

Practical – 7

Aim: Write a program for Automatic grouping of similar objects into sets.

- Code:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.cluster import KMeans
from sklearn.preprocessing import StandardScaler
from sklearn.decomposition import PCA

data_set = pd.read_csv('/content/drive/MyDrive/temp/practical_4_2.csv')
X = data_set[['Match_Duration', 'Loot_Collected', 'Enemies_Defeated']]

scaler = StandardScaler()
X_scaled = scaler.fit_transform(X)

k = 3
kmeans = KMeans(n_clusters=k, random_state=42)
clusters = kmeans.fit_predict(X_scaled)
centroids = kmeans.cluster_centers_

pca = PCA(n_components=2)
X_pca = pca.fit_transform(X_scaled)
centroids_pca = pca.transform(centroids)

data_set['Cluster'] = clusters

colors = ['red', 'green', 'blue']
labels = [f'Cluster {i}' for i in range(k)]

plt.figure(figsize=(10, 7))
for i in range(k):
    plt.scatter(X_pca[clusters == i, 0], X_pca[clusters == i, 1],
                c=colors[i], label=labels[i])

plt.scatter(centroids_pca[:, 0], centroids_pca[:, 1],
            s=200, c='yellow', marker='X', label='Centroids')

new_point = np.array([[26, 77, 15]])
new_point_scaled = scaler.transform(new_point)
new_point_cluster = kmeans.predict(new_point_scaled)[0]
new_point_pca = pca.transform(new_point_scaled)

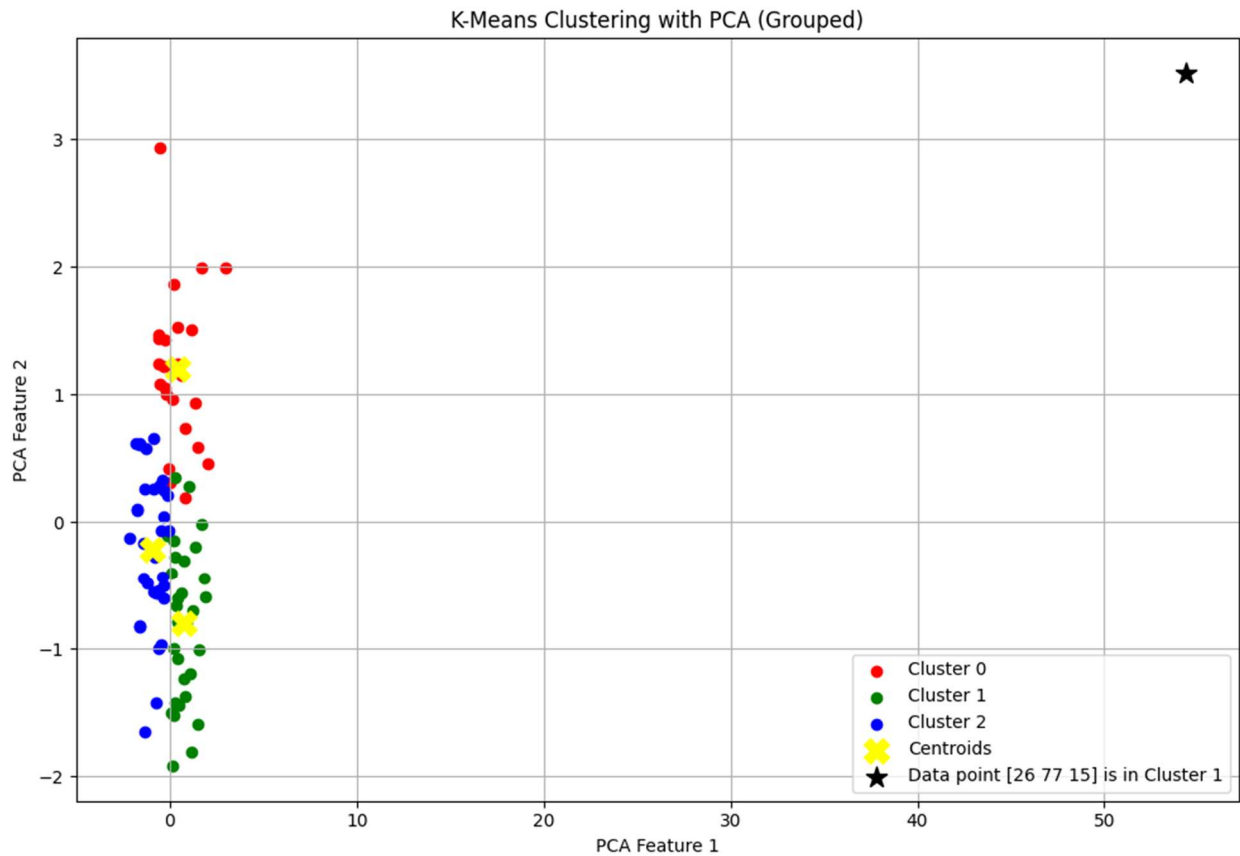
plt.scatter(new_point_pca[0, 0], new_point_pca[0, 1],
            c='black', s=150, marker='*', label=f'Data point {new_point[0]} is in Cluster {new_point_cluster}')
```

```

plt.title("K-Means Clustering with PCA (Grouped)")
plt.xlabel("PCA Feature 1")
plt.ylabel("PCA Feature 2")
plt.legend()
plt.grid(True)
plt.tight_layout()
plt.show()

```

- Output



Faculty Signature: _____

Date: _____