2.9 5.6 1.8] Membership Value = 0.8457
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Point A105: [6.5 3.  5.8 2.2] Membership Value = 0.9576
Point A106: [7.6 3.  6.6 2.1] Membership Value = 0.8119
Point A107: [4.9 2.5 4.5 1.7] Membership Value = 0.1670
Point A108: [7.3 2.9 6.3 1.8] Membership Value = 0.8630
Point A109: [6.7 2.5 5.8 1.8] Membership Value = 0.8687
Point A110: [7.2 3.6 6.1 2.5] Membership Value = 0.8610
Point A111: [6.5 3.2 5.1 2. ] Membership Value = 0.7735
Point A112: [6.4 2.7 5.3 1.9] Membership Value = 0.7613
Point A113: [6.8 3.  5.5 2.1] Membership Value = 0.9888
Point A114: [5.7 2.5 5.  2. ] Membership Value = 0.3058
Point A115: [5.8 2.8 5.1 2.4] Membership Value = 0.5008
Point A116: [6.4 3.2 5.3 2.3] Membership Value = 0.8500
Point A117: [6.5 3.  5.5 1.8] Membership Value = 0.9133
Point A118: [7.7 3.8 6.7 2.2] Membership Value = 0.7636
Point A119: [7.7 2.6 6.9 2.3] Membership Value = 0.7576
Point A120: [6.  2.2 5.  1.5] Membership Value = 0.2572
Point A121: [6.9 3.2 5.7 2.3] Membership Value = 0.9705
Point A122: [5.6 2.8 4.9 2. ] Membership Value = 0.2595
Point A123: [7.7 2.8 6.7 2. ] Membership Value = 0.7832
Point A124: [6.3 2.7 4.9 1.8] Membership Value = 0.3817
Point A125: [6.7 3.3 5.7 2.1] Membership Value = 0.9753
Point A126: [7.2 3.2 6.  1.8] Membership Value = 0.9119
Point A127: [6.2 2.8 4.8 1.8] Membership Value = 0.2715
Point A128: [6.1 3.  4.9 1.8] Membership Value = 0.3303
Point A129: [6.4 2.8 5.6 2.1] Membership Value = 0.9087
Point A130: [7.2 3.  5.8 1.6] Membership Value = 0.8908
Point A131: [7.4 2.8 6.1 1.9] Membership Value = 0.8728
Point A132: [7.9 3.8 6.4 2. ] Membership Value = 0.7601
Point A133: [6.4 2.8 5.6 2.2] Membership Value = 0.9063
Point A134: [6.3 2.8 5.1 1.5] Membership Value = 0.4367
Point A135: [6.1 2.6 5.6 1.4] Membership Value = 0.5762
Point A136: [7.7 3.  6.1 2.3] Membership Value = 0.8396
Point A137: [6.3 3.4 5.6 2.4] Membership Value = 0.8541
Point A138: [6.4 3.1 5.5 1.8] Membership Value = 0.8803
Point A139: [6.  3.  4.8 1.8] Membership Value = 0.2286
Point A140: [6.9 3.1 5.4 2.1] Membership Value = 0.9676
Point A141: [6.7 3.1 5.6 2.4] Membership Value = 0.9573
Point A142: [6.9 3.1 5.1 2.3] Membership Value = 0.8552
Point A143: [5.8 2.7 5.1 1.9] Membership Value = 0.3553
Point A144: [6.8 3.2 5.9 2.3] Membership Value = 0.9610
Point A145: [6.7 3.3 5.7 2.5] Membership Value = 0.9271
Point A146: [6.7 3.  5.2 2.3] Membership Value = 0.8824
Point A147: [6.3 2.5 5.  1.9] Membership Value = 0.4669
Point A148: [6.5 3.  5.2 2. ] Membership Value = 0.8316
Point A149: [6.2 3.4 5.4 2.3] Membership Value = 0.7895
Point A150: [5.9 3.  5.1 1.8] Membership Value = 0.3915
Cluster 3 - Centroid: [5.88885254 2.7610406  4.36383499 1.39725491]
Point A1: [5.1 3.5 1.4 0.2] Membership Value = 0.0023
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Point A2:  [4.9 3.  1.4 0.2] Membership Value = 0.0167
Point A3:  [4.7 3.2 1.3 0.2] Membership Value = 0.0138
Point A4:  [4.6 3.1 1.5 0.2] Membership Value = 0.0225
Point A5:  [5.  3.6 1.4 0.2] Membership Value = 0.0038
Point A6:  [5.4 3.9 1.7 0.4] Membership Value = 0.0448
Point A7:  [4.6 3.4 1.4 0.3] Membership Value = 0.0140
Point A8:  [5.  3.4 1.5 0.2] Membership Value = 0.0003
Point A9:  [4.4 2.9 1.4 0.2] Membership Value = 0.0477
Point A10: [4.9 3.1 1.5 0.1] Membership Value = 0.0119
Point A11: [5.4 3.7 1.5 0.2] Membership Value = 0.0218
Point A12: [4.8 3.4 1.6 0.2] Membership Value = 0.0054
Point A13: [4.8 3.  1.4 0.1] Membership Value = 0.0202
Point A14: [4.3 3.  1.1 0.1] Membership Value = 0.0518
Point A15: [5.8 4.  1.2 0.2] Membership Value = 0.0726
Point A16: [5.7 4.4 1.5 0.4] Membership Value = 0.1044
Point A17: [5.4 3.9 1.3 0.4] Membership Value = 0.0356
Point A18: [5.1 3.5 1.4 0.3] Membership Value = 0.0023
Point A19: [5.7 3.8 1.7 0.3] Membership Value = 0.0656
Point A20: [5.1 3.8 1.5 0.3] Membership Value = 0.0142
Point A21: [5.4 3.4 1.7 0.2] Membership Value = 0.0219
Point A22: [5.1 3.7 1.5 0.4] Membership Value = 0.0104
Point A23: [4.6 3.6 1.  0.2] Membership Value = 0.0275
Point A24: [5.1 3.3 1.7 0.5] Membership Value = 0.0145
Point A25: [4.8 3.4 1.9 0.2] Membership Value = 0.0232
Point A26: [5.  3.  1.6 0.2] Membership Value = 0.0185
Point A27: [5.  3.4 1.6 0.4] Membership Value = 0.0036
Point A28: [5.2 3.5 1.5 0.2] Membership Value = 0.0046
Point A29: [5.2 3.4 1.4 0.2] Membership Value = 0.0043
Point A30: [4.7 3.2 1.6 0.2] Membership Value = 0.0142
Point A31: [4.8 3.1 1.6 0.2] Membership Value = 0.0148
Point A32: [5.4 3.4 1.5 0.4] Membership Value = 0.0177
Point A33: [5.2 4.1 1.5 0.1] Membership Value = 0.0411
Point A34: [5.5 4.2 1.4 0.2] Membership Value = 0.0635
Point A35: [4.9 3.1 1.5 0.2] Membership Value = 0.0103
Point A36: [5.  3.2 1.2 0.2] Membership Value = 0.0102
Point A37: [5.5 3.5 1.3 0.2] Membership Value = 0.0243
Point A38: [4.9 3.6 1.4 0.1] Membership Value = 0.0062
Point A39: [4.4 3.  1.3 0.2] Membership Value = 0.0411
Point A40: [5.1 3.4 1.5 0.2] Membership Value = 0.0012
Point A41: [5.  3.5 1.3 0.3] Membership Value = 0.0036
Point A42: [4.5 2.3 1.3 0.3] Membership Value = 0.1023
Point A43: [4.4 3.2 1.3 0.2] Membership Value = 0.0322
Point A44: [5.  3.5 1.6 0.6] Membership Value = 0.0144
Point A45: [5.1 3.8 1.9 0.4] Membership Value = 0.0381
Point A46: [4.8 3.  1.4 0.3] Membership Value = 0.0192
Point A47: [5.1 3.8 1.6 0.2] Membership Value = 0.0158
Point A48: [4.6 3.2 1.4 0.2] Membership Value = 0.0177
Point A49: [5.3 3.7 1.5 0.2] Membership Value = 0.0155
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Point A50: [5.  3.3 1.4 0.2] Membership Value = 0.0020
Point A51: [7.  3.2 4.7 1.4] Membership Value = 0.4541
Point A52: [6.4 3.2 4.5 1.5] Membership Value = 0.7639
Point A53: [6.9 3.1 4.9 1.5] Membership Value = 0.3686
Point A54: [5.5 2.3 4.  1.3] Membership Value = 0.8703
Point A55: [6.5 2.8 4.6 1.5] Membership Value = 0.7586
Point A56: [5.7 2.8 4.5 1.3] Membership Value = 0.9738
