iris_decision_tree.ipynb

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```
import numpy as np
import pandas as pd
df=pd.read_csv("/content/Iris.csv")
df
```

	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

```
[ ] df.drop('Id',axis=1,inplace=True)
```

```
[1] df.isna().sum()
```

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```
[4] df.drop('Id',axis=1,inplace=True)
```

```
df.isna().sum()
```

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

```
[6] x=df.iloc[:,:-1].values
    y=df.iloc[:,-1].values
```

```
from sklearn.model_selection import train_test_split
xtrain,xtest,ytrain,ytest=train_test_split(x,y,test_size=0.30,random_state=1)
xtest
```

```
array([[5.8, 4. , 1.2, 0.2],
       [5.1, 2.5, 3. , 1.1],
       [6.6, 3. , 4.4, 1.4],
       [5.4, 3.9, 1.3, 0.4],
       [7.9, 3.8, 6.4, 2. ],
       [6.3, 3.3, 4.7, 1.6],
       [6.9, 3.1, 5.1, 2.3],
       [5.1, 3.8, 1.9, 0.4],
       [4.7, 3.2, 1.6, 0.2],
       [6.9, 3.2, 5.7, 2.3],
       [5.6, 2.7, 4.2, 1.3],
       [5.4, 3.9, 1.7, 0.4],
       [7.1, 3. , 5.9, 2.1],
       [6.4, 3.2, 4.5, 1.5],
       [6. , 2.9, 4.5, 1.5],
```

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[8]
```
        [6.8, 3. , 5.5, 2.1],
        [5.1, 3.5, 1.4, 0.3],
        [6. , 2.2, 5. , 1.5],
        [6.3, 2.9, 5.6, 1.8],
        [6.6, 2.9, 4.6, 1.3]])
```

```
from sklearn.preprocessing import StandardScaler
scaler=StandardScaler()
scaler.fit(xtrain)
xtrain=scaler.transform(xtrain)
xtest=scaler.transform(xtest)
```

```
from sklearn.tree import DecisionTreeClassifier
model=DecisionTreeClassifier(criterion='entropy')
model.fit(xtrain,ytrain)
ypred=model.predict(xtest)
ypred
```

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

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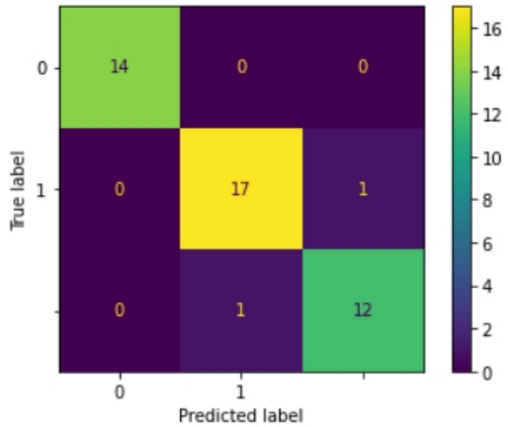
```
[10]        'Iris-versicolor', 'Iris-virginica', 'Iris-virginica',
            'Iris-setosa', 'Iris-versicolor', 'Iris-virginica',
            'Iris-versicolor'], dtype=object)
```

```
from sklearn.metrics import classification_report,confusion_matrix,accuracy_score,ConfusionMatrixDisplay
cm=confusion_matrix(ytest,ypred)
label=[0,1]
cmd=ConfusionMatrixDisplay(cm,display_labels=label)
cmd.plot()
```

```
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x7f410bde3dc0>
```




```
[12] score=accuracy_score(ytest,ypred)
     score
```

```
0.9555555555555556
```

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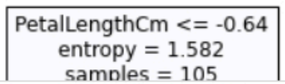
```
report=classification_report(ytest,ypred)
report
```

```
'              precision    recall  f1-score   support\n\n    Iris-setosa       1.00      1.00      1.00        14\nIris-versicol
or       0.94      0.94      0.94        18\n Iris-virginica       0.92      0.92      0.92        13\n\n       accuracy
0.96        45\n      macro avg       0.96      0.96      0.96        45\n   weighted avg       0.96      0.96      0.96        45
\n'
```

```
#for ploting a tree :

from sklearn import tree
import matplotlib.pyplot as plt
plt.figure(figsize=(15,15))
tree.plot_tree(model,feature_names=['SepalLengthCm','SepalWidthCm','PetalLengthCm','PetalWidthCm',],class_names=['Iris-setosa','Iri
```

```
[Text(0.4, 0.9, 'PetalLengthCm <= -0.64\nentropy = 1.582\nsamples = 105\nvalue = [36, 32, 37]\nclass = Iris-versicolor'),
 Text(0.3, 0.7, 'entropy = 0.0\nsamples = 36\nvalue = [36, 0, 0]\nclass = Iris-setosa'),
 Text(0.5, 0.7, 'PetalWidthCm <= 0.59\nentropy = 0.996\nsamples = 69\nvalue = [0, 32, 37]\nclass = Iris-versicolor'),
 Text(0.2, 0.5, 'PetalLengthCm <= 0.709\nentropy = 0.431\nsamples = 34\nvalue = [0, 31, 3]\nclass = Iris-virginica'),
 Text(0.1, 0.3, 'entropy = 0.0\nsamples = 30\nvalue = [0, 30, 0]\nclass = Iris-virginica'),
 Text(0.3, 0.3, 'SepalLengthCm <= 0.297\nentropy = 0.811\nsamples = 4\nvalue = [0, 1, 3]\nclass = Iris-versicolor'),
 Text(0.2, 0.1, 'entropy = 0.0\nsamples = 1\nvalue = [0, 1, 0]\nclass = Iris-virginica'),
 Text(0.4, 0.1, 'entropy = 0.0\nsamples = 3\nvalue = [0, 0, 3]\nclass = Iris-versicolor'),
 Text(0.8, 0.5, 'PetalLengthCm <= 0.625\nentropy = 0.187\nsamples = 35\nvalue = [0, 1, 34]\nclass = Iris-versicolor'),
 Text(0.7, 0.3, 'SepalWidthCm <= 0.161\nentropy = 0.811\nsamples = 4\nvalue = [0, 1, 3]\nclass = Iris-versicolor'),
 Text(0.6, 0.1, 'entropy = 0.0\nsamples = 3\nvalue = [0, 0, 3]\nclass = Iris-versicolor'),
 Text(0.8, 0.1, 'entropy = 0.0\nsamples = 1\nvalue = [0, 1, 0]\nclass = Iris-virginica'),
 Text(0.9, 0.3, 'entropy = 0.0\nsamples = 31\nvalue = [0, 0, 31]\nclass = Iris-versicolor')]
```



