

```
In [3]: import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.decomposition import PCA
from sklearn.preprocessing import StandardScaler
```

```
df = pd.read_csv('Iris.csv')
print("Dataset preview:")
print(df.head())
```

Dataset preview:

	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

```
In [4]: X = df.iloc[:, :-1].values
y = df.iloc[:, -1].values

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

pca = PCA(n_components=2)
X_pca = pca.fit_transform(X_scaled)

unique_labels = np.unique(y)

plt.figure(figsize=(8, 6))
for target in unique_labels:
    plt.scatter(X_pca[y == target, 0], X_pca[y == target, 1], label=target, alpha=0.7)

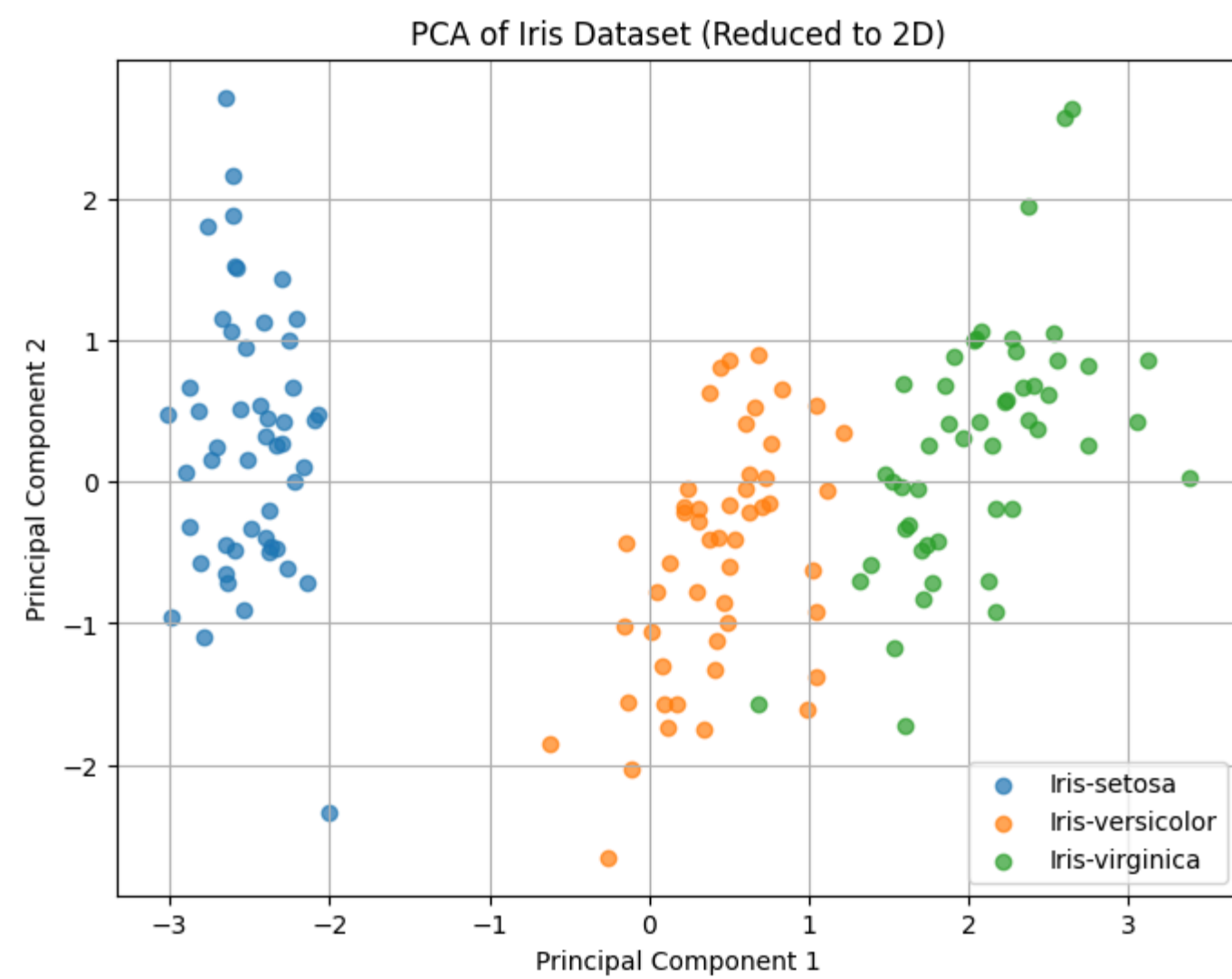
print("\nOriginal dataset shape:", X_scaled.shape)
print("Reduced dataset shape:", X_pca.shape)

plt.title('PCA of Iris Dataset (Reduced to 2D)')
plt.xlabel('Principal Component 1')
plt.ylabel('Principal Component 2')
plt.legend()
plt.grid(True)
plt.show()

print("Explained variance ratio:", pca.explained_variance_ratio_)
```

Original dataset shape: (150, 5)

Reduced dataset shape: (150, 2)



Explained variance ratio: [0.7470533 0.18435257]

In []: