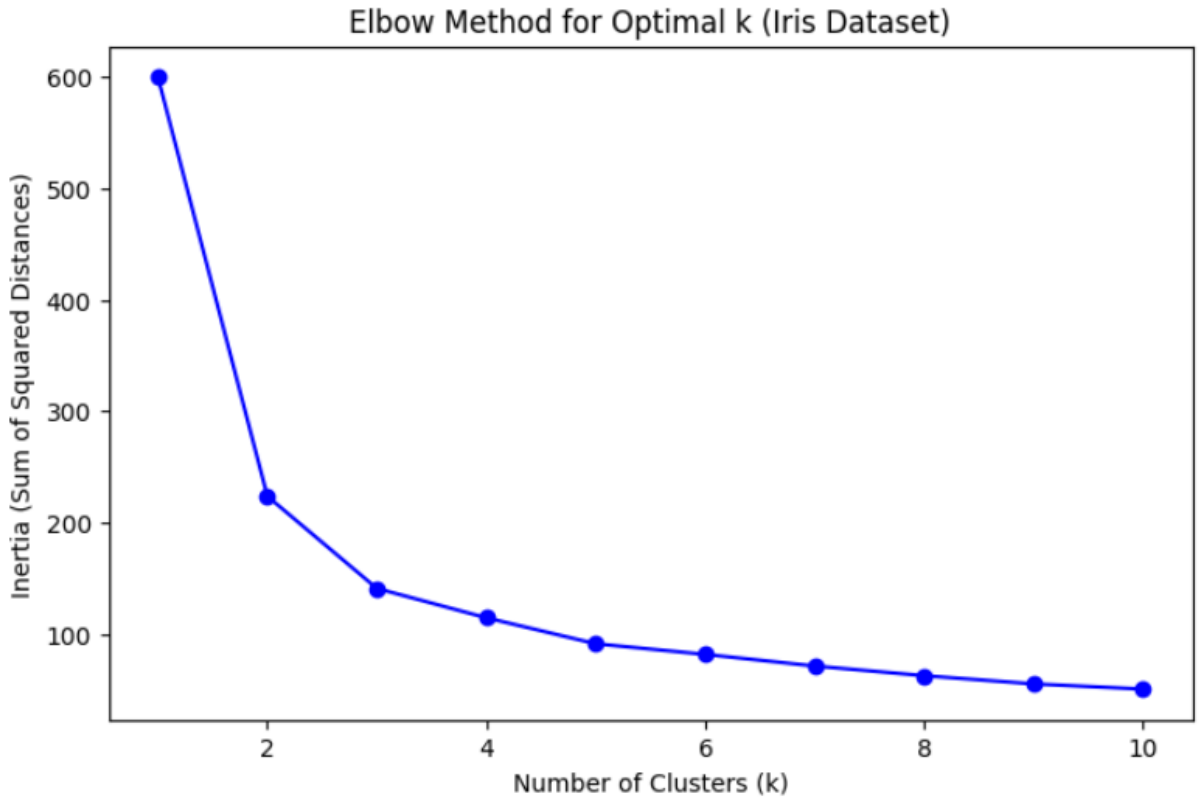
```
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.cluster import KMeans
from sklearn.preprocessing import StandardScaler

data = pd.read_csv("iris.csv")
X = data.drop(columns=["Id", "Species"], errors="ignore")

scaler = StandardScaler()
X_scaled = scaler.fit_transform(X)
inertia = []
K_range = range(1, 11)

for k in K_range:
    kmeans = KMeans(n_clusters=k, random_state=42, n_init=10)
    kmeans.fit(X_scaled)
    inertia.append(kmeans.inertia_)

plt.figure(figsize=(8, 5))
plt.plot(K_range, inertia, 'bo-')
plt.xlabel("Number of Clusters (k)")
plt.ylabel("Inertia (Sum of Squared Distances)")
plt.title("Elbow Method for Optimal k (Iris Dataset)")
plt.show()

k_opt = 3
kmeans = KMeans(n_clusters=k_opt, random_state=42, n_init=10)
clusters = kmeans.fit_predict(X_scaled)

data["Cluster"] = clusters
print(data.head())
```

Output:-



	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species \
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa

	Cluster
0	1
1	1
2	1
3	1
4	1