**7. K MEANS VS EM.ipynb**

**import matplotlib.pyplot as plt**

**from sklearn import datasets**

**from sklearn.cluster import KMeans**

**from sklearn.mixture import GaussianMixture**

**import sklearn.metrics as sm**

**import pandas as pd**

**import numpy as np**

**iris = datasets.load\_iris()**

**X = pd.DataFrame(iris.data)**

**X.columns = ['Sepal\_Length','Sepal\_Width','Petal\_Length','Petal\_Width']**

**Y = pd.DataFrame(iris.target)**

**Y.columns = ['Targets']**

**print(X)**

**print(Y)**

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

**plt.subplot(1,2,1)**

**plt.scatter(X.Petal\_Length, X.Petal\_Width, c=colormap[Y.Targets], s=40)**

**plt.title('Real Clustering')**

**model1 = KMeans(n\_clusters=3)**

**model1.fit(X)**

**plt.subplot(1,2,2)**

**plt.scatter(X.Petal\_Length, X.Petal\_Width, c=colormap[model1.labels\_], s=40)**

**plt.title('K Mean Clustering')**

**plt.show()**

**model2 = GaussianMixture(n\_components=3)**

**model2.fit(X)**

**plt.subplot(1,2,1)**

**plt.scatter(X.Petal\_Length, X.Petal\_Width, c=colormap[model2.predict(X)], s=40)**

**plt.title('EM Clustering')**

**plt.show()**

**print("Actual Target is:\n", iris.target)**

**print("K Means:\n",model1.labels\_)**

**print("EM:\n",model2.predict(X))**

**print("Accuracy of KMeans is ",sm.accuracy\_score(Y,model1.labels\_))**

**print("Accuracy of EM is ",sm.accuracy\_score(Y, model2.predict(X)))**