In [19]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.neighbores import KNeighboreClassifier
from sklearn import preprocessing
from sklearn.model_selection import train_test_split
```

```
---------------------------------------------------------------------------
ModuleNotFoundError                       Traceback (most recent call last)
<ipython-input-19-c21fa305d695> in <module>
      2 import pandas as pd
      3 import matplotlib.pyplot as plt
----> 4 from sklearn.neighbores import KNeighboreClassifier
      5 from sklearn import preprocessing
      6 from sklearn.model_selection import train_test_split

ModuleNotFoundError: No module named 'sklearn.neighbores'
```

In [3]:

```
iris = pd.read_csv("C:/Users/Subham Kumar Singh/Desktop/IRIS.csv")
```

In [7]:

```
iris.tail()
```

Out[7]:

	sepal_length	sepal_width	petal_length	petal_width	species
145	6.7	3.0	5.2	2.3	Iris-virginica
146	6.3	2.5	5.0	1.9	Iris-virginica
147	6.5	3.0	5.2	2.0	Iris-virginica
148	6.2	3.4	5.4	2.3	Iris-virginica
149	5.9	3.0	5.1	1.8	Iris-virginica

In [6]:

```
iris.shape
```

Out[6]:

```
(150, 5)
```

In [8]:

```
iris['species'].value_counts()
```

Out[8]:

```
Iris-setosa        50
Iris-virginica     50
Iris-versicolor    50
Name: species, dtype: int64
```

In [9]:

```
iris.columns
```

Out[9]:

```
Index(['sepal_length', 'sepal_width', 'petal_length', 'petal_width',
       'species'],
      dtype='object')
```

In [10]:

```
iris.values
```

Out[10]:

```
array([[5.1, 3.5, 1.4, 0.2, 'Iris-setosa'],
       [4.9, 3.0, 1.4, 0.2, 'Iris-setosa'],
       [4.7, 3.2, 1.3, 0.2, 'Iris-setosa'],
       [4.6, 3.1, 1.5, 0.2, 'Iris-setosa'],
       [5.0, 3.6, 1.4, 0.2, 'Iris-setosa'],
       [5.4, 3.9, 1.7, 0.4, 'Iris-setosa'],
       [4.6, 3.4, 1.4, 0.3, 'Iris-setosa'],
       [5.0, 3.4, 1.5, 0.2, 'Iris-setosa'],
       [4.4, 2.9, 1.4, 0.2, 'Iris-setosa'],
       [4.9, 3.1, 1.5, 0.1, 'Iris-setosa'],
       [5.4, 3.7, 1.5, 0.2, 'Iris-setosa'],
       [4.8, 3.4, 1.6, 0.2, 'Iris-setosa'],
       [4.8, 3.0, 1.4, 0.1, 'Iris-setosa'],
       [4.3, 3.0, 1.1, 0.1, 'Iris-setosa'],
       [5.8, 4.0, 1.2, 0.2, 'Iris-setosa'],
       [5.7, 4.4, 1.5, 0.4, 'Iris-setosa'],
       [5.4, 3.9, 1.3, 0.4, 'Iris-setosa'],
       [5.1, 3.5, 1.4, 0.3, 'Iris-setosa'],
```

