Iris Flower Species Data Analysis And Prediction With Python

Libraries Import

In [1]:

```python
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import sklearn
import scipy.stats as spy
```

```
/opt/conda/lib/python3.10/site-packages/scipy/__init__.py:146: UserWarning: A
NumPy version >=1.16.5 and <1.23.0 is required for this version of SciPy (det
ected version 1.23.5
  warnings.warn(f"A NumPy version >={np_minversion} and <{np_maxversion}"
```

Data Acquisition

In [2]:

```python
df_iris=pd.read_csv('/kaggle/input/iris/Iris.csv')
df_iris
```

Out[2]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa
...	...	...	...	...	...	...
145	146	6.7	3.0	5.2	2.3	Iris-virginica
146	147	6.3	2.5	5.0	1.9	Iris-virginica
147	148	6.5	3.0	5.2	2.0	Iris-virginica
148	149	6.2	3.4	5.4	2.3	Iris-virginica
149	150	5.9	3.0	5.1	1.8	Iris-virginica

150 rows × 6 columns

Shape Of Dataset

In [3]:
```
df_iris.shape
```

Out[3]:
```
(150, 6)
```

First 5 Rows

In [4]:
```
df_iris.head()
```

Out[4]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa

Last 5 Rows

In [5]:
```
df_iris.tail()
```

Out[5]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
145	146	6.7	3.0	5.2	2.3	Iris-virginica
146	147	6.3	2.5	5.0	1.9	Iris-virginica
147	148	6.5	3.0	5.2	2.0	Iris-virginica
148	149	6.2	3.4	5.4	2.3	Iris-virginica
149	150	5.9	3.0	5.1	1.8	Iris-virginica

Columns Name

In [6]:
```
df_iris.columns
```

Out[6]:
```
Index(['Id', 'SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidthCm
',
       'Species'],
      dtype='object')
```

Check NaN Values

In [7]:

```
df_iris.isna().sum()
```

Out[7]:

```
Id               0
SepalLengthCm    0
SepalWidthCm     0
PetalLengthCm    0
PetalWidthCm     0
Species          0
dtype: int64
```

Information

In [8]:

```
df_iris.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 6 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   Id             150 non-null    int64  
 1   SepalLengthCm  150 non-null    float64
 2   SepalWidthCm   150 non-null    float64
 3   PetalLengthCm  150 non-null    float64
 4   PetalWidthCm   150 non-null    float64
 5   Species        150 non-null    object 
dtypes: float64(4), int64(1), object(1)
memory usage: 7.2+ KB
```

Datatypes

In [9]:

```
df_iris.dtypes
```

Out[9]:

```
Id                 int64
SepalLengthCm    float64
SepalWidthCm     float64
PetalLengthCm    float64
PetalWidthCm     float64
Species           object
dtype: object
```

Memory Usage

In [10]:

```
df_iris.memory_usage()
```

Out[10]:

```
Index              128
Id                1200
SepalLengthCm     1200
SepalWidthCm      1200
PetalLengthCm     1200
PetalWidthCm      1200
Species           1200
dtype: int64
```

Descriptive Stats

In [11]:

```
df_iris.describe(include='all')
```

Out[11]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
count	150.000000	150.000000	150.000000	150.000000	150.000000	150
unique	NaN	NaN	NaN	NaN	NaN	3
top	NaN	NaN	NaN	NaN	NaN	Iris-setosa
freq	NaN	NaN	NaN	NaN	NaN	50
mean	75.500000	5.843333	3.054000	3.758667	1.198667	NaN
std	43.445368	0.828066	0.433594	1.764420	0.763161	NaN
min	1.000000	4.300000	2.000000	1.000000	0.100000	NaN
25%	38.250000	5.100000	2.800000	1.600000	0.300000	NaN
50%	75.500000	5.800000	3.000000	4.350000	1.300000	NaN
75%	112.750000	6.400000	3.300000	5.100000	1.800000	NaN
max	150.000000	7.900000	4.400000	6.900000	2.500000	NaN

Species Valuecounts

In [12]:

```
df_iris[['Species']].value_counts()
```

Out[12]:

```
Species
Iris-setosa        50
Iris-versicolor    50
Iris-virginica     50
dtype: int64
```

Grouping By Species

In [13]:

```
df_iris_species_group=df_iris.groupby(['Species']).agg({'SepalLengthCm':['
'SepalWidthCm':['max','min','mean','median','std','var'],'PetalLengthCm':[
'PetalWidthCm':['max','min','mean','median','std','var']})
df_iris_species_group.transpose()
```