Point A57: [6.3 3.3 4.7 1.6] Membership Value = 0.6728
Point A58: [4.9 2.4 3.3 1. ] Membership Value = 0.5826
Point A59: [6.6 2.9 4.6 1.3] Membership Value = 0.7209
Point A60: [5.2 2.7 3.9 1.4] Membership Value = 0.8306
Point A61: [5.  2.  3.5 1. ] Membership Value = 0.6366
Point A62: [5.9 3.  4.2 1.5] Membership Value = 0.9621
Point A63: [6.  2.2 4.  1. ] Membership Value = 0.8433
Point A64: [6.1 2.9 4.7 1.4] Membership Value = 0.8995
Point A65: [5.6 2.9 3.6 1.3] Membership Value = 0.8162
Point A66: [6.7 3.1 4.4 1.4] Membership Value = 0.6898
Point A67: [5.6 3.  4.5 1.5] Membership Value = 0.9331
Point A68: [5.8 2.7 4.1 1. ] Membership Value = 0.9258
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Point A73: [6.3 2.5 4.9 1.5] Membership Value = 0.7053
Point A74: [6.1 2.8 4.7 1.2] Membership Value = 0.9027
Point A75: [6.4 2.9 4.3 1.3] Membership Value = 0.8758
Point A76: [6.6 3.  4.4 1.4] Membership Value = 0.7547
Point A77: [6.8 2.8 4.8 1.4] Membership Value = 0.5235
Point A78: [6.7 3.  5.  1.7] Membership Value = 0.3061
Point A79: [6.  2.9 4.5 1.5] Membership Value = 0.9688
Point A80: [5.7 2.6 3.5 1. ] Membership Value = 0.7671
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Point A82: [5.5 2.4 3.7 1. ] Membership Value = 0.7955
Point A83: [5.8 2.7 3.9 1.2] Membership Value = 0.9188
Point A84: [6.  2.7 5.1 1.6] Membership Value = 0.6561
Point A85: [5.4 3.  4.5 1.5] Membership Value = 0.8912
Point A86: [6.  3.4 4.5 1.6] Membership Value = 0.7971
Point A87: [6.7 3.1 4.7 1.5] Membership Value = 0.5552
Point A88: [6.3 2.3 4.4 1.3] Membership Value = 0.8576
Point A89: [5.6 3.  4.1 1.3] Membership Value = 0.9290
Point A90: [5.5 2.5 4.  1.3] Membership Value = 0.8995
Point A91: [5.5 2.6 4.4 1.2] Membership Value = 0.9312
Point A92: [6.1 3.  4.6 1.4] Membership Value = 0.9156
Point A93: [5.8 2.6 4.  1.2] Membership Value = 0.9357
Point A94: [5.  2.3 3.3 1. ] Membership Value = 0.5984
Point A95: [5.6 2.7 4.2 1.3] Membership Value = 0.9589
Point A96: [5.7 3.  4.2 1.2] Membership Value = 0.9456
Point A97: [5.7 2.9 4.2 1.3] Membership Value = 0.9674
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Point A98:  [6.2 2.9 4.3 1.3] Membership Value = 0.9438
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Point A100: [5.7 2.8 4.1 1.3] Membership Value = 0.9606
Point A101: [6.3 3.3 6.  2.5] Membership Value = 0.1207
Point A102: [5.8 2.7 5.1 1.9] Membership Value = 0.6154
Point A103: [7.1 3.  5.9 2.1] Membership Value = 0.0382
Point A104: [6.3 2.9 5.6 1.8] Membership Value = 0.1418
Point A105: [6.5 3.  5.8 2.2] Membership Value = 0.0376
Point A106: [7.6 3.  6.6 2.1] Membership Value = 0.1527
Point A107: [4.9 2.5 4.5 1.7] Membership Value = 0.7600
Point A108: [7.3 2.9 6.3 1.8] Membership Value = 0.1151
Point A109: [6.7 2.5 5.8 1.8] Membership Value = 0.1173
Point A110: [7.2 3.6 6.1 2.5] Membership Value = 0.1146
Point A111: [6.5 3.2 5.1 2. ] Membership Value = 0.2097
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Point A113: [6.8 3.  5.5 2.1] Membership Value = 0.0100
Point A114: [5.7 2.5 5.  2. ] Membership Value = 0.6598
Point A115: [5.8 2.8 5.1 2.4] Membership Value = 0.4609
Point A116: [6.4 3.2 5.3 2.3] Membership Value = 0.1360
Point A117: [6.5 3.  5.5 1.8] Membership Value = 0.0795
Point A118: [7.7 3.8 6.7 2.2] Membership Value = 0.1858
Point A119: [7.7 2.6 6.9 2.3] Membership Value = 0.1933
Point A120: [6.  2.2 5.  1.5] Membership Value = 0.7106
Point A121: [6.9 3.2 5.7 2.3] Membership Value = 0.0257
Point A122: [5.6 2.8 4.9 2. ] Membership Value = 0.7069
Point A123: [7.7 2.8 6.7 2. ] Membership Value = 0.1748
Point A124: [6.3 2.7 4.9 1.8] Membership Value = 0.5955
Point A125: [6.7 3.3 5.7 2.1] Membership Value = 0.0217
Point A126: [7.2 3.2 6.  1.8] Membership Value = 0.0752
Point A127: [6.2 2.8 4.8 1.8] Membership Value = 0.7075
Point A128: [6.1 3.  4.9 1.8] Membership Value = 0.6467
Point A129: [6.4 2.8 5.6 2.1] Membership Value = 0.0829
Point A130: [7.2 3.  5.8 1.6] Membership Value = 0.0947
Point A131: [7.4 2.8 6.1 1.9] Membership Value = 0.1075
Point A132: [7.9 3.8 6.4 2. ] Membership Value = 0.1890
Point A133: [6.4 2.8 5.6 2.2] Membership Value = 0.0848
Point A134: [6.3 2.8 5.1 1.5] Membership Value = 0.5400
Point A135: [6.1 2.6 5.6 1.4] Membership Value = 0.3926
Point A136: [7.7 3.  6.1 2.3] Membership Value = 0.1318
Point A137: [6.3 3.4 5.6 2.4] Membership Value = 0.1286
Point A138: [6.4 3.1 5.5 1.8] Membership Value = 0.1100
Point A139: [6.  3.  4.8 1.8] Membership Value = 0.7497
Point A140: [6.9 3.1 5.4 2.1] Membership Value = 0.0289
Point A141: [6.7 3.1 5.6 2.4] Membership Value = 0.0377
Point A142: [6.9 3.1 5.1 2.3] Membership Value = 0.1294
Point A143: [5.8 2.7 5.1 1.9] Membership Value = 0.6154
Point A144: [6.8 3.2 5.9 2.3] Membership Value = 0.0337
Point A145: [6.7 3.3 5.7 2.5] Membership Value = 0.0632
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Point A146: [6.7 3.   5.2 2.3] Membership Value = 0.1063
Point A147: [6.3 2.5 5.   1.9] Membership Value = 0.5073
Point A148: [6.5 3.   5.2 2. ] Membership Value = 0.1563
Point A149: [6.2 3.4 5.4 2.3] Membership Value = 0.1889
Point A150: [5.9 3.   5.1 1.8] Membership Value = 0.5816
FOR CLUSTER VALUE 5
Cluster 1 - Centroid: [6.52506314 3.03736325 5.44706988 2.0841045 ]
Point A1: [5.1 3.5 1.4 0.2] Membership Value = 0.0011
Point A2: [4.9 3.   1.4 0.2] Membership Value = 0.0081
Point A3: [4.7 3.2 1.3 0.2] Membership Value = 0.0067
Point A4: [4.6 3.1 1.5 0.2] Membership Value = 0.0108
Point A5: [5.   3.6 1.4 0.2] Membership Value = 0.0017
Point A6: [5.4 3.9 1.7 0.4] Membership Value = 0.0218
Point A7: [4.6 3.4 1.4 0.3] Membership Value = 0.0069
Point A8: [5.   3.4 1.5 0.2] Membership Value = 0.0002
Point A9: [4.4 2.9 1.4 0.2] Membership Value = 0.0225
Point A10: [4.9 3.1 1.5 0.1] Membership Value = 0.0058
Point A11: [5.4 3.7 1.5 0.2] Membership Value = 0.0110
Point A12: [4.8 3.4 1.6 0.2] Membership Value = 0.0027
Point A13: [4.8 3.   1.4 0.1] Membership Value = 0.0097
Point A14: [4.3 3.   1.1 0.1] Membership Value = 0.0253
Point A15: [5.8 4.   1.2 0.2] Membership Value = 0.0367
Point A16: [5.7 4.4 1.5 0.4] Membership Value = 0.0514
Point A17: [5.4 3.9 1.3 0.4] Membership Value = 0.0182
Point A18: [5.1 3.5 1.4 0.3] Membership Value = 0.0011
Point A19: [5.7 3.8 1.7 0.3] Membership Value = 0.0309
Point A20: [5.1 3.8 1.5 0.3] Membership Value = 0.0072
Point A21: [5.4 3.4 1.7 0.2] Membership Value = 0.0107
Point A22: [5.1 3.7 1.5 0.4] Membership Value = 0.0053
Point A23: [4.6 3.6 1.   0.2] Membership Value = 0.0140
Point A24: [5.1 3.3 1.7 0.5] Membership Value = 0.0073
Point A25: [4.8 3.4 1.9 0.2] Membership Value = 0.0111
Point A26: [5.   3.   1.6 0.2] Membership Value = 0.0089
Point A27: [5.   3.4 1.6 0.4] Membership Value = 0.0020
Point A28: [5.2 3.5 1.5 0.2] Membership Value = 0.0024
Point A29: [5.2 3.4 1.4 0.2] Membership Value = 0.0022
Point A30: [4.7 3.2 1.6 0.2] Membership Value = 0.0069
Point A31: [4.8 3.1 1.6 0.2] Membership Value = 0.0072
Point A32: [5.4 3.4 1.5 0.4] Membership Value = 0.0089
Point A33: [5.2 4.1 1.5 0.1] Membership Value = 0.0208
Point A34: [5.5 4.2 1.4 0.2] Membership Value = 0.0322
Point A35: [4.9 3.1 1.5 0.2] Membership Value = 0.0051
Point A36: [5.   3.2 1.2 0.2] Membership Value = 0.0049
Point A37: [5.5 3.5 1.3 0.2] Membership Value = 0.0122
Point A38: [4.9 3.6 1.4 0.1] Membership Value = 0.0029
Point A39: [4.4 3.   1.3 0.2] Membership Value = 0.0197
Point A40: [5.1 3.4 1.5 0.2] Membership Value = 0.0006
Point A41: [5.   3.5 1.3 0.3] Membership Value = 0.0016
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```
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Point A45: [5.1 3.8 1.9 0.4] Membership Value = 0.0181
Point A46: [4.8 3.  1.4 0.3] Membership Value = 0.0093
Point A47: [5.1 3.8 1.6 0.2] Membership Value = 0.0080
Point A48: [4.6 3.2 1.4 0.2] Membership Value = 0.0086
Point A49: [5.3 3.7 1.5 0.2] Membership Value = 0.0079
Point A50: [5.  3.3 1.4 0.2] Membership Value = 0.0009
Point A51: [7.  3.2 4.7 1.4] Membership Value = 0.2812
Point A52: [6.4 3.2 4.5 1.5] Membership Value = 0.1127
Point A53: [6.9 3.1 4.9 1.5] Membership Value = 0.3386
Point A54: [5.5 2.3 4.  1.3] Membership Value = 0.0241
Point A55: [6.5 2.8 4.6 1.5] Membership Value = 0.0855
Point A56: [5.7 2.8 4.5 1.3] Membership Value = 0.0709
Point A57: [6.3 3.3 4.7 1.6] Membership Value = 0.1519
Point A58: [4.9 2.4 3.3 1. ] Membership Value = 0.0695
Point A59: [6.6 2.9 4.6 1.3] Membership Value = 0.1279
Point A60: [5.2 2.7 3.9 1.4] Membership Value = 0.0341
Point A61: [5.  2.  3.5 1. ] Membership Value = 0.0740
Point A62: [5.9 3.  4.2 1.5] Membership Value = 0.0730
Point A63: [6.  2.2 4.  1. ] Membership Value = 0.0627
Point A64: [6.1 2.9 4.7 1.4] Membership Value = 0.0255
Point A65: [5.6 2.9 3.6 1.3] Membership Value = 0.0351
Point A66: [6.7 3.1 4.4 1.4] Membership Value = 0.1630
Point A67: [5.6 3.  4.5 1.5] Membership Value = 0.0951
Point A68: [5.8 2.7 4.1 1. ] Membership Value = 0.0278
Point A69: [6.2 2.2 4.5 1.5] Membership Value = 0.1296
Point A70: [5.6 2.5 3.9 1.1] Membership Value = 0.0062
Point A71: [5.9 3.2 4.8 1.8] Membership Value = 0.1832
Point A72: [6.1 2.8 4.  1.3] Membership Value = 0.0614
Point A73: [6.3 2.5 4.9 1.5] Membership Value = 0.1427
Point A74: [6.1 2.8 4.7 1.2] Membership Value = 0.0696
Point A75: [6.4 2.9 4.3 1.3] Membership Value = 0.0923
Point A76: [6.6 3.  4.4 1.4] Membership Value = 0.1289
Point A77: [6.8 2.8 4.8 1.4] Membership Value = 0.2312
Point A78: [6.7 3.  5.  1.7] Membership Value = 0.4299
Point A79: [6.  2.9 4.5 1.5] Membership Value = 0.0454
Point A80: [5.7 2.6 3.5 1. ] Membership Value = 0.0361
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Point A84: [6.  2.7 5.1 1.6] Membership Value = 0.1984
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Point A86: [6.  3.4 4.5 1.6] Membership Value = 0.1432
Point A87: [6.7 3.1 4.7 1.5] Membership Value = 0.2094
Point A88: [6.3 2.3 4.4 1.3] Membership Value = 0.1123
Point A89: [5.6 3.  4.1 1.3] Membership Value = 0.0411
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Point A90:  [5.5 2.5 4.   1.3] Membership Value = 0.0074
Point A91:  [5.5 2.6 4.4 1.2] Membership Value = 0.0488
Point A92:  [6.1 3.   4.6 1.4] Membership Value = 0.0388
Point A93:  [5.8 2.6 4.   1.2] Membership Value = 0.0127
Point A94:  [5.   2.3 3.3 1. ] Membership Value = 0.0673
Point A95:  [5.6 2.7 4.2 1.3] Membership Value = 0.0215
Point A96:  [5.7 3.   4.2 1.2] Membership Value = 0.0502
Point A97:  [5.7 2.9 4.2 1.3] Membership Value = 0.0413
Point A98:  [6.2 2.9 4.3 1.3] Membership Value = 0.0726
Point A99:  [5.1 2.5 3.   1.1] Membership Value = 0.0717
Point A100: [5.7 2.8 4.1 1.3] Membership Value = 0.0211
Point A101: [6.3 3.3 6.   2.5] Membership Value = 0.5892
Point A102: [5.8 2.7 5.1 1.9] Membership Value = 0.2932
Point A103: [7.1 3.   5.9 2.1] Membership Value = 0.2996
Point A104: [6.3 2.9 5.6 1.8] Membership Value = 0.7405
Point A105: [6.5 3.   5.8 2.2] Membership Value = 0.8085
Point A106: [7.6 3.   6.6 2.1] Membership Value = 0.0512
Point A107: [4.9 2.5 4.5 1.7] Membership Value = 0.1295
Point A108: [7.3 2.9 6.3 1.8] Membership Value = 0.0718
Point A109: [6.7 2.5 5.8 1.8] Membership Value = 0.5287
Point A110: [7.2 3.6 6.1 2.5] Membership Value = 0.2529
Point A111: [6.5 3.2 5.1 2. ] Membership Value = 0.7103
Point A112: [6.4 2.7 5.3 1.9] Membership Value = 0.6679
Point A113: [6.8 3.   5.5 2.1] Membership Value = 0.8621
Point A114: [5.7 2.5 5.   2. ] Membership Value = 0.2668
Point A115: [5.8 2.8 5.1 2.4] Membership Value = 0.4346
Point A116: [6.4 3.2 5.3 2.3] Membership Value = 0.8400
Point A117: [6.5 3.   5.5 1.8] Membership Value = 0.8405
Point A118: [7.7 3.8 6.7 2.2] Membership Value = 0.1585
Point A119: [7.7 2.6 6.9 2.3] Membership Value = 0.1467
Point A120: [6.   2.2 5.   1.5] Membership Value = 0.2000
Point A121: [6.9 3.2 5.7 2.3] Membership Value = 0.6318
Point A122: [5.6 2.8 4.9 2. ] Membership Value = 0.2403
Point A123: [7.7 2.8 6.7 2. ] Membership Value = 0.0913
Point A124: [6.3 2.7 4.9 1.8] Membership Value = 0.1844
Point A125: [6.7 3.3 5.7 2.1] Membership Value = 0.7642
Point A126: [7.2 3.2 6.   1.8] Membership Value = 0.1799
Point A127: [6.2 2.8 4.8 1.8] Membership Value = 0.0936
Point A128: [6.1 3.   4.9 1.8] Membership Value = 0.1594
Point A129: [6.4 2.8 5.6 2.1] Membership Value = 0.8546
Point A130: [7.2 3.   5.8 1.6] Membership Value = 0.3150
Point A131: [7.4 2.8 6.1 1.9] Membership Value = 0.0901
Point A132: [7.9 3.8 6.4 2. ] Membership Value = 0.1573
Point A133: [6.4 2.8 5.6 2.2] Membership Value = 0.8456
Point A134: [6.3 2.8 5.1 1.5] Membership Value = 0.2089
Point A135: [6.1 2.6 5.6 1.4] Membership Value = 0.3874
Point A136: [7.7 3.   6.1 2.3] Membership Value = 0.0789
Point A137: [6.3 3.4 5.6 2.4] Membership Value = 0.7161
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Point A138: [6.4 3.1 5.5 1.8] Membership Value = 0.8163
Point A139: [6.  3.  4.8 1.8] Membership Value = 0.1198
Point A140: [6.9 3.1 5.4 2.1] Membership Value = 0.7773
Point A141: [6.7 3.1 5.6 2.4] Membership Value = 0.7924
Point A142: [6.9 3.1 5.1 2.3] Membership Value = 0.6614
Point A143: [5.8 2.7 5.1 1.9] Membership Value = 0.2932
Point A144: [6.8 3.2 5.9 2.3] Membership Value = 0.5627
Point A145: [6.7 3.3 5.7 2.5] Membership Value = 0.6621
Point A146: [6.7 3.  5.2 2.3] Membership Value = 0.7999
Point A147: [6.3 2.5 5.  1.9] Membership Value = 0.3240
Point A148: [6.5 3.  5.2 2. ] Membership Value = 0.8416
Point A149: [6.2 3.4 5.4 2.3] Membership Value = 0.7061
Point A150: [5.9 3.  5.1 1.8] Membership Value = 0.2933
Cluster 2 - Centroid: [7.43727008 3.07973146 6.27721736 2.05280428]
Point A1: [5.1 3.5 1.4 0.2] Membership Value = 0.0007
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Point A3: [4.7 3.2 1.3 0.2] Membership Value = 0.0045
Point A4: [4.6 3.1 1.5 0.2] Membership Value = 0.0072
Point A5: [5.  3.6 1.4 0.2] Membership Value = 0.0012
Point A6: [5.4 3.9 1.7 0.4] Membership Value = 0.0144
Point A7: [4.6 3.4 1.4 0.3] Membership Value = 0.0046
Point A8: [5.  3.4 1.5 0.2] Membership Value = 0.0001
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Point A23: [4.6 3.6 1.  0.2] Membership Value = 0.0096
Point A24: [5.1 3.3 1.7 0.5] Membership Value = 0.0047
Point A25: [4.8 3.4 1.9 0.2] Membership Value = 0.0072
Point A26: [5.  3.  1.6 0.2] Membership Value = 0.0059
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Point A28: [5.2 3.5 1.5 0.2] Membership Value = 0.0016
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Point A31: [4.8 3.1 1.6 0.2] Membership Value = 0.0047
Point A32: [5.4 3.4 1.5 0.4] Membership Value = 0.0059
Point A33: [5.2 4.1 1.5 0.1] Membership Value = 0.0143
Point A34: [5.5 4.2 1.4 0.2] Membership Value = 0.0223
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Point A42: [4.5 2.3 1.3 0.3] Membership Value = 0.0303
Point A43: [4.4 3.2 1.3 0.2] Membership Value = 0.0106
Point A44: [5.  3.5 1.6 0.6] Membership Value = 0.0047
Point A45: [5.1 3.8 1.9 0.4] Membership Value = 0.0117
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Point A52: [6.4 3.2 4.5 1.5] Membership Value = 0.0317
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Point A119: [7.7 2.6 6.9 2.3] Membership Value = 0.7311
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Point A128: [6.1 3.  4.9 1.8] Membership Value = 0.0239
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Point A130: [7.2 3.  5.8 1.6] Membership Value = 0.5188
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Point A139: [6.  3.  4.8 1.8] Membership Value = 0.0215
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Point A141: [6.7 3.1 5.6 2.4] Membership Value = 0.1113
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Point A146: [6.7 3.  5.2 2.3] Membership Value = 0.0631
Point A147: [6.3 2.5 5.  1.9] Membership Value = 0.0565
Point A148: [6.5 3.  5.2 2. ] Membership Value = 0.0288
Point A149: [6.2 3.4 5.4 2.3] Membership Value = 0.0820
Point A150: [5.9 3.  5.1 1.8] Membership Value = 0.0456
Cluster 3 - Centroid: [6.1907853  2.87799837 4.7098514  1.55710311]
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Point A4: [4.6 3.1 1.5 0.2] Membership Value = 0.0167
Point A5: [5.  3.6 1.4 0.2] Membership Value = 0.0027
Point A6: [5.4 3.9 1.7 0.4] Membership Value = 0.0341
Point A7: [4.6 3.4 1.4 0.3] Membership Value = 0.0105
Point A8: [5.  3.4 1.5 0.2] Membership Value = 0.0003
Point A9: [4.4 2.9 1.4 0.2] Membership Value = 0.0343
Point A10: [4.9 3.1 1.5 0.1] Membership Value = 0.0091
Point A11: [5.4 3.7 1.5 0.2] Membership Value = 0.0170
Point A12: [4.8 3.4 1.6 0.2] Membership Value = 0.0043
Point A13: [4.8 3.  1.4 0.1] Membership Value = 0.0151
Point A14: [4.3 3.  1.1 0.1] Membership Value = 0.0375
Point A15: [5.8 4.  1.2 0.2] Membership Value = 0.0544
Point A16: [5.7 4.4 1.5 0.4] Membership Value = 0.0759
Point A17: [5.4 3.9 1.3 0.4] Membership Value = 0.0273
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Point A21: [5.4 3.4 1.7 0.2] Membership Value = 0.0172
Point A22: [5.1 3.7 1.5 0.4] Membership Value = 0.0082
Point A23: [4.6 3.6 1.  0.2] Membership Value = 0.0205
Point A24: [5.1 3.3 1.7 0.5] Membership Value = 0.0118
Point A25: [4.8 3.4 1.9 0.2] Membership Value = 0.0178
Point A26: [5.  3.  1.6 0.2] Membership Value = 0.0142
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Point A33: [5.2 4.1 1.5 0.1] Membership Value = 0.0313
Point A34: [5.5 4.2 1.4 0.2] Membership Value = 0.0478
Point A35: [4.9 3.1 1.5 0.2] Membership Value = 0.0080
Point A36: [5.  3.2 1.2 0.2] Membership Value = 0.0075
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Point A47: [5.1 3.8 1.6 0.2] Membership Value = 0.0124
Point A48: [4.6 3.2 1.4 0.2] Membership Value = 0.0131
Point A49: [5.3 3.7 1.5 0.2] Membership Value = 0.0122
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Point A140: [6.9 3.1 5.4 2.1] Membership Value = 0.0863
Point A141: [6.7 3.1 5.6 2.4] Membership Value = 0.0690
Point A142: [6.9 3.1 5.1 2.3] Membership Value = 0.1640
Point A143: [5.8 2.7 5.1 1.9] Membership Value = 0.5124
Point A144: [6.8 3.2 5.9 2.3] Membership Value = 0.0815
Point A145: [6.7 3.3 5.7 2.5] Membership Value = 0.0966
Point A146: [6.7 3.  5.2 2.3] Membership Value = 0.1048
Point A147: [6.3 2.5 5.  1.9] Membership Value = 0.5207
Point A148: [6.5 3.  5.2 2. ] Membership Value = 0.1079
Point A149: [6.2 3.4 5.4 2.3] Membership Value = 0.1552
Point A150: [5.9 3.  5.1 1.8] Membership Value = 0.5599
Cluster 4 - Centroid: [5.58496286 2.61662225 3.94912891 1.21211094]
Point A1: [5.1 3.5 1.4 0.2] Membership Value = 0.0028
Point A2: [4.9 3.  1.4 0.2] Membership Value = 0.0224
Point A3: [4.7 3.2 1.3 0.2] Membership Value = 0.0175
Point A4: [4.6 3.1 1.5 0.2] Membership Value = 0.0300
Point A5: [5.  3.6 1.4 0.2] Membership Value = 0.0045
Point A6: [5.4 3.9 1.7 0.4] Membership Value = 0.0556
Point A7: [4.6 3.4 1.4 0.3] Membership Value = 0.0180
Point A8: [5.  3.4 1.5 0.2] Membership Value = 0.0004
Point A9: [4.4 2.9 1.4 0.2] Membership Value = 0.0610
Point A10: [4.9 3.1 1.5 0.1] Membership Value = 0.0162
Point A11: [5.4 3.7 1.5 0.2] Membership Value = 0.0277
Point A12: [4.8 3.4 1.6 0.2] Membership Value = 0.0075
Point A13: [4.8 3.  1.4 0.1] Membership Value = 0.0266
Point A14: [4.3 3.  1.1 0.1] Membership Value = 0.0630
Point A15: [5.8 4.  1.2 0.2] Membership Value = 0.0803
Point A16: [5.7 4.4 1.5 0.4] Membership Value = 0.1094
Point A17: [5.4 3.9 1.3 0.4] Membership Value = 0.0428
Point A18: [5.1 3.5 1.4 0.3] Membership Value = 0.0029
Point A19: [5.7 3.8 1.7 0.3] Membership Value = 0.0781
Point A20: [5.1 3.8 1.5 0.3] Membership Value = 0.0181
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Point A21: [5.4 3.4 1.7 0.2] Membership Value = 0.0302
Point A22: [5.1 3.7 1.5 0.4] Membership Value = 0.0137
Point A23: [4.6 3.6 1.  0.2] Membership Value = 0.0327
Point A24: [5.1 3.3 1.7 0.5] Membership Value = 0.0217
Point A25: [4.8 3.4 1.9 0.2] Membership Value = 0.0330
Point A26: [5.  3.  1.6 0.2] Membership Value = 0.0261
Point A27: [5.  3.4 1.6 0.4] Membership Value = 0.0057
Point A28: [5.2 3.5 1.5 0.2] Membership Value = 0.0062
Point A29: [5.2 3.4 1.4 0.2] Membership Value = 0.0057
Point A30: [4.7 3.2 1.6 0.2] Membership Value = 0.0196
Point A31: [4.8 3.1 1.6 0.2] Membership Value = 0.0207
Point A32: [5.4 3.4 1.5 0.4] Membership Value = 0.0241
Point A33: [5.2 4.1 1.5 0.1] Membership Value = 0.0487
Point A34: [5.5 4.2 1.4 0.2] Membership Value = 0.0716
Point A35: [4.9 3.1 1.5 0.2] Membership Value = 0.0143
Point A36: [5.  3.2 1.2 0.2] Membership Value = 0.0127
Point A37: [5.5 3.5 1.3 0.2] Membership Value = 0.0304
Point A38: [4.9 3.6 1.4 0.1] Membership Value = 0.0074
Point A39: [4.4 3.  1.3 0.2] Membership Value = 0.0520
Point A40: [5.1 3.4 1.5 0.2] Membership Value = 0.0017
Point A41: [5.  3.5 1.3 0.3] Membership Value = 0.0042
Point A42: [4.5 2.3 1.3 0.3] Membership Value = 0.1230
Point A43: [4.4 3.2 1.3 0.2] Membership Value = 0.0406
Point A44: [5.  3.5 1.6 0.6] Membership Value = 0.0204
Point A45: [5.1 3.8 1.9 0.4] Membership Value = 0.0503
Point A46: [4.8 3.  1.4 0.3] Membership Value = 0.0259
Point A47: [5.1 3.8 1.6 0.2] Membership Value = 0.0205
Point A48: [4.6 3.2 1.4 0.2] Membership Value = 0.0229
Point A49: [5.3 3.7 1.5 0.2] Membership Value = 0.0200
Point A50: [5.  3.3 1.4 0.2] Membership Value = 0.0025
Point A51: [7.  3.2 4.7 1.4] Membership Value = 0.1222
Point A52: [6.4 3.2 4.5 1.5] Membership Value = 0.1037
Point A53: [6.9 3.1 4.9 1.5] Membership Value = 0.0901
Point A54: [5.5 2.3 4.  1.3] Membership Value = 0.8792
Point A55: [6.5 2.8 4.6 1.5] Membership Value = 0.0692
Point A56: [5.7 2.8 4.5 1.3] Membership Value = 0.4451
Point A57: [6.3 3.3 4.7 1.6] Membership Value = 0.0819
Point A58: [4.9 2.4 3.3 1. ] Membership Value = 0.6244
Point A59: [6.6 2.9 4.6 1.3] Membership Value = 0.1125
Point A60: [5.2 2.7 3.9 1.4] Membership Value = 0.8358
Point A61: [5.  2.  3.5 1. ] Membership Value = 0.6387
Point A62: [5.9 3.  4.2 1.5] Membership Value = 0.4259
Point A63: [6.  2.2 4.  1. ] Membership Value = 0.6768
Point A64: [6.1 2.9 4.7 1.4] Membership Value = 0.0331
Point A65: [5.6 2.9 3.6 1.3] Membership Value = 0.8178
Point A66: [6.7 3.1 4.4 1.4] Membership Value = 0.1519
Point A67: [5.6 3.  4.5 1.5] Membership Value = 0.3735
Point A68: [5.8 2.7 4.1 1. ] Membership Value = 0.8328
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Point A69: [6.2 2.2 4.5 1.5] Membership Value = 0.2825
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Point A71: [5.9 3.2 4.8 1.8] Membership Value = 0.1113
Point A72: [6.1 2.8 4.  1.3] Membership Value = 0.5852
Point A73: [6.3 2.5 4.9 1.5] Membership Value = 0.0924
Point A74: [6.1 2.8 4.7 1.2] Membership Value = 0.1272
Point A75: [6.4 2.9 4.3 1.3] Membership Value = 0.2072
Point A76: [6.6 3.  4.4 1.4] Membership Value = 0.1431
Point A77: [6.8 2.8 4.8 1.4] Membership Value = 0.1038
Point A78: [6.7 3.  5.  1.7] Membership Value = 0.0597
Point A79: [6.  2.9 4.5 1.5] Membership Value = 0.1090
Point A80: [5.7 2.6 3.5 1. ] Membership Value = 0.8098
Point A81: [5.5 2.4 3.8 1.1] Membership Value = 0.9190
Point A82: [5.5 2.4 3.7 1. ] Membership Value = 0.8737
Point A83: [5.8 2.7 3.9 1.2] Membership Value = 0.9214
Point A84: [6.  2.7 5.1 1.6] Membership Value = 0.0893
Point A85: [5.4 3.  4.5 1.5] Membership Value = 0.4592
Point A86: [6.  3.4 4.5 1.6] Membership Value = 0.1777
Point A87: [6.7 3.1 4.7 1.5] Membership Value = 0.0921
Point A88: [6.3 2.3 4.4 1.3] Membership Value = 0.3147
Point A89: [5.6 3.  4.1 1.3] Membership Value = 0.7594
Point A90: [5.5 2.5 4.  1.3] Membership Value = 0.9610
Point A91: [5.5 2.6 4.4 1.2] Membership Value = 0.7222
Point A92: [6.1 3.  4.6 1.4] Membership Value = 0.0608
Point A93: [5.8 2.6 4.  1.2] Membership Value = 0.9241
Point A94: [5.  2.3 3.3 1. ] Membership Value = 0.6410
Point A95: [5.6 2.7 4.2 1.3] Membership Value = 0.8677
Point A96: [5.7 3.  4.2 1.2] Membership Value = 0.6786
Point A97: [5.7 2.9 4.2 1.3] Membership Value = 0.7220
Point A98: [6.2 2.9 4.3 1.3] Membership Value = 0.2531
Point A99: [5.1 2.5 3.  1.1] Membership Value = 0.5721
Point A100: [5.7 2.8 4.1 1.3] Membership Value = 0.8656
Point A101: [6.3 3.3 6.  2.5] Membership Value = 0.0515
Point A102: [5.8 2.7 5.1 1.9] Membership Value = 0.1258
Point A103: [7.1 3.  5.9 2.1] Membership Value = 0.0229
Point A104: [6.3 2.9 5.6 1.8] Membership Value = 0.0351
Point A105: [6.5 3.  5.8 2.2] Membership Value = 0.0210
Point A106: [7.6 3.  6.6 2.1] Membership Value = 0.0106
Point A107: [4.9 2.5 4.5 1.7] Membership Value = 0.5024
Point A108: [7.3 2.9 6.3 1.8] Membership Value = 0.0115
Point A109: [6.7 2.5 5.8 1.8] Membership Value = 0.0552
Point A110: [7.2 3.6 6.1 2.5] Membership Value = 0.0352
Point A111: [6.5 3.2 5.1 2. ] Membership Value = 0.0352
Point A112: [6.4 2.7 5.3 1.9] Membership Value = 0.0416
Point A113: [6.8 3.  5.5 2.1] Membership Value = 0.0143
Point A114: [5.7 2.5 5.  2. ] Membership Value = 0.1791
Point A115: [5.8 2.8 5.1 2.4] Membership Value = 0.1238
Point A116: [6.4 3.2 5.3 2.3] Membership Value = 0.0231
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Point A117: [6.5 3.   5.5 1.8] Membership Value = 0.0192
Point A118: [7.7 3.8 6.7 2.2] Membership Value = 0.0390
Point A119: [7.7 2.6 6.9 2.3] Membership Value = 0.0381
Point A120: [6.   2.2 5.   1.5] Membership Value = 0.1980
Point A121: [6.9 3.2 5.7 2.3] Membership Value = 0.0278
Point A122: [5.6 2.8 4.9 2. ] Membership Value = 0.1878
Point A123: [7.7 2.8 6.7 2. ] Membership Value = 0.0217
Point A124: [6.3 2.7 4.9 1.8] Membership Value = 0.0568
Point A125: [6.7 3.3 5.7 2.1] Membership Value = 0.0225
Point A126: [7.2 3.2 6.   1.8] Membership Value = 0.0208
Point A127: [6.2 2.8 4.8 1.8] Membership Value = 0.0418
Point A128: [6.1 3.   4.9 1.8] Membership Value = 0.0539
Point A129: [6.4 2.8 5.6 2.1] Membership Value = 0.0194
Point A130: [7.2 3.   5.8 1.6] Membership Value = 0.0406
Point A131: [7.4 2.8 6.1 1.9] Membership Value = 0.0137
Point A132: [7.9 3.8 6.4 2. ] Membership Value = 0.0398
Point A133: [6.4 2.8 5.6 2.2] Membership Value = 0.0209
Point A134: [6.3 2.8 5.1 1.5] Membership Value = 0.0608
Point A135: [6.1 2.6 5.6 1.4] Membership Value = 0.1105
Point A136: [7.7 3.   6.1 2.3] Membership Value = 0.0140
Point A137: [6.3 3.4 5.6 2.4] Membership Value = 0.0416
Point A138: [6.4 3.1 5.5 1.8] Membership Value = 0.0231
Point A139: [6.   3.   4.8 1.8] Membership Value = 0.0670
Point A140: [6.9 3.1 5.4 2.1] Membership Value = 0.0235
Point A141: [6.7 3.1 5.6 2.4] Membership Value = 0.0223
Point A142: [6.9 3.1 5.1 2.3] Membership Value = 0.0461
Point A143: [5.8 2.7 5.1 1.9] Membership Value = 0.1258
Point A144: [6.8 3.2 5.9 2.3] Membership Value = 0.0293
Point A145: [6.7 3.3 5.7 2.5] Membership Value = 0.0346
Point A146: [6.7 3.   5.2 2.3] Membership Value = 0.0270
Point A147: [6.3 2.5 5.   1.9] Membership Value = 0.0883
Point A148: [6.5 3.   5.2 2. ] Membership Value = 0.0186
Point A149: [6.2 3.4 5.4 2.3] Membership Value = 0.0472
Point A150: [5.9 3.   5.1 1.8] Membership Value = 0.0908
Cluster 5 - Centroid: [4.99887813 3.41808593 1.46794162 0.24616089]
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Point A2: [4.9 3.   1.4 0.2] Membership Value = 0.9516
Point A3: [4.7 3.2 1.3 0.2] Membership Value = 0.9611
Point A4: [4.6 3.1 1.5 0.2] Membership Value = 0.9353
Point A5: [5.   3.6 1.4 0.2] Membership Value = 0.9899
Point A6: [5.4 3.9 1.7 0.4] Membership Value = 0.8741
Point A7: [4.6 3.4 1.4 0.3] Membership Value = 0.9601
Point A8: [5.   3.4 1.5 0.2] Membership Value = 0.9990
Point A9: [4.4 2.9 1.4 0.2] Membership Value = 0.8671
Point A10: [4.9 3.1 1.5 0.1] Membership Value = 0.9650
Point A11: [5.4 3.7 1.5 0.2] Membership Value = 0.9369
Point A12: [4.8 3.4 1.6 0.2] Membership Value = 0.9837
Point A13: [4.8 3.   1.4 0.1] Membership Value = 0.9420
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Point A16: [5.7 4.4 1.5 0.4] Membership Value = 0.7278
Point A17: [5.4 3.9 1.3 0.4] Membership Value = 0.8994
Point A18: [5.1 3.5 1.4 0.3] Membership Value = 0.9935
Point A19: [5.7 3.8 1.7 0.3] Membership Value = 0.8217
Point A20: [5.1 3.8 1.5 0.3] Membership Value = 0.9589
Point A21: [5.4 3.4 1.7 0.2] Membership Value = 0.9348
Point A22: [5.1 3.7 1.5 0.4] Membership Value = 0.9692
Point A23: [4.6 3.6 1.  0.2] Membership Value = 0.9232
Point A24: [5.1 3.3 1.7 0.5] Membership Value = 0.9545
Point A25: [4.8 3.4 1.9 0.2] Membership Value = 0.9309
Point A26: [5.  3.  1.6 0.2] Membership Value = 0.9449
Point A27: [5.  3.4 1.6 0.4] Membership Value = 0.9877
Point A28: [5.2 3.5 1.5 0.2] Membership Value = 0.9862
Point A29: [5.2 3.4 1.4 0.2] Membership Value = 0.9874
Point A30: [4.7 3.2 1.6 0.2] Membership Value = 0.9581
Point A31: [4.8 3.1 1.6 0.2] Membership Value = 0.9560
Point A32: [5.4 3.4 1.5 0.4] Membership Value = 0.9471
Point A33: [5.2 4.1 1.5 0.1] Membership Value = 0.8848
Point A34: [5.5 4.2 1.4 0.2] Membership Value = 0.8262
Point A35: [4.9 3.1 1.5 0.2] Membership Value = 0.9692
Point A36: [5.  3.2 1.2 0.2] Membership Value = 0.9714
Point A37: [5.5 3.5 1.3 0.2] Membership Value = 0.9304
Point A38: [4.9 3.6 1.4 0.1] Membership Value = 0.9833
Point A39: [4.4 3.  1.3 0.2] Membership Value = 0.8850
Point A40: [5.1 3.4 1.5 0.2] Membership Value = 0.9962
Point A41: [5.  3.5 1.3 0.3] Membership Value = 0.9906
Point A42: [4.5 2.3 1.3 0.3] Membership Value = 0.7335
Point A43: [4.4 3.2 1.3 0.2] Membership Value = 0.9095
Point A44: [5.  3.5 1.6 0.6] Membership Value = 0.9561
Point A45: [5.1 3.8 1.9 0.4] Membership Value = 0.8909
Point A46: [4.8 3.  1.4 0.3] Membership Value = 0.9442
Point A47: [5.1 3.8 1.6 0.2] Membership Value = 0.9538
Point A48: [4.6 3.2 1.4 0.2] Membership Value = 0.9496
