Please write a program to perform one of the following tasks on the IRIS data.

1. k-means clustering algorithm

In IRIS data every sample was labeled with a class of flower among three. Please perform clustering with three clusters, and compare the clustering result with the class labels and have a few discussions.

1. t-SNE for reducing every samples as 2D points

The 4D samples of IRIS dataset could be converted into 2D points through t-SNE algorithm, which may be further visualized on a plane. Please perform t-SNE to produce 2D points, and use three colors corresponding to the class labels to display the 2D points.

請編寫一個程式來對IRIS數據執行以下任務之一。

k-means 聚類演算法

在IRIS數據中，每個樣本都用三朵花中的一類標記。請對三個聚類進行聚類分析，並將聚類結果與類標籤進行比較，並進行一些討論。

t-SNE 用於將每個樣品減少為 2D 點

IRIS數據集的4D樣本可以通過t-SNE演算法轉換為2D點，並在平面上進一步可視化。請執行 t-SNE 生成 2D 點，並使用類標籤對應的三種顏色顯示 2D 點。

I choose question2 to switch the 4Dpoints to 2Dpoints through t-SNE algorithm.

there is my visiualized png result below :

一張含有 文字, 螢幕擷取畫面, 圖表, 行 的圖片

自動產生的描述

import pandas as pd

from sklearn.manifold import TSNE

import matplotlib.pyplot as plt

# 讀取 iris 數據集

data = pd.read\_csv('D:/GitHub/NTUST/112-2/MI5118701 人工智慧技術與商業應用/iris.csv')

# 提取特徵和標籤

features = data.iloc[:, :-1].values

labels = data.iloc[:, -1].values

# 使用 t-SNE 進行降維

tsne = TSNE(n\_components=2, random\_state=0)

tsne\_results = tsne.fit\_transform(features)

# 將 t-SNE 結果轉換為 DataFrame

tsne\_df = pd.DataFrame(tsne\_results, columns=['Dimension 1', 'Dimension 2'])

tsne\_df['Label'] = labels

# 顏色字典

colors = {'setosa': 'red', 'versicolor': 'green', 'virginica': 'blue'}

# 繪製 t-SNE 結果

plt.figure(figsize=(10, 8))

for label in tsne\_df['Label'].unique():

    subset = tsne\_df[tsne\_df['Label'] == label]

    plt.scatter(subset['Dimension 1'], subset['Dimension 2'], c=colors[label], label=label)

plt.legend()

plt.title('t-SNE visualization of Iris dataset')

plt.xlabel('Dimension 1')

plt.ylabel('Dimension 2')

plt.savefig('iris\_tsne\_visualization.png')

plt.show()