```
[5.7, 3.8, 1.7, 0.3, 'Iris-setosa'],
[5.1, 3.8, 1.5, 0.3, 'Iris-setosa'],
[5.4, 3.4, 1.7, 0.2, 'Iris-setosa'],
[5.1, 3.7, 1.5, 0.4, 'Iris-setosa'],
[4.6, 3.6, 1.0, 0.2, 'Iris-setosa'],
[5.1, 3.3, 1.7, 0.5, 'Iris-setosa'],
[4.8, 3.4, 1.9, 0.2, 'Iris-setosa'],
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[5.0, 3.4, 1.6, 0.4, 'Iris-setosa'],
[5.2, 3.5, 1.5, 0.2, 'Iris-setosa'],
[5.2, 3.4, 1.4, 0.2, 'Iris-setosa'],
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[4.8, 3.1, 1.6, 0.2, 'Iris-setosa'],
[5.4, 3.4, 1.5, 0.4, 'Iris-setosa'],
[5.2, 4.1, 1.5, 0.1, 'Iris-setosa'],
[5.5, 4.2, 1.4, 0.2, 'Iris-setosa'],
[4.9, 3.1, 1.5, 0.1, 'Iris-setosa'],
[5.0, 3.2, 1.2, 0.2, 'Iris-setosa'],
[5.5, 3.5, 1.3, 0.2, 'Iris-setosa'],
[4.9, 3.1, 1.5, 0.1, 'Iris-setosa'],
[4.4, 3.0, 1.3, 0.2, 'Iris-setosa'],
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[4.4, 3.2, 1.3, 0.2, 'Iris-setosa'],
[5.0, 3.5, 1.6, 0.6, 'Iris-setosa'],
[5.1, 3.8, 1.9, 0.4, 'Iris-setosa'],
[4.8, 3.0, 1.4, 0.3, 'Iris-setosa'],
[5.1, 3.8, 1.6, 0.2, 'Iris-setosa'],
[4.6, 3.2, 1.4, 0.2, 'Iris-setosa'],
[5.3, 3.7, 1.5, 0.2, 'Iris-setosa'],
[5.0, 3.3, 1.4, 0.2, 'Iris-setosa'],
[7.0, 3.2, 4.7, 1.4, 'Iris-versicolor'],
[6.4, 3.2, 4.5, 1.5, 'Iris-versicolor'],
[6.9, 3.1, 4.9, 1.5, 'Iris-versicolor'],
[5.5, 2.3, 4.0, 1.3, 'Iris-versicolor'],
[6.5, 2.8, 4.6, 1.5, 'Iris-versicolor'],
[5.7, 2.8, 4.5, 1.3, 'Iris-versicolor'],
[6.3, 3.3, 4.7, 1.6, 'Iris-versicolor'],
[4.9, 2.4, 3.3, 1.0, 'Iris-versicolor'],
[6.6, 2.9, 4.6, 1.3, 'Iris-versicolor'],
[5.2, 2.7, 3.9, 1.4, 'Iris-versicolor'],
[5.0, 2.0, 3.5, 1.0, 'Iris-versicolor'],
[5.9, 3.0, 4.2, 1.5, 'Iris-versicolor'],
[6.0, 2.2, 4.0, 1.0, 'Iris-versicolor'],
[6.1, 2.9, 4.7, 1.4, 'Iris-versicolor'],
[5.6, 2.9, 3.6, 1.3, 'Iris-versicolor'],
[6.7, 3.1, 4.4, 1.4, 'Iris-versicolor'],
[5.6, 3.0, 4.5, 1.5, 'Iris-versicolor'],
[5.8, 2.7, 4.1, 1.0, 'Iris-versicolor'],
[6.2, 2.2, 4.5, 1.5, 'Iris-versicolor'],
[5.6, 2.5, 3.9, 1.1, 'Iris-versicolor'],
[5.9, 3.2, 4.8, 1.8, 'Iris-versicolor'],
[6.1, 2.8, 4.0, 1.3, 'Iris-versicolor'],
[6.3, 2.5, 4.9, 1.5, 'Iris-versicolor'],
[6.1, 2.8, 4.7, 1.2, 'Iris-versicolor'],
[6.4, 2.9, 4.3, 1.3, 'Iris-versicolor'],
[6.6, 3.0, 4.4, 1.4, 'Iris-versicolor'],
[6.8, 2.8, 4.8, 1.4, 'Iris-versicolor'],
[6.7, 3.0, 5.0, 1.7, 'Iris-versicolor'],
[6.0, 2.9, 4.5, 1.5, 'Iris-versicolor'],
[5.7, 2.6, 3.5, 1.0, 'Iris-versicolor'],
[5.5, 2.4, 3.8, 1.1, 'Iris-versicolor'],
[5.5, 2.4, 3.7, 1.0, 'Iris-versicolor'],
[5.8, 2.7, 3.9, 1.2, 'Iris-versicolor'],
[6.0, 2.7, 5.1, 1.6, 'Iris-versicolor'],
[5.4, 3.0, 4.5, 1.5, 'Iris-versicolor'],
[6.0, 3.4, 4.5, 1.6, 'Iris-versicolor'],
[6.7, 3.1, 4.7, 1.5, 'Iris-versicolor'],
[6.3, 2.3, 4.4, 1.3, 'Iris-versicolor'],
[5.6, 3.0, 4.1, 1.3, 'Iris-versicolor'],
[5.5, 2.5, 4.0, 1.3, 'Iris-versicolor'],
[5.5, 2.6, 4.4, 1.2, 'Iris-versicolor'],
[6.1, 3.0, 4.6, 1.4, 'Iris-versicolor'],
[5.8, 2.6, 4.0, 1.2, 'Iris-versicolor'],
[5.0, 2.3, 3.3, 1.0, 'Iris-versicolor'],
[5.6, 2.7, 4.2, 1.3, 'Iris-versicolor'],
```