Point A49: [5.3 3.7 1.5 0.2] Membership Value = 0.9547
Point A50: [5.  3.3 1.4 0.2] Membership Value = 0.9946
Point A51: [7.  3.2 4.7 1.4] Membership Value = 0.0227
Point A52: [6.4 3.2 4.5 1.5] Membership Value = 0.0113
Point A53: [6.9 3.1 4.9 1.5] Membership Value = 0.0156
Point A54: [5.5 2.3 4.  1.3] Membership Value = 0.0115
Point A55: [6.5 2.8 4.6 1.5] Membership Value = 0.0068
Point A56: [5.7 2.8 4.5 1.3] Membership Value = 0.0143
Point A57: [6.3 3.3 4.7 1.6] Membership Value = 0.0099
Point A58: [4.9 2.4 3.3 1. ] Membership Value = 0.1234
Point A59: [6.6 2.9 4.6 1.3] Membership Value = 0.0126
Point A60: [5.2 2.7 3.9 1.4] Membership Value = 0.0207
Point A61: [5.  2.  3.5 1. ] Membership Value = 0.0923
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Point A62: [5.9 3.   4.2 1.5] Membership Value = 0.0167
Point A63: [6.   2.2 4.   1. ] Membership Value = 0.0281
Point A64: [6.1 2.9 4.7 1.4] Membership Value = 0.0024
Point A65: [5.6 2.9 3.6 1.3] Membership Value = 0.0273
Point A66: [6.7 3.1 4.4 1.4] Membership Value = 0.0202
Point A67: [5.6 3.   4.5 1.5] Membership Value = 0.0176
Point A68: [5.8 2.7 4.1 1. ] Membership Value = 0.0116
Point A69: [6.2 2.2 4.5 1.5] Membership Value = 0.0194
Point A70: [5.6 2.5 3.9 1.1] Membership Value = 0.0035
Point A71: [5.9 3.2 4.8 1.8] Membership Value = 0.0117
Point A72: [6.1 2.8 4.   1.3] Membership Value = 0.0199
Point A73: [6.3 2.5 4.9 1.5] Membership Value = 0.0088
Point A74: [6.1 2.8 4.7 1.2] Membership Value = 0.0085
Point A75: [6.4 2.9 4.3 1.3] Membership Value = 0.0160
Point A76: [6.6 3.   4.4 1.4] Membership Value = 0.0160
Point A77: [6.8 2.8 4.8 1.4] Membership Value = 0.0147
Point A78: [6.7 3.   5.   1.7] Membership Value = 0.0092
Point A79: [6.   2.9 4.5 1.5] Membership Value = 0.0058
Point A80: [5.7 2.6 3.5 1. ] Membership Value = 0.0360
Point A81: [5.5 2.4 3.8 1.1] Membership Value = 0.0110
Point A82: [5.5 2.4 3.7 1. ] Membership Value = 0.0206
Point A83: [5.8 2.7 3.9 1.2] Membership Value = 0.0064
Point A84: [6.   2.7 5.1 1.6] Membership Value = 0.0089
Point A85: [5.4 3.   4.5 1.5] Membership Value = 0.0235
Point A86: [6.   3.4 4.5 1.6] Membership Value = 0.0183
Point A87: [6.7 3.1 4.7 1.5] Membership Value = 0.0130
Point A88: [6.3 2.3 4.4 1.3] Membership Value = 0.0205
Point A89: [5.6 3.   4.1 1.3] Membership Value = 0.0157
Point A90: [5.5 2.5 4.   1.3] Membership Value = 0.0035
Point A91: [5.5 2.6 4.4 1.2] Membership Value = 0.0146
Point A92: [6.1 3.   4.6 1.4] Membership Value = 0.0042
Point A93: [5.8 2.6 4.   1.2] Membership Value = 0.0053
Point A94: [5.   2.3 3.3 1. ] Membership Value = 0.1126
Point A95: [5.6 2.7 4.2 1.3] Membership Value = 0.0071
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Point A97: [5.7 2.9 4.2 1.3] Membership Value = 0.0127
Point A98: [6.2 2.9 4.3 1.3] Membership Value = 0.0138
Point A99: [5.1 2.5 3.   1.1] Membership Value = 0.1692
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Point A101: [6.3 3.3 6.   2.5] Membership Value = 0.0129
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Point A103: [7.1 3.   5.9 2.1] Membership Value = 0.0058
Point A104: [6.3 2.9 5.6 1.8] Membership Value = 0.0060
Point A105: [6.5 3.   5.8 2.2] Membership Value = 0.0045
Point A106: [7.6 3.   6.6 2.1] Membership Value = 0.0035
Point A107: [4.9 2.5 4.5 1.7] Membership Value = 0.0423
Point A108: [7.3 2.9 6.3 1.8] Membership Value = 0.0033
Point A109: [6.7 2.5 5.8 1.8] Membership Value = 0.0111
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Point A110: [7.2 3.6 6.1 2.5] Membership Value = 0.0110
Point A111: [6.5 3.2 5.1 2. ] Membership Value = 0.0059
Point A112: [6.4 2.7 5.3 1.9] Membership Value = 0.0062
Point A113: [6.8 3.  5.5 2.1] Membership Value = 0.0030
Point A114: [5.7 2.5 5.  2. ] Membership Value = 0.0186
Point A115: [5.8 2.8 5.1 2.4] Membership Value = 0.0185
Point A116: [6.4 3.2 5.3 2.3] Membership Value = 0.0044
Point A117: [6.5 3.  5.5 1.8] Membership Value = 0.0034
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Point A119: [7.7 2.6 6.9 2.3] Membership Value = 0.0131
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Point A121: [6.9 3.2 5.7 2.3] Membership Value = 0.0068
Point A122: [5.6 2.8 4.9 2. ] Membership Value = 0.0188
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Point A125: [6.7 3.3 5.7 2.1] Membership Value = 0.0052
Point A126: [7.2 3.2 6.  1.8] Membership Value = 0.0056
Point A127: [6.2 2.8 4.8 1.8] Membership Value = 0.0040
Point A128: [6.1 3.  4.9 1.8] Membership Value = 0.0057
Point A129: [6.4 2.8 5.6 2.1] Membership Value = 0.0036
Point A130: [7.2 3.  5.8 1.6] Membership Value = 0.0100
Point A131: [7.4 2.8 6.1 1.9] Membership Value = 0.0038
Point A132: [7.9 3.8 6.4 2. ] Membership Value = 0.0148
Point A133: [6.4 2.8 5.6 2.2] Membership Value = 0.0040
Point A134: [6.3 2.8 5.1 1.5] Membership Value = 0.0071
Point A135: [6.1 2.6 5.6 1.4] Membership Value = 0.0165
Point A136: [7.7 3.  6.1 2.3] Membership Value = 0.0044
Point A137: [6.3 3.4 5.6 2.4] Membership Value = 0.0093
Point A138: [6.4 3.1 5.5 1.8] Membership Value = 0.0041
Point A139: [6.  3.  4.8 1.8] Membership Value = 0.0063
Point A140: [6.9 3.1 5.4 2.1] Membership Value = 0.0051
Point A141: [6.7 3.1 5.6 2.4] Membership Value = 0.0051
Point A142: [6.9 3.1 5.1 2.3] Membership Value = 0.0098
Point A143: [5.8 2.7 5.1 1.9] Membership Value = 0.0136
Point A144: [6.8 3.2 5.9 2.3] Membership Value = 0.0073
Point A145: [6.7 3.3 5.7 2.5] Membership Value = 0.0086
Point A146: [6.7 3.  5.2 2.3] Membership Value = 0.0053
Point A147: [6.3 2.5 5.  1.9] Membership Value = 0.0105
Point A148: [6.5 3.  5.2 2. ] Membership Value = 0.0030
Point A149: [6.2 3.4 5.4 2.3] Membership Value = 0.0096
Point A150: [5.9 3.  5.1 1.8] Membership Value = 0.0105


---Custom Dataset---
FOR CLUSTER VALUE 3
Cluster 1 - Centroid: [4.11887865 4.73319685]
Point A1: [ 2. 10.] Membership Value = 0.1035
Point A2: [2. 6.] Membership Value = 0.6731
