

pgm7.py

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1  '''exp-7:Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data
   set for
2  clustering using k-Means algorithm. Compare the results of these two algorithms and
3  comment on the quality of clustering. You can add Python ML library classes/API in the
4  program.'''
5
6  from sklearn.cluster import KMeans
7  from sklearn.mixture import GaussianMixture
8  import sklearn.metrics as metrics
9  import pandas as pd
10 import numpy as np
11 import matplotlib.pyplot as plt
12
13 names = ['Sepal_Length', 'Sepal_Width', 'Petal_Length', 'Petal_Width', 'Class']
14
15 dataset = pd.read_csv("pgm7.csv", names=names) #dataset
16
17 X = dataset.iloc[:, :-1]
18
19 label = {'Iris-setosa': 0, 'Iris-versicolor': 1, 'Iris-virginica': 2}
20
21 y = [label[c] for c in dataset.iloc[:, -1]]
22
23 plt.figure(figsize=(14,7))
24 colormap=np.array(['red', 'lime', 'black'])
25
26 # REAL PLOT
27 plt.subplot(1,3,1)
28 plt.title('Real')
29 plt.scatter(X.Petal_Length,X.Petal_Width,c=colormap[y])
30
31 # K-PLOT
32 model=KMeans(n_clusters=3, random_state=0).fit(X)
33 plt.subplot(1,3,2)
34 plt.title('KMeans')
35 plt.scatter(X.Petal_Length,X.Petal_Width,c=colormap[model.labels_])
36
37 print('The accuracy score of K-Mean: ',metrics.accuracy_score(y, model.labels_))
38 print('The Confusion matrix of K-Mean:\n',metrics.confusion_matrix(y, model.labels_))
39
40 # GMM PLOT
41 gmm=GaussianMixture(n_components=3, random_state=0).fit(X)
42 y_cluster_gmm=gmm.predict(X)
43 plt.subplot(1,3,3)
44 plt.title('GMM Classification')
45 plt.scatter(X.Petal_Length,X.Petal_Width,c=colormap[y_cluster_gmm])
46
47 print('The accuracy score of EM: ',metrics.accuracy_score(y, y_cluster_gmm))
48 print('The Confusion matrix of EM:\n ',metrics.confusion_matrix(y, y_cluster_gmm))
49
50 '''OUTPUT
51 The accuracy score of K-Mean:  0.24

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52 The Confusion matrixof K-Mean:
53 [[ 0 50  0]
54 [48  0  2]
55 [14  0 36]]
56 The accuracy score of EM:  0.36666666666666664
57 The Confusion matrix of EM:
58 [[50  0  0]
59 [ 0  5 45]
60 [ 0 50  0]]
61 '''
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