```
       [5.7, 3.0, 4.2, 1.2, 'Iris-versicolor'],
       [5.7, 2.9, 4.2, 1.3, 'Iris-versicolor'],
       [6.2, 2.9, 4.3, 1.3, 'Iris-versicolor'],
       [5.1, 2.5, 3.0, 1.1, 'Iris-versicolor'],
       [5.7, 2.8, 4.1, 1.3, 'Iris-versicolor'],
       [6.3, 3.3, 6.0, 2.5, 'Iris-virginica'],
       [5.8, 2.7, 5.1, 1.9, 'Iris-virginica'],
       [7.1, 3.0, 5.9, 2.1, 'Iris-virginica'],
       [6.3, 2.9, 5.6, 1.8, 'Iris-virginica'],
       [6.5, 3.0, 5.8, 2.2, 'Iris-virginica'],
       [7.6, 3.0, 6.6, 2.1, 'Iris-virginica'],
       [4.9, 2.5, 4.5, 1.7, 'Iris-virginica'],
       [7.3, 2.9, 6.3, 1.8, 'Iris-virginica'],
       [6.7, 2.5, 5.8, 1.8, 'Iris-virginica'],
       [7.2, 3.6, 6.1, 2.5, 'Iris-virginica'],
       [6.5, 3.2, 5.1, 2.0, 'Iris-virginica'],
       [6.4, 2.7, 5.3, 1.9, 'Iris-virginica'],
       [6.8, 3.0, 5.5, 2.1, 'Iris-virginica'],
       [5.7, 2.5, 5.0, 2.0, 'Iris-virginica'],
       [5.8, 2.8, 5.1, 2.4, 'Iris-virginica'],
       [6.4, 3.2, 5.3, 2.3, 'Iris-virginica'],
       [6.5, 3.0, 5.5, 1.8, 'Iris-virginica'],
       [7.7, 3.8, 6.7, 2.2, 'Iris-virginica'],
       [7.7, 2.6, 6.9, 2.3, 'Iris-virginica'],
       [6.0, 2.2, 5.0, 1.5, 'Iris-virginica'],
       [6.9, 3.2, 5.7, 2.3, 'Iris-virginica'],
       [5.6, 2.8, 4.9, 2.0, 'Iris-virginica'],
       [7.7, 2.8, 6.7, 2.0, 'Iris-virginica'],
       [6.3, 2.7, 4.9, 1.8, 'Iris-virginica'],
       [6.7, 3.3, 5.7, 2.1, 'Iris-virginica'],
       [7.2, 3.2, 6.0, 1.8, 'Iris-virginica'],
       [6.2, 2.8, 4.8, 1.8, 'Iris-virginica'],
       [6.1, 3.0, 4.9, 1.8, 'Iris-virginica'],
       [6.4, 2.8, 5.6, 2.1, 'Iris-virginica'],
       [7.2, 3.0, 5.8, 1.6, 'Iris-virginica'],
       [7.4, 2.8, 6.1, 1.9, 'Iris-virginica'],
       [7.9, 3.8, 6.4, 2.0, 'Iris-virginica'],
       [6.4, 2.8, 5.6, 2.2, 'Iris-virginica'],
       [6.3, 2.8, 5.1, 1.5, 'Iris-virginica'],
       [6.1, 2.6, 5.6, 1.4, 'Iris-virginica'],
       [7.7, 3.0, 6.1, 2.3, 'Iris-virginica'],
       [6.3, 3.4, 5.6, 2.4, 'Iris-virginica'],
       [6.4, 3.1, 5.5, 1.8, 'Iris-virginica'],
       [6.0, 3.0, 4.8, 1.8, 'Iris-virginica'],
       [6.9, 3.1, 5.4, 2.1, 'Iris-virginica'],
       [6.7, 3.1, 5.6, 2.4, 'Iris-virginica'],
       [6.9, 3.1, 5.1, 2.3, 'Iris-virginica'],
       [5.8, 2.7, 5.1, 1.9, 'Iris-virginica'],
       [6.8, 3.2, 5.9, 2.3, 'Iris-virginica'],
       [6.7, 3.3, 5.7, 2.5, 'Iris-virginica'],
       [6.7, 3.0, 5.2, 2.3, 'Iris-virginica'],
       [6.3, 2.5, 5.0, 1.9, 'Iris-virginica'],
       [6.5, 3.0, 5.2, 2.0, 'Iris-virginica'],
       [6.2, 3.4, 5.4, 2.3, 'Iris-virginica'],
       [5.9, 3.0, 5.1, 1.8, 'Iris-virginica']], dtype=object)
```

In [11]:

```
iris.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 5 columns):
 #   Column        Non-Null Count  Dtype  
---  ------        --------------  -----  
 0   sepal_length  150 non-null    float64
 1   sepal_width   150 non-null    float64
 2   petal_length  150 non-null    float64
 3   petal_width   150 non-null    float64
 4   species       150 non-null    object 
dtypes: float64(4), object(1)
memory usage: 6.0+ KB
```

In [14]:

```
iris.describe(include="all")
```

Out[14]:

	sepal_length	sepal_width	petal_length	petal_width	species
count	150.000000	150.000000	150.000000	150.000000	150
unique	NaN	NaN	NaN	NaN	3
top	NaN	NaN	NaN	NaN	Iris-setosa
freq	NaN	NaN	NaN	NaN	50
mean	5.843333	3.054000	3.758667	1.198667	NaN
std	0.828066	0.433594	1.764420	0.763161	NaN
min	4.300000	2.000000	1.000000	0.100000	NaN
25%	5.100000	2.800000	1.600000	0.300000	NaN
50%	5.800000	3.000000	4.350000	1.300000	NaN
75%	6.400000	3.300000	5.100000	1.800000	NaN
max	7.900000	4.400000	6.900000	2.500000	NaN

In [15]:

```
X=iris.iloc[:,:4]
X.head()
```

Out[15]:

	sepal_length	sepal_width	petal_length	petal_width
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

In [ ]:

In [16]:

```
Y=iris.iloc[:,-1]
Y.head()
```

Out[16]:

```
0    Iris-setosa
1    Iris-setosa
2    Iris-setosa
3    Iris-setosa
4    Iris-setosa
Name: species, dtype: object
```

In [26]:

```
from sklearn import preprocessing
```

In [27]:

```
X = preprocessing.StandardScaler().fit_transform(X)
X[0:4]
```

Out[27]:

```
array([[-0.90068117,  1.03205722, -1.3412724 , -1.31297673],
       [-1.14301691, -0.1249576 , -1.3412724 , -1.31297673],
       [-1.38535265,  0.33784833, -1.39813811, -1.31297673],
       [-1.50652052,  0.10644536, -1.2844067 , -1.31297673]])
```

In [28]:

```
from sklearn.model_selection import train_test_split
X_train,X_test,Y_train,Y_test=train_test_split( X,Y,test_size=0.3,random_state=1)
Y_test.shape
```

Out[28]:

```
(45,)
```

In [34]:

```
from sklearn.neighbors import KNeighborsClassifier
```

In [35]:

```
knnmodel=KNeighborsClassifier(n_neighbors=3)
knnmodel.fit(X_train,Y_train)
Y_predict1=knnmodel.predict(X_test)
```

In [36]:

```
from sklearn.metrics import accuracy_score
```

In [37]:

```
acc=accuracy_score(Y_test,Y_predict1)
acc
```

Out[37]:

```
0.9777777777777777
```

In [41]:

```
from sklearn.metrics import confusion_matrix
```

In [43]:

```
cm=confusion_matrix(Y_test.values,Y_predict1)
cm
```

Out[43]:

```
array([[14,  0,  0],
       [ 0, 18,  0],
       [ 0,  1, 12]], dtype=int64)
```

In [44]:

```
cm1=pd.DataFrame(data=cm,index=['setosa','versicolor','virginica'],columns=['setosa','versicolor','virgin
cm1
```

Out[44]:

	setosa	versicolor	virginica
setosa	14	0	0
versicolor	0	18	0
virginica	0	1	12

In [45]:

```
prediction_output=pd.DataFrame(data=[Y_test.values,Y_predict1],index=['Y_test','Y_pedict1'])
```

In [46]:

```
prediction_output.transpose()
```

Out[46]:

	Y_test	Y_pedict1
0	Iris-setosa	Iris-setosa
1	Iris-versicolor	Iris-versicolor
2	Iris-versicolor	Iris-versicolor
3	Iris-setosa	Iris-setosa
4	Iris-virginica	Iris-virginica
5	Iris-versicolor	Iris-versicolor
6	Iris-virginica	Iris-virginica
7	Iris-setosa	Iris-setosa
8	Iris-setosa	Iris-setosa
9	Iris-virginica	Iris-virginica
10	Iris-versicolor	Iris-versicolor
11	Iris-setosa	Iris-setosa
12	Iris-virginica	Iris-virginica
13	Iris-versicolor	Iris-versicolor
14	Iris-versicolor	Iris-versicolor
15	Iris-setosa	Iris-setosa
16	Iris-versicolor	Iris-versicolor
17	Iris-versicolor	Iris-versicolor
18	Iris-setosa	Iris-setosa
19	Iris-setosa	Iris-setosa
20	Iris-versicolor	Iris-versicolor
21	Iris-versicolor	Iris-versicolor
22	Iris-versicolor	Iris-versicolor

	Y_test	Y_pedict1
22	Iris-versicolor	Iris-versicolor
23	Iris-setosa	Iris-setosa
24	Iris-virginica	Iris-virginica
25	Iris-versicolor	Iris-versicolor
26	Iris-setosa	Iris-setosa
27	Iris-setosa	Iris-setosa
28	Iris-versicolor	Iris-versicolor
29	Iris-virginica	Iris-virginica
30	Iris-versicolor	Iris-versicolor
31	Iris-virginica	Iris-virginica
32	Iris-versicolor	Iris-versicolor
33	Iris-virginica	Iris-virginica
34	Iris-virginica	Iris-virginica
35	Iris-setosa	Iris-setosa
36	Iris-versicolor	Iris-versicolor
37	Iris-setosa	Iris-setosa
38	Iris-versicolor	Iris-versicolor
39	Iris-virginica	Iris-virginica
40	Iris-virginica	Iris-virginica
41	Iris-setosa	Iris-setosa
42	Iris-virginica	Iris-versicolor
43	Iris-virginica	Iris-virginica
44	Iris-versicolor	Iris-versicolor

In [47]:

```
prediction_output.iloc[0,:].value_counts()
```

Out[47]:

```
Iris-versicolor    18
Iris-setosa        14
Iris-virginica     13
Name: Y_test, dtype: int64
```

In [ ]: