

A PYTHON PROGRAM TO IMPLEMENT DIMENSIONALITY REDUCTION USING PCA

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Code:

```
from sklearn import datasets
import pandas as pd
from sklearn.preprocessing import StandardScaler
from sklearn.decomposition import PCA
import seaborn as sns

import matplotlib.pyplot as plt

iris = datasets.load_iris()
df = pd.DataFrame(iris['data'], columns=iris['feature_names'])
print(df.head())

scalar = StandardScaler()
scaled_data = pd.DataFrame(scalar.fit_transform(df),
columns=df.columns)
```

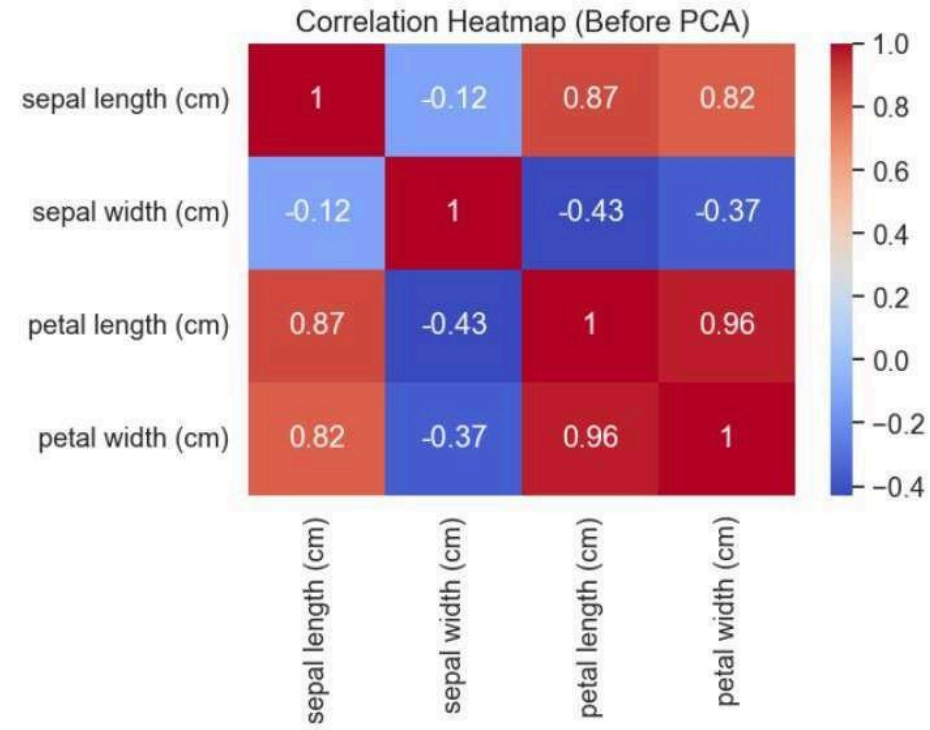
```
plt.figure(figsize=(6, 4))  
sns.heatmap(scaled_data.corr(), annot=True,  
cmap='coolwarm')  
plt.title('Correlation Heatmap (Before PCA)')  
plt.show()
```

```
pca = PCA(n_components=3)  
pca.fit(scaled_data)  
data_pca = pca.transform(scaled_data)  
data_pca = pd.DataFrame(data_pca, columns=['PC1', 'PC2',  
'PC3'])  
print(data_pca.head())
```

```
plt.figure(figsize=(6, 4))  
sns.heatmap(data_pca.corr(), annot=True, cmap='coolwarm')  
plt.title('Correlation Heatmap (After PCA)')  
plt.show()
```

output:

	sepal length (cm)	sepal width (cm)	petal length (cm)	petal width (cm)
0	5.1	3.5	1.4	0.2
1	4.9	3.0	1.4	0.2
2	4.7	3.2	1.3	0.2
3	4.6	3.1	1.5	0.2
4	5.0	3.6	1.4	0.2



	PC1	PC2	PC3
0	-2.264703	0.480027	0.127706
1	-2.080961	-0.674134	0.234609
2	-2.364229	-0.341908	-0.044201
3	-2.299384	-0.597395	-0.091290
4	-2.389842	0.646835	-0.015738