Out[13]:

	Species	Iris-setosa	Iris-versicolor	Iris-virginica
SepalLengthCm	max	5.800000	7.000000	7.900000
	min	4.300000	4.900000	4.900000
	mean	5.006000	5.936000	6.588000
	median	5.000000	5.900000	6.500000
	std	0.352490	0.516171	0.635880
	var	0.124249	0.266433	0.404343
SepalWidthCm	max	4.400000	3.400000	3.800000
	min	2.300000	2.000000	2.200000
	mean	3.418000	2.770000	2.974000
	median	3.400000	2.800000	3.000000
	std	0.381024	0.313798	0.322497
	var	0.145180	0.098469	0.104004
PetalLengthCm	max	1.900000	5.100000	6.900000
	min	1.000000	3.000000	4.500000
	mean	1.464000	4.260000	5.552000
	median	1.500000	4.350000	5.550000
	std	0.173511	0.469911	0.551895
	var	0.030106	0.220816	0.304588
PetalWidthCm	max	0.600000	1.800000	2.500000
	min	0.100000	1.000000	1.400000
	mean	0.244000	1.326000	2.026000
	median	0.200000	1.300000	2.000000
	std	0.107210	0.197753	0.274650
	var	0.011494	0.039106	0.075433

Finding Correlation B/W [['SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidthCm']] which are Predictor And Independent Variable By Pearson Correlation

In [14]:

```
print('Correlation b/w SepalLengthCm & SepalWidthCm =',spy.pearsonr(df_iri
print('Correlation b/w SepalLengthCm & PetalLengthCm =',spy.pearsonr(df_ir
print('Correlation b/w SepalLengthCm & PetalWidthCm =',spy.pearsonr(df_iri
print('Correlation b/w SepalWidthCm & PetalLengthCm =',spy.pearsonr(df_iri
print('Correlation b/w SepalWidthCm & PetalWidthCm =',spy.pearsonr(df_iris
print('Correlation b/w PetalLengthCm & PetalWidthCm =',spy.pearsonr(df_iri
```

```
Correlation b/w SepalLengthCm & SepalWidthCm = (-0.10936924995064937, 0.18276
52152713699)
Correlation b/w SepalLengthCm & PetalLengthCm = (0.8717541573048713, 1.038454
0627941062e-47)
Correlation b/w SepalLengthCm & PetalWidthCm = (0.8179536333691635, 2.3148491
512728037e-37)
Correlation b/w SepalWidthCm & PetalLengthCm = (-0.4205160964011545, 8.429366
392950231e-08)
Correlation b/w SepalWidthCm & PetalWidthCm = (-0.3565440896138058, 7.5238909
56067452e-06)
Correlation b/w PetalLengthCm & PetalWidthCm = (0.9627570970509661, 5.7766609
88496418e-86)
```

Test For Significance Difference Of Mean B/W Iris-setosa,Iris-versicolor & Iris-virginica By ANNOVA

For Iris-setosa

In [15]:

```
Iris_setosa_sepallength=df_iris[df_iris['Species']=='Iris-setosa']['SepalL
Iris_setosa_sepalwidth=df_iris[df_iris['Species']=='Iris-setosa']['SepalWi
Iris_setosa_petallength=df_iris[df_iris['Species']=='Iris-setosa']['PetalL
Iris_setosa_petalwidth=df_iris[df_iris['Species']=='Iris-setosa']['PetalWi
print('Annova is',spy.f_oneway(Iris_setosa_sepallength,Iris_setosa_sepalwi
```

```
Annova is F_onewayResult(statistic=2846.734398922159, pvalue=2.73095876445112
25e-161)
```

For Iris-versicolor

In [16]:

```
Iris_versicolor_sepallength=df_iris[df_iris['Species']=='Iris-versicolor']
Iris_versicolor_sepalwidth=df_iris[df_iris['Species']=='Iris-versicolor'][
Iris_versicolor_petallength=df_iris[df_iris['Species']=='Iris-versicolor']
Iris_versicolor_petalwidth=df_iris[df_iris['Species']=='Iris-versicolor'][
print('Annova is',spy.f_oneway(Iris_versicolor_sepallength,Iris_versicolor
Iris_versicolor_petalwidth))
```

```
Annova is F_onewayResult(statistic=1253.6380153556045, pvalue=1.3770621813910
734e-127)
```

