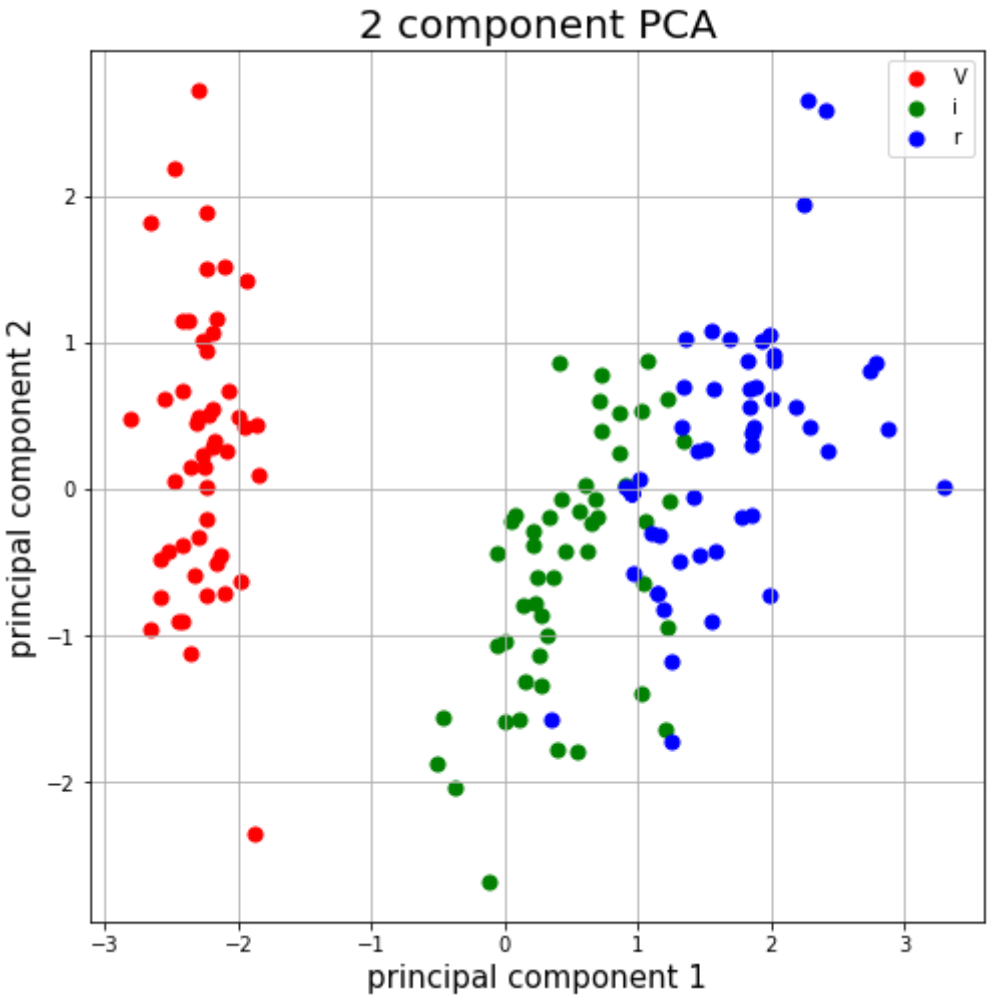
In [1]:
```
#8th lab program ML PCA
import pandas as pd
import matplotlib.pyplot as plt
df=pd.read_csv("iris.csv")
from sklearn.preprocessing import StandardScaler
features=['sepal.length','sepal.width','petal.length','petal.width']
x=df.loc[:,features].values
y=df.loc[:,['variety']].values
x=StandardScaler().fit_transform(x)
```

In [2]:
```
from sklearn.preprocessing import StandardScaler
features=['sepal.length','sepal.width','petal.length','petal.width']
x=df.loc[:,features].values
y=df.loc[:,['variety']].values
x=StandardScaler().fit_transform(x)
```

In [3]:
```
from sklearn.decomposition import PCA
pca=PCA(n_components=2)
principalComponents=pca.fit_transform(x)
principalDf=pd.DataFrame(data=principalComponents,columns=['principal component 1','
finalDf=pd.concat([principalDf,df[['variety']]],axis=1)
fig=plt.figure(figsize=(8,8))
ax=fig.add_subplot(1,1,1)
ax.set_xlabel('principal component 1',fontsize=15)
ax.set_ylabel('principal component 2',fontsize=15)
ax.set_title('2 component PCA',fontsize=20)
variety=['Setosa','Versicolor','Virginica']
colors=['r','g','b']
for variety,color in zip(variety,colors):
    indicesToKeep=finalDf['variety']==variety
    ax.scatter(finalDf.loc[indicesToKeep,'principal component 1'],finalDf.loc[indice
ax.legend(variety)
ax.grid()
```


2 component PCA
V
i
r
principal component 2
principal component 1
2
1
0
−1
−2
−3
−2
−1
0
1
2
3

In [ ]: