math456 hw8

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April 2022

1 Code

This code is in Python which I wrote in Jupyter notebooks

import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.cluster import SpectralClustering
from sklearn.cluster import KMeans

from sklearn.datasets import make$_circles$

X, y = make$_circles(n_samples = 200, noise = 0.1)$

df = df = pd.DataFrame(dict(x=X[:,0], y=X[:,1], label = y))
colors = 0:'red',1:'blue'
fig, ax = plt.subplots()
grouped = df.groupby('label')
for key, group in grouped:
group.plot(ax = ax, kind = 'scatter', x = 'x', y = 'y', label = key, color = colors[key])
plt.show()

sc = SpectralClustering(n$_clusters = 2).fit(x)$
$print(sc)$
$identified_clusters1 = sc.fit_predict(X)$
$identified_clusters1$

kmeans = KMeans(n$_clusters = 2).fit(X)$
$print('')$
$print('From K - Means :')$
$identified_clusters2 = kmeans.fit_predict(X)$
$identified_clusters2$

OUTPUT IS OUTPUT#1 FILE

import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

from sklearn.datasets import make$_moons$

X, y = make$_moons(n_samples = 200, noise = 0.1)$

df = df = pd.DataFrame(dict(x=X[:,0], y=X[:,1], label = y))
colors = 0:'red',1:'blue'
fig, ax = plt.subplots()
grouped = df.groupby('label')
for key, group in grouped:
group.plot(ax = ax, kind = 'scatter', x = 'x', y = 'y', label = key, color = colors[key])
plt.show()

sc = SpectralClustering(n$_clusters = 2).fit(x)$
$print(sc)$
$identified_clusters1 = sc.fit_predict(X)$
$identified_clusters1$

kmeans = KMeans(n$_clusters = 2).fit(X)$
$print('')$
$print('FromK - Means :')$
$identified_clusters2 = kmeans.fit_predict(X)$
$identified_clusters2$

OUTPUT IS OUTPUT#2 FILE

2 My findings

Based on the outputs I think that the k-means algorithm did a better and more accurate job at clustering than the spectral clustering did. The k-means clustering looked very clean and with no errors but I thought that the spectral clustering had some errors as I believe some of the data points were clustered incorrectly.