For Iris-virginica

In [17]:

```
Iris_virginica_sepallength=df_iris[df_iris['Species']=='Iris-virginica']['
Iris_virginica_sepalwidth=df_iris[df_iris['Species']=='Iris-virginica']['S
Iris_virginica_petallength=df_iris[df_iris['Species']=='Iris-virginica']['
Iris_virginica_petalwidth=df_iris[df_iris['Species']=='Iris-virginica']['P
print('Annova is',spy.f_oneway(Iris_virginica_sepallength,Iris_virginica_s
Iris_virginica_petalwidth))
```

```
Annova is F_onewayResult(statistic=1030.422084386245, pvalue=1.06608222341350
73e-119)
```

Boxplot Of [['SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidthCm']] which are Predictor And Independent Variable

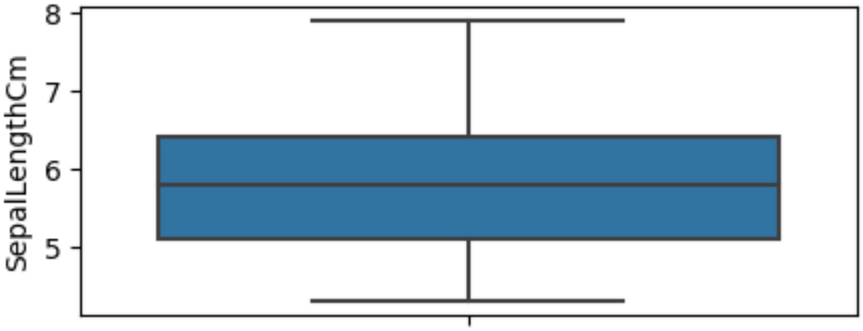
For SepalLength

In [18]:

```
plt.figure(figsize=(5,2))
sns.boxplot(y='SepalLengthCm',data=df_iris)
```

Out[18]:

```
<Axes: ylabel='SepalLengthCm'>
```



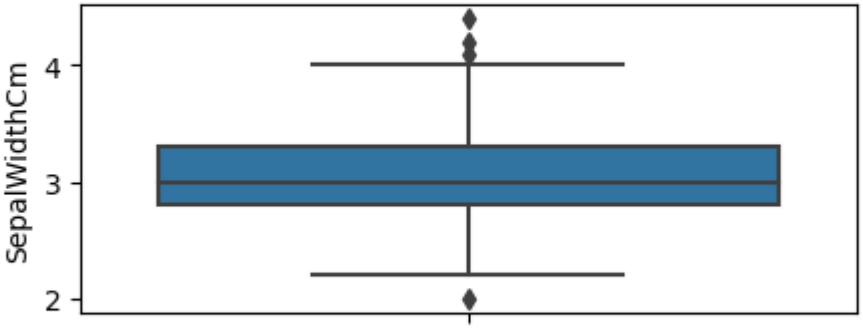
For SepalWidth

In [19]:

```
plt.figure(figsize=(5,2))
sns.boxplot(y='SepalWidthCm',data=df_iris)
```

Out[19]:

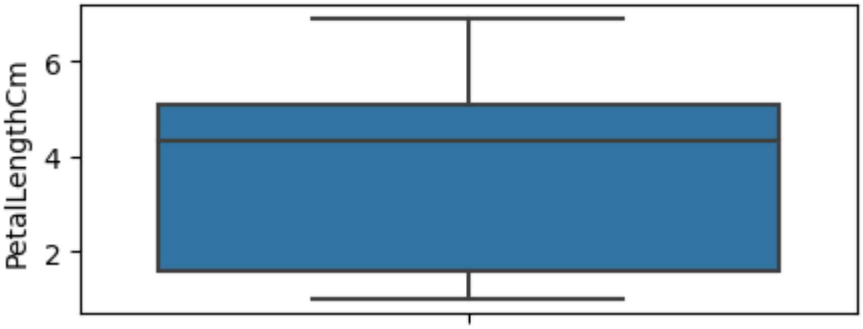
```
<Axes: ylabel='SepalWidthCm'>
```



For PetalLength

```
In [20]:
plt.figure(figsize=(5,2))
sns.boxplot(y='PetalLengthCm',data=df_iris)
```

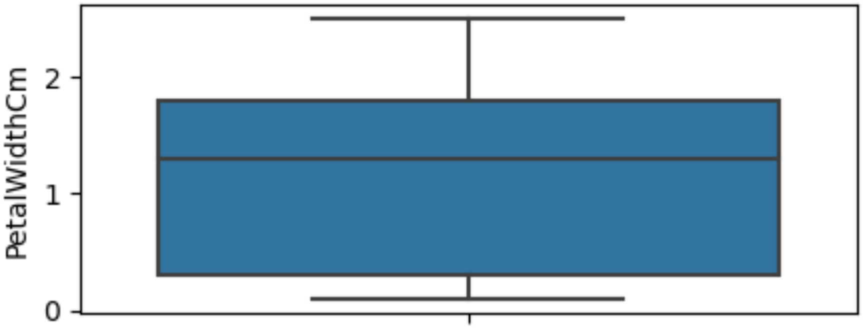
```
Out[20]: <Axes: ylabel='PetalLengthCm'>
```



For PetalWidth

```
In [21]:
plt.figure(figsize=(5,2))
sns.boxplot(y='PetalWidthCm',data=df_iris)
```

```
Out[21]: <Axes: ylabel='PetalWidthCm'>
```



Frequency Plot Of [['SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidthCm']] which are Predictor And Independent Variable

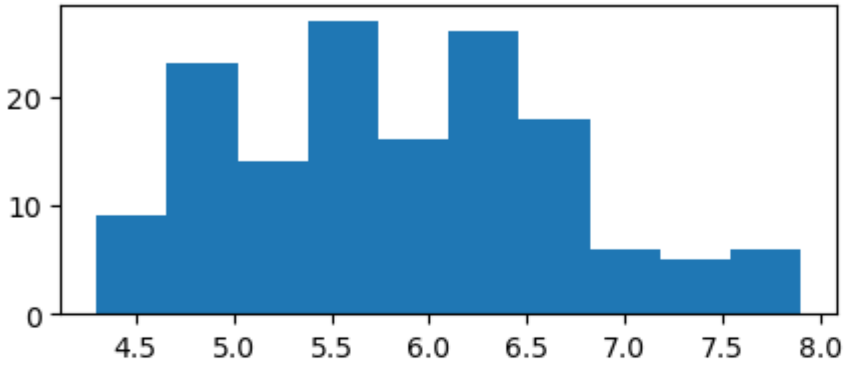
For SepalLength

In [22]:

```python
plt.figure(figsize=(5,2))
plt.hist(df_iris['SepalLengthCm'])
```

Out[22]:

```
(array([ 9., 23., 14., 27., 16., 26., 18.,  6.,  5.,  6.]),
 array([4.3 , 4.66, 5.02, 5.38, 5.74, 6.1 , 6.46, 6.82, 7.18, 7.54, 7.9 ]),
 <BarContainer object of 10 artists>)
```



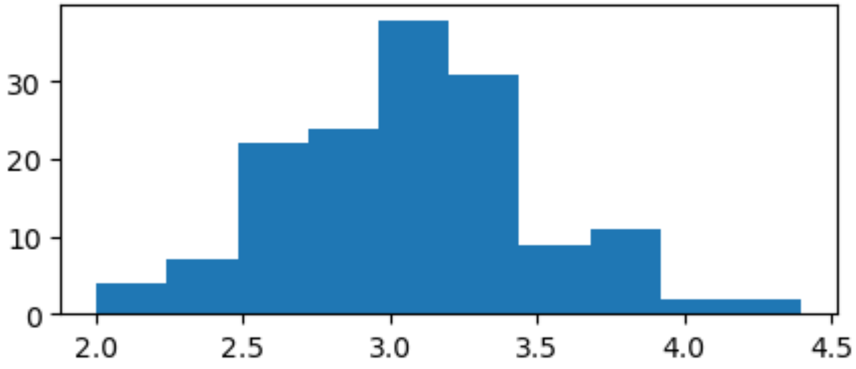
For Sepalwidth

In [23]:

```python
plt.figure(figsize=(5,2))
plt.hist(df_iris['SepalWidthCm'])
```

Out[23]:

```
(array([ 4.,  7., 22., 24., 38., 31.,  9., 11.,  2.,  2.]),
 array([2.  , 2.24, 2.48, 2.72, 2.96, 3.2 , 3.44, 3.68, 3.92, 4.16, 4.4 ]),
 <BarContainer object of 10 artists>)
```