Point A3: [11. 11.] Membership Value = 0.0174
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Point A4: [6. 9.] Membership Value = 0.1463
Point A5: [6. 4.] Membership Value = 0.8441
Point A6: [1. 2.] Membership Value = 0.7230
Point A7: [ 5. 10.] Membership Value = 0.0529
Point A8: [4. 9.] Membership Value = 0.0069
Point A9: [10. 12.] Membership Value = 0.0070
Point A10: [7. 5.] Membership Value = 0.6791
Point A11: [ 9. 11.] Membership Value = 0.0099
Point A12: [4. 6.] Membership Value = 0.8532
Point A13: [ 3. 10.] Membership Value = 0.0391
Point A14: [3. 8.] Membership Value = 0.1699
Point A15: [ 6. 11.] Membership Value = 0.1012
Cluster 2 - Centroid: [ 9.76678713 11.24256322]
Point A1: [ 2. 10.] Membership Value = 0.0539
Point A2: [2. 6.] Membership Value = 0.0467
Point A3: [11. 11.] Membership Value = 0.9544
Point A4: [6. 9.] Membership Value = 0.1656
Point A5: [6. 4.] Membership Value = 0.0516
Point A6: [1. 2.] Membership Value = 0.0766
Point A7: [ 5. 10.] Membership Value = 0.0622
Point A8: [4. 9.] Membership Value = 0.0033
Point A9: [10. 12.] Membership Value = 0.9792
Point A10: [7. 5.] Membership Value = 0.1219
Point A11: [ 9. 11.] Membership Value = 0.9685
Point A12: [4. 6.] Membership Value = 0.0227
Point A13: [ 3. 10.] Membership Value = 0.0239
Point A14: [3. 8.] Membership Value = 0.0360
Point A15: [ 6. 11.] Membership Value = 0.3040
Cluster 3 - Centroid: [3.87616593 9.33544625]
Point A1: [ 2. 10.] Membership Value = 0.8425
Point A2: [2. 6.] Membership Value = 0.2802
Point A3: [11. 11.] Membership Value = 0.0282
Point A4: [6. 9.] Membership Value = 0.6881
Point A5: [6. 4.] Membership Value = 0.1043
Point A6: [1. 2.] Membership Value = 0.2003
Point A7: [ 5. 10.] Membership Value = 0.8849
Point A8: [4. 9.] Membership Value = 0.9897
Point A9: [10. 12.] Membership Value = 0.0138
Point A10: [7. 5.] Membership Value = 0.1990
Point A11: [ 9. 11.] Membership Value = 0.0216
Point A12: [4. 6.] Membership Value = 0.1240
Point A13: [ 3. 10.] Membership Value = 0.9370
Point A14: [3. 8.] Membership Value = 0.7942
Point A15: [ 6. 11.] Membership Value = 0.5948
FOR CLUSTER VALUE 5
Cluster 1 - Centroid: [10.01607353 11.35453052]
Point A1: [ 2. 10.] Membership Value = 0.0227
Point A2: [2. 6.] Membership Value = 0.0396
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Point A3: [11. 11.] Membership Value = 0.9315
Point A4: [6. 9.] Membership Value = 0.0398
Point A5: [6. 4.] Membership Value = 0.0064
Point A6: [1. 2.] Membership Value = 0.0007
Point A7: [ 5. 10.] Membership Value = 0.0077
Point A8: [4. 9.] Membership Value = 0.0184
Point A9: [10. 12.] Membership Value = 0.9689
Point A10: [7. 5.] Membership Value = 0.0147
Point A11: [ 9. 11.] Membership Value = 0.8738
Point A12: [4. 6.] Membership Value = 0.0414
Point A13: [ 3. 10.] Membership Value = 0.0164
Point A14: [3. 8.] Membership Value = 0.0135
Point A15: [ 6. 11.] Membership Value = 0.0759
Cluster 2 - Centroid: [5.45314795 9.87572064]
Point A1: [ 2. 10.] Membership Value = 0.1257
Point A2: [2. 6.] Membership Value = 0.1365
Point A3: [11. 11.] Membership Value = 0.0318
Point A4: [6. 9.] Membership Value = 0.8103
Point A5: [6. 4.] Membership Value = 0.0128
Point A6: [1. 2.] Membership Value = 0.0014
Point A7: [ 5. 10.] Membership Value = 0.9434
Point A8: [4. 9.] Membership Value = 0.2668
Point A9: [10. 12.] Membership Value = 0.0160
Point A10: [7. 5.] Membership Value = 0.0278
Point A11: [ 9. 11.] Membership Value = 0.0731
Point A12: [4. 6.] Membership Value = 0.1569
Point A13: [ 3. 10.] Membership Value = 0.1390
Point A14: [3. 8.] Membership Value = 0.0858
Point A15: [ 6. 11.] Membership Value = 0.7895
Cluster 3 - Centroid: [6.17738878 4.66160318]
Point A1: [ 2. 10.] Membership Value = 0.0327
Point A2: [2. 6.] Membership Value = 0.1911
Point A3: [11. 11.] Membership Value = 0.0161
Point A4: [6. 9.] Membership Value = 0.0458
Point A5: [6. 4.] Membership Value = 0.9511
Point A6: [1. 2.] Membership Value = 0.0033
Point A7: [ 5. 10.] Membership Value = 0.0070
Point A8: [4. 9.] Membership Value = 0.0326
Point A9: [10. 12.] Membership Value = 0.0059
Point A10: [7. 5.] Membership Value = 0.9178
Point A11: [ 9. 11.] Membership Value = 0.0210
Point A12: [4. 6.] Membership Value = 0.4116
Point A13: [ 3. 10.] Membership Value = 0.0217
Point A14: [3. 8.] Membership Value = 0.0385
Point A15: [ 6. 11.] Membership Value = 0.0307
Cluster 4 - Centroid: [2.92761938 8.9844002 ]
Point A1: [ 2. 10.] Membership Value = 0.7938
Point A2: [2. 6.] Membership Value = 0.3765
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Point A3: [11. 11.] Membership Value = 0.0147
Point A4: [6. 9.] Membership Value = 0.0915
Point A5: [6. 4.] Membership Value = 0.0130
Point A6: [1. 2.] Membership Value = 0.0021
Point A7: [ 5. 10.] Membership Value = 0.0391
Point A8: [4. 9.] Membership Value = 0.6677
Point A9: [10. 12.] Membership Value = 0.0068
Point A10: [7. 5.] Membership Value = 0.0224
Point A11: [ 9. 11.] Membership Value = 0.0247
Point A12: [4. 6.] Membership Value = 0.2673
Point A13: [ 3. 10.] Membership Value = 0.8094
Point A14: [3. 8.] Membership Value = 0.8393
Point A15: [ 6. 11.] Membership Value = 0.0914
Cluster 5 - Centroid: [1.11152629 2.31721582]
Point A1: [ 2. 10.] Membership Value = 0.0251
Point A2: [2. 6.] Membership Value = 0.2563
Point A3: [11. 11.] Membership Value = 0.0059
Point A4: [6. 9.] Membership Value = 0.0126
Point A5: [6. 4.] Membership Value = 0.0167
Point A6: [1. 2.] Membership Value = 0.9925
Point A7: [ 5. 10.] Membership Value = 0.0028
Point A8: [4. 9.] Membership Value = 0.0145
Point A9: [10. 12.] Membership Value = 0.0023
Point A10: [7. 5.] Membership Value = 0.0173
Point A11: [ 9. 11.] Membership Value = 0.0074
Point A12: [4. 6.] Membership Value = 0.1227
Point A13: [ 3. 10.] Membership Value = 0.0134
Point A14: [3. 8.] Membership Value = 0.0228
Point A15: [ 6. 11.] Membership Value = 0.0124
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