import pandas as pd

url = "https://media.geeksforgeeks.org/wp-content/uploads/Wine.csv"

df = pd.read\_csv(url)

target\_col = 'Customer\_Segment'

y = df[target\_col]

X = df.drop(columns=[target\_col])

scaler = StandardScaler()

X\_scaled = scaler.fit\_transform(X)

pca = PCA(n\_components=0.95, random\_state=42)

X\_pca = pca.fit\_transform(X\_scaled)

pc\_cols = [f'PC{i+1}' for i in range(X\_pca.shape[1])]

df\_pca = pd.DataFrame(X\_pca, columns=pc\_cols)

df\_pca['Segment'] = y

print(f"Original features: {X.shape[1]}")

print(f"PCA reduced to : {X\_pca.shape[1]} components")

print("Explained Variance Ratio:", pca.explained\_variance\_ratio\_)

plt.figure(figsize=(8,6))

sns.scatterplot(

data=df\_pca,

x='PC1', y='PC2',

hue='Segment',

palette='Set1',

alpha=0.8

)

plt.title("PCA - Wine Dataset (by Customer Segment)")

plt.tight\_layout()

plt.show()

Output:-

Original features: 13

PCA reduced to : 10 components

Explained Variance Ratio: [0.36198848 0.1920749 0.11123631 0.0706903 0.06563294 0.04935823

0.04238679 0.02680749 0.02222153 0.01930019]

