from sklearn.cluster import KMeans

from sklearn.mixture import GaussianMixture

import sklearn.metrics as metrics

import pandas as pd

import numpy as np

import matplotlib.pyplot as plt

names = ['Sepal\_Length','Sepal\_Width','Petal\_Length','Petal\_Width', 'Class']

dataset = pd.read\_csv("8-dataset.csv", names=names)

X = dataset.iloc[:, :-1]

label = {'Iris-setosa': 0,'Iris-versicolor': 1, 'Iris-virginica': 2}

y = [label[c] for c in dataset.iloc[:, -1]]

plt.figure(figsize=(14,7))

colormap=np.array(['red','lime','black'])

# REAL PLOT

plt.subplot(1,3,1)

plt.title('Real')

plt.scatter(X.Petal\_Length,X.Petal\_Width,c=colormap[y])

# K-PLOT

model=KMeans(n\_clusters=3, random\_state=0).fit(X)

plt.subplot(1,3,2)

plt.title('KMeans')

plt.scatter(X.Petal\_Length,X.Petal\_Width,c=colormap[model.labels\_])

print('The accuracy score of K-Mean: ',metrics.accuracy\_score(y, model.labels\_))

print('The Confusion matrixof K-Mean:\n',metrics.confusion\_matrix(y, model.labels\_))

# GMM PLOT

gmm=GaussianMixture(n\_components=3, random\_state=0).fit(X)

y\_cluster\_gmm=gmm.predict(X)

plt.subplot(1,3,3)

plt.title('GMM Classification')

plt.scatter(X.Petal\_Length,X.Petal\_Width,c=colormap[y\_cluster\_gmm])

print('The accuracy score of EM: ',metrics.accuracy\_score(y, y\_cluster\_gmm))

print('The Confusion matrix of EM:\n ',metrics.confusion\_matrix(y, y\_cluster\_gmm))

OutPut:

The accuracy score of K-Mean: 0.24

The Confusion matrixof K-Mean:

[[ 0 50 0]

[48 0 2]

[14 0 36]]

The accuracy score of EM: 0.36666666666666664

The Confusion matrix of EM:

[[50 0 0]

[ 0 5 45]

[ 0 50 0]]

