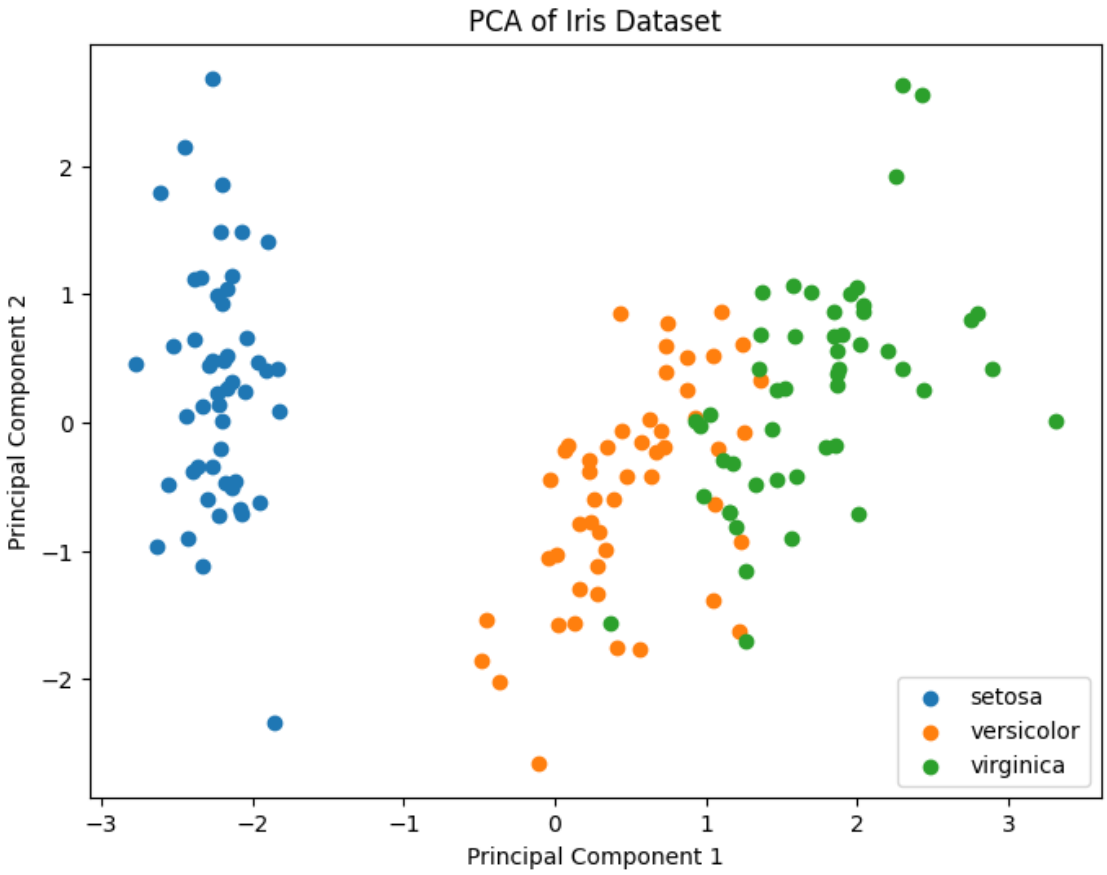
exp8-principal-component-analysis

```python
# Import necessary libraries
import numpy as np
import matplotlib.pyplot as plt
from sklearn.datasets import load_iris
from sklearn.decomposition import PCA
from sklearn.preprocessing import StandardScaler

# Load the Iris dataset
data = load_iris()
X = data.data
y = data.target

# Standardize the data
scaler = StandardScaler()
X_scaled = scaler.fit_transform(X)

# Initialize PCA to reduce the data to 2 principal components
pca = PCA(n_components=2)
X_pca = pca.fit_transform(X_scaled)

# Plot the data in the reduced 2D PCA space
plt.figure(figsize=(8, 6))
plt.scatter(X_pca[y == 0, 0], X_pca[y == 0, 1], label=data.target_names[0])
plt.scatter(X_pca[y == 1, 0], X_pca[y == 1, 1], label=data.target_names[1])
plt.scatter(X_pca[y == 2, 0], X_pca[y == 2, 1], label=data.target_names[2])
plt.xlabel('Principal Component 1')
plt.ylabel('Principal Component 2')
plt.title('PCA of Iris Dataset')
plt.legend()
plt.show()

# Print the explained variance ratio
print("Explained Variance Ratio:", pca.explained_variance_ratio_)
```




```
Explained Variance Ratio: [0.72962445 0.22850762]
```