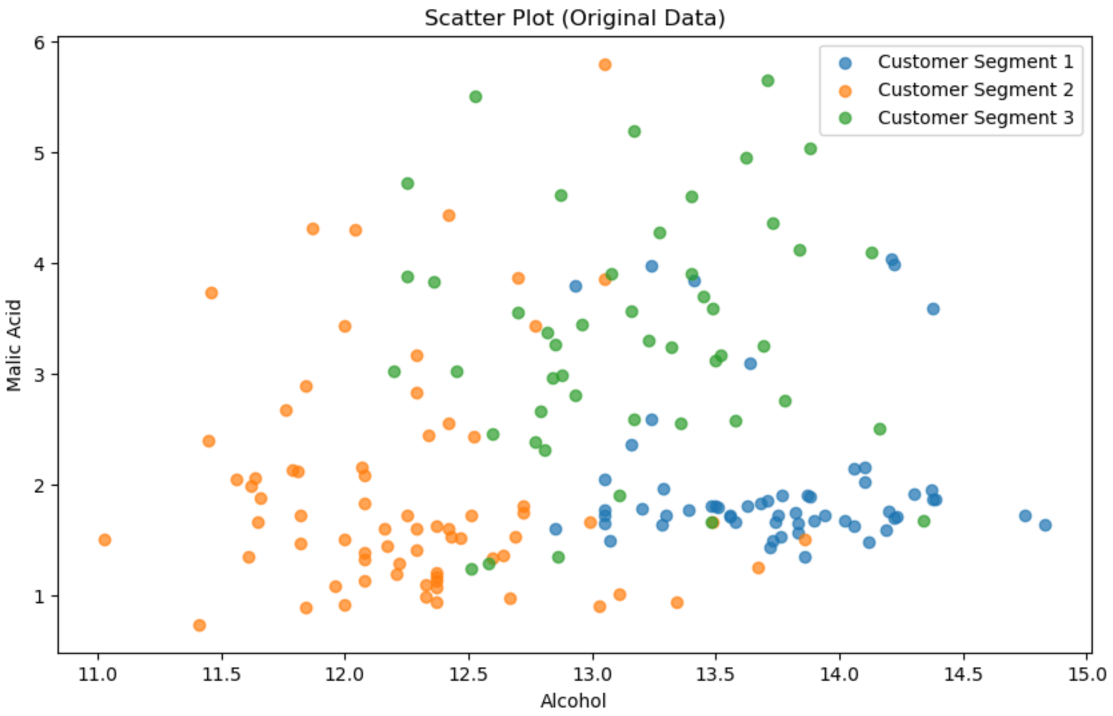
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn.preprocessing import StandardScaler
from sklearn.decomposition import PCA
```

```
df = pd.read_csv("C://Users//Aarya Kulkarni//Downloads//archive//wine.csv")
```

```
# Separating features and target variable
X = df.drop(columns=['Customer_Segment'])  # Features
y = df['Customer_Segment']  # Type of wine
```

```
# Scatter plot before applying PCA
plt.figure(figsize=(10, 6))
plt.scatter(X[y == 1]['Alcohol'], X[y == 1]['Malic_Acid'], label='Customer Segment 1', alpha=0.7)
plt.scatter(X[y == 2]['Alcohol'], X[y == 2]['Malic_Acid'], label='Customer Segment 2', alpha=0.7)
plt.scatter(X[y == 3]['Alcohol'], X[y == 3]['Malic_Acid'], label='Customer Segment 3', alpha=0.7)
plt.xlabel('Alcohol')
plt.ylabel('Malic Acid')
plt.legend()
plt.title('Scatter Plot (Original Data)')
plt.show()
```

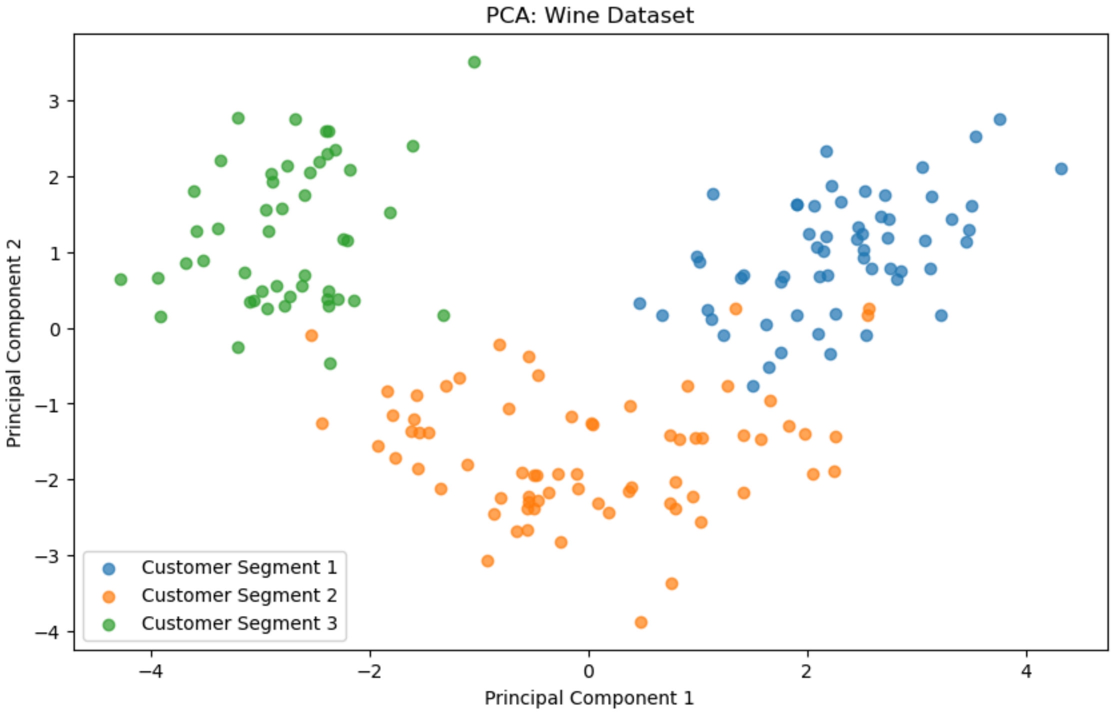


```
# Standardize the features
scaler = StandardScaler()
X_scaled = scaler.fit_transform(X)
```

```
# Apply PCA
pca = PCA(n_components=2)
X_pca = pca.fit_transform(X_scaled)
```

```
# Create a new DataFrame with the first two principal components
pca_df = pd.DataFrame(data=X_pca, columns=['Principal Component 1', 'Principal Component 2'])
pca_df['Customer_Segment'] = y
```

```
# Visualize the data using the first two principal components
plt.figure(figsize=(10, 6))
plt.scatter(pca_df[pca_df['Customer_Segment'] == 1]['Principal Component 1'], pca_df[pca_df['Customer_Segment'] == 1]['Princi
plt.scatter(pca_df[pca_df['Customer_Segment'] == 2]['Principal Component 1'], pca_df[pca_df['Customer_Segment'] == 2]['Princi
plt.scatter(pca_df[pca_df['Customer_Segment'] == 3]['Principal Component 1'], pca_df[pca_df['Customer_Segment'] == 3]['Princi
plt.xlabel('Principal Component 1')
plt.ylabel('Principal Component 2')
plt.legend()
plt.title('PCA: Wine Dataset')
plt.show()
```



```
Start coding or generate with AI.
```