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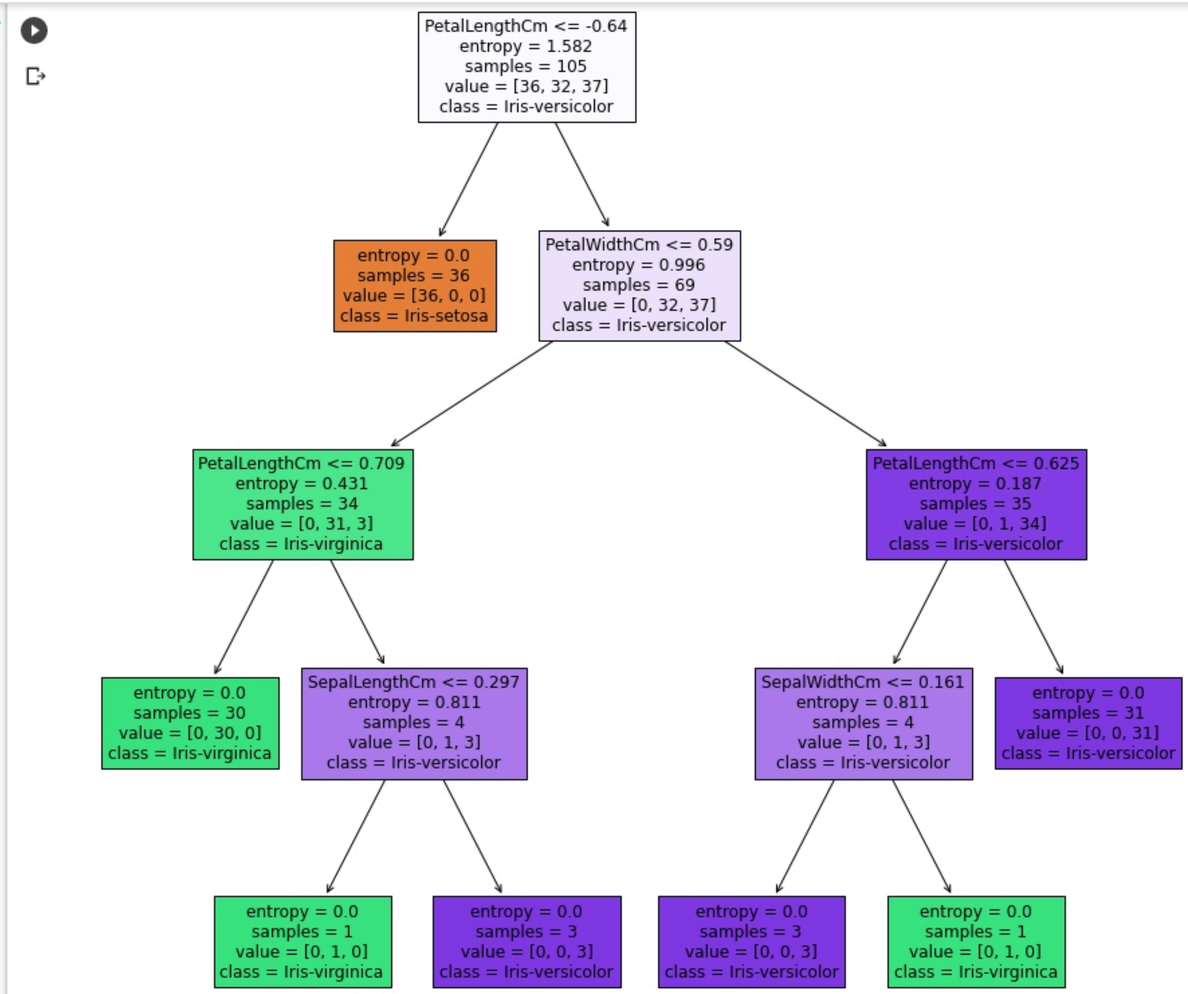
PetalLengthCm <= -0.64
entropy = 1.582
samples = 105
value = [36, 32, 37]
class = Iris-versicolor
entropy = 0.0
samples = 36
value = [36, 0, 0]
class = Iris-setosa
PetalWidthCm <= 0.59
entropy = 0.996
samples = 69
value = [0, 32, 37]
class = Iris-versicolor
PetalLengthCm <= 0.709
entropy = 0.431
samples = 34
value = [0, 31, 3]
class = Iris-virginica
PetalLengthCm <= 0.625
entropy = 0.187
samples = 35
value = [0, 1