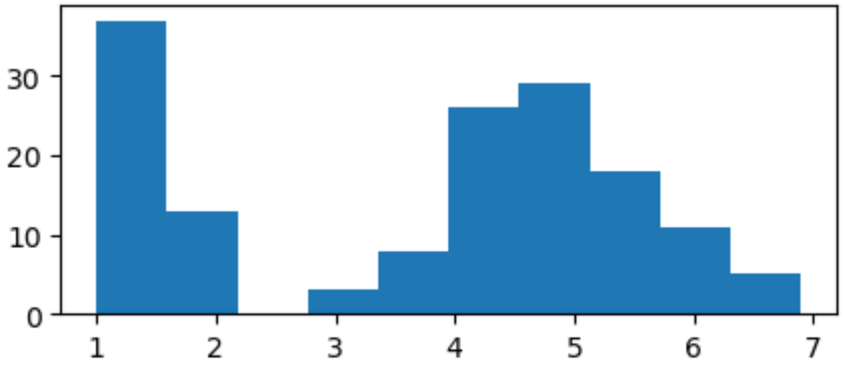
For PetalLength

In [24]:

```
plt.figure(figsize=(5,2))
plt.hist(df_iris['PetalLengthCm'])
```

Out[24]:

```
(array([37., 13.,  0.,  3.,  8., 26., 29., 18., 11.,  5.]),
 array([1.  , 1.59, 2.18, 2.77, 3.36, 3.95, 4.54, 5.13, 5.72, 6.31, 6.9 ]),
 <BarContainer object of 10 artists>)
```



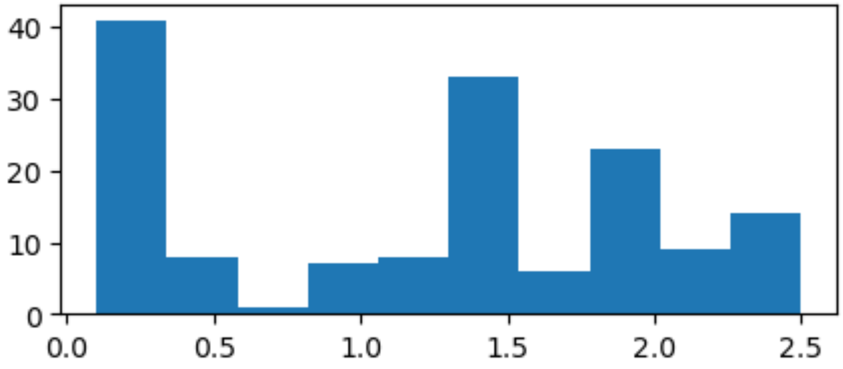
For PetalWidth

In [25]:

```
plt.figure(figsize=(5,2))
plt.hist(df_iris['PetalWidthCm'])
```

Out[25]:

```
(array([41.,  8.,  1.,  7.,  8., 33.,  6., 23.,  9., 14.]),
 array([0.1 , 0.34, 0.58, 0.82, 1.06, 1.3 , 1.54, 1.78, 2.02, 2.26, 2.5 ]),
 <BarContainer object of 10 artists>)
```



Taking x as Predictor And Independent Variable And Storing Features [['SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidthCm']] In It To Predict [['Species']]

In [26]:

```
x=df_iris[['SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidthCm
```

Taking y as Target And Dependent Variable And Storing Feature [['Species']] In It

In [27]:

```
y=df_iris[['Species']]
```

Train-Test Split For M.L.

In [28]:

```
from sklearn.model_selection import train_test_split
```

Spliting Dataset 80% For Training And 20% For Testing

In [29]:

```
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.2)
```

Shape Of Train And Test Dataset

In [30]:

```
print(x_train.shape,y_train.shape)
print(x_test.shape,y_test.shape)
```

```
(120, 4) (120, 1)
(30, 4) (30, 1)
```

By K-Nearest Neighbors(KNN)

In [31]:

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

Fitting Of KNN

In [32]:

```
KNN=KNeighborsClassifier(n_neighbors=1)
KNN.fit(x_train,y_train)
```

```
/opt/conda/lib/python3.10/site-packages/sklearn/neighbors/_classification.py:
215: DataConversionWarning: A column-vector y was passed when a 1d array was
expected. Please change the shape of y to (n_samples,), for example using rav
el().
  return self._fit(X, y)
```

Out[32]:

```
KNeighborsClassifier(n_neighbors=1)
```

In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.

Predicting Species By KNN

In [33]:

```
y_pred_KNN=KNN.predict(x_test)
```

Predicted Species By KNN

In [34]:
```
y_pred_KNN
```

Out[34]:
```
array(['Iris-setosa', 'Iris-setosa', 'Iris-versicolor', 'Iris-setosa',
       'Iris-virginica', 'Iris-virginica', 'Iris-versicolor',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-versicolor', 'Iris-setosa', 'Iris-virginica', 'Iris-setosa',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-setosa', 'Iris-setosa',
       'Iris-virginica', 'Iris-versicolor', 'Iris-virginica',
       'Iris-virginica', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-versicolor', 'Iris-setosa', 'Iris-virginica'], dtype=object)
```

Accuracy Score Import

In [35]:
```
from sklearn.metrics import accuracy_score
```

Accuracy Score For KNN

In [36]:
```
y_pred_KNN_accuracy=accuracy_score(y_test,y_pred_KNN)
y_pred_KNN_accuracy
```

Out[36]:
```
0.9
```

By Decision Tree Classifier(DTC)

In [37]:
```
from sklearn.tree import DecisionTreeClassifier
```

Fitting Of DTC

In [38]:
```
DTC=DecisionTreeClassifier()
DTC.fit(x_train,y_train)
```

Out[38]:
```
DecisionTreeClassifier()
```

In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.

Predicting Species By DTC

In [39]:
```
y_pred_DTC=DTC.predict(x_test)
```

Predicted Species By DTC

```
In [40]: y_pred_DTC
```

```
Out[40]: array(['Iris-setosa', 'Iris-setosa', 'Iris-virginica', 'Iris-setosa',
               'Iris-virginica', 'Iris-virginica', 'Iris-versicolor',
               'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
               'Iris-versicolor', 'Iris-setosa', 'Iris-virginica', 'Iris-setosa',
               'Iris-versicolor', 'Iris-versicolor', 'Iris-setosa', 'Iris-setosa',
               'Iris-virginica', 'Iris-versicolor', 'Iris-virginica',
               'Iris-virginica', 'Iris-versicolor', 'Iris-versicolor',
               'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
               'Iris-versicolor', 'Iris-setosa', 'Iris-virginica'], dtype=object)
```

Accuracy Score For DTC

```
In [41]: y_pred_DTC_accuracy=accuracy_score(y_test,y_pred_DTC)
         y_pred_DTC_accuracy
```

```
Out[41]: 0.9333333333333333
```

By Logistic Regression(LR)

```
In [42]: from sklearn.linear_model import LogisticRegression
```

Fitting Of LR

```
In [43]: LR=LogisticRegression()
         LR.fit(x_train,y_train)
```

```
/opt/conda/lib/python3.10/site-packages/sklearn/utils/validation.py:1143: Dat
aConversionWarning: A column-vector y was passed when a 1d array was expecte
d. Please change the shape of y to (n_samples, ), for example using ravel().
  y = column_or_1d(y, warn=True)
```

```
Out[43]: LogisticRegression()
```

In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.

Predicting Species By LR

```
In [44]: y_pred_LR=LR.predict(x_test)
```

Predicted Species By LR

In [45]:

```python
y_pred_LR
```

Out[45]:

```
array(['Iris-setosa', 'Iris-setosa', 'Iris-virginica', 'Iris-setosa',
       'Iris-virginica', 'Iris-virginica', 'Iris-versicolor',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-versicolor', 'Iris-setosa', 'Iris-virginica', 'Iris-setosa',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-setosa', 'Iris-setosa',
       'Iris-virginica', 'Iris-versicolor', 'Iris-virginica',
       'Iris-virginica', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-versicolor', 'Iris-setosa', 'Iris-versicolor'], dtype=object)
```

Accuracy Score For LR

In [46]:

```python
y_pred_LR_accuracy=accuracy_score(y_test,y_pred_LR)
y_pred_LR_accuracy
```

Out[46]:

```
0.9666666666666667
```

By Support Vector Machine(SVM)

In [47]:

```python
from sklearn.svm import SVC
```

Fitting Of SVM

In [48]:

```python
svc=SVC()
svc.fit(x_train,y_train)
```

```
/opt/conda/lib/python3.10/site-packages/sklearn/utils/validation.py:1143: Dat
aConversionWarning: A column-vector y was passed when a 1d array was expecte
d. Please change the shape of y to (n_samples, ), for example using ravel().
  y = column_or_1d(y, warn=True)
```

Out[48]:

```
SVC()
```

In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.

Predicting Species By SVM

In [49]:

```python
y_pred_SVM=svc.predict(x_test)
```

Predicted Species By SVM

In [50]:

```
y_pred_SVM_accuracy=accuracy_score(y_test,y_pred_SVM)
y_pred_SVM_accuracy
```

Out[50]:

```
0.9333333333333333
```

By Random Forest Classifier(RFC)

In [51]:

```
from sklearn.ensemble import RandomForestClassifier
```

Fitting Of RFC

In [52]:

```
RFC=RandomForestClassifier()
RFC.fit(x_train,y_train)
```

```
/tmp/ipykernel_20/926610623.py:2: DataConversionWarning: A column-vector y wa
s passed when a 1d array was expected. Please change the shape of y to (n_sam
ples,), for example using ravel().
  RFC.fit(x_train,y_train)
```

Out[52]:

```
RandomForestClassifier()
```

In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.

Predicting Species By RFC

In [53]:

```
y_pred_RFC=RFC.predict(x_test)
```

Predicted Species By RFC

In [54]:

```
y_pred_RFC
```

Out[54]:

```
array(['Iris-setosa', 'Iris-setosa', 'Iris-virginica', 'Iris-setosa',
       'Iris-virginica', 'Iris-virginica', 'Iris-versicolor',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-versicolor', 'Iris-setosa', 'Iris-virginica', 'Iris-setosa',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-setosa', 'Iris-setosa',
       'Iris-virginica', 'Iris-versicolor', 'Iris-virginica',
       'Iris-virginica', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-versicolor', 'Iris-setosa', 'Iris-virginica'], dtype=object)
```

Accuracy Score For RFC

In [55]:
```
y_pred_RFC_accuracy=accuracy_score(y_test,y_pred_RFC)
y_pred_RFC_accuracy
```

Out[55]:
```
0.9333333333333333
```

By Gaussian Naive Bayes(GNB)

In [56]:
```
from sklearn.naive_bayes import GaussianNB
```

Fitting Of GNB

In [57]:
```
GNB=GaussianNB()
GNB.fit(x_train,y_train)
```

```
/opt/conda/lib/python3.10/site-packages/sklearn/utils/validation.py:1143: Dat
aConversionWarning: A column-vector y was passed when a 1d array was expecte
d. Please change the shape of y to (n_samples, ), for example using ravel().
  y = column_or_1d(y, warn=True)
```

Out[57]:
```
GaussianNB()
```

In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.

Predicting Species By GNB

In [58]:
```
y_pred_GNB=GNB.predict(x_test)
```

Predicted Species By GNB

In [59]:
```
y_pred_GNB
```

Out[59]:
```
array(['Iris-setosa', 'Iris-setosa', 'Iris-virginica', 'Iris-setosa',
       'Iris-virginica', 'Iris-virginica', 'Iris-versicolor',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-versicolor', 'Iris-setosa', 'Iris-virginica', 'Iris-setosa',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-setosa', 'Iris-setosa',
       'Iris-virginica', 'Iris-versicolor', 'Iris-virginica',
       'Iris-virginica', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-setosa', 'Iris-versicolor'], dtype='<U15')
```

Accuracy Score For GNB

In [60]:

```
y_pred_GNB_accuracy=accuracy_score(y_test,y_pred_GNB)
y_pred_GNB_accuracy
```

Out[60]:

```
0.9333333333333333
```

Accuracy Score For All Models

In [61]:

```
df_accuracy_all=pd.DataFrame({'K-Nearest Neighbors(KNN)':[y_pred_KNN_accur
'Logistic Regression(LR)':[y_pred_LR_accuracy],'Support Vector Machine(SVM
'Random Forest Classifier(RFC)':[y_pred_RFC_accuracy],'Gaussian Naive Baye
index=['Accuracy Score For All Models'])
df_accuracy_all.transpose()
```

Out[61]:

	Accuracy Score For All Models
K-Nearest Neighbors(KNN)	0.900000
Decision Tree Classifier(DTC)	0.933333
Logistic Regression(LR)	0.966667
Support Vector Machine(SVM)	0.933333
Random Forest Classifier(RFC)	0.933333
Gaussian Naive Bayes(GNB)	0.933333