ex6-dimensionality-reduction

August 5, 2024

[1]:
```
# Import necessary libraries
from sklearn import datasets  # to retrieve the iris Dataset
import pandas as pd  # to load the dataframe
from sklearn.preprocessing import StandardScaler  # to standardize the features
from sklearn.decomposition import PCA  # to apply PCA
import seaborn as sns  # to plot the heat maps
```

[2]:
```
# Load the Dataset
iris = datasets.load_iris()
# convert the dataset into a pandas data frame
df = pd.DataFrame(iris["data"], columns=iris["feature_names"])
# display the head (first 5 rows) of the dataset
df.head()
```

[2]:

	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

[3]:
```
# Standardize the features
# Create an object of StandardScaler which is present in sklearn.preprocessing
scalar = StandardScaler()
scaled_data = pd.DataFrame(scalar.fit_transform(df))  # scaling the data
scaled_data
```

[3]:

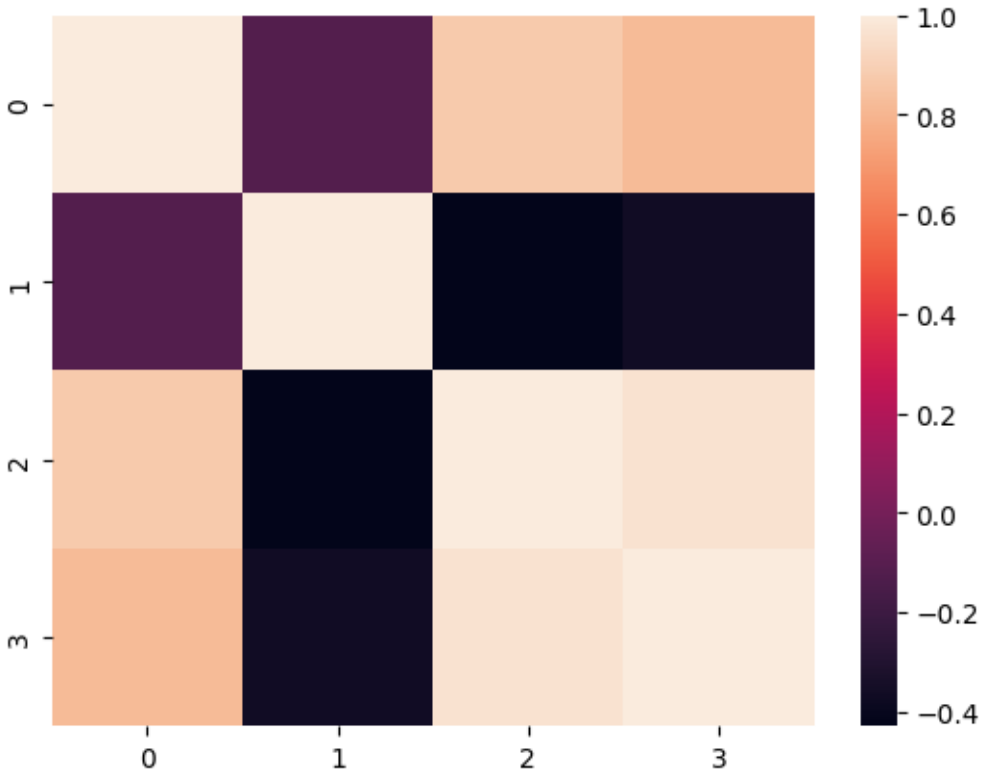
	0	1	2	3
0	-0.900681	1.019004	-1.340227	-1.315444
1	-1.143017	-0.131979	-1.340227	-1.315444
2	-1.385353	0.328414	-1.397064	-1.315444
3	-1.506521	0.098217	-1.283389	-1.315444
4	-1.021849	1.249201	-1.340227	-1.315444
..	…	…	…	…
145	1.038005	-0.131979	0.819596	1.448832
146	0.553333	-1.282963	0.705921	0.922303
147	0.795669	-0.131979	0.819596	1.053935

```
148  0.432165  0.788808  0.933271  1.448832
149  0.068662 -0.131979  0.762758  0.790671

[150 rows x 4 columns]
```

[4]:
```
# Check the Co-relation between features without PCA
sns.heatmap(scaled_data.corr())
```

[4]:
```
<Axes: >
```



[5]:
```
# Applying PCA
# Taking no. of Principal Components as 3
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"])
data_pca.head()
```

[5]:
```
        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
```

[6]:
```
# Checking Co-relation between features after PCA
sns.heatmap(data_pca.corr())
```

[6]: <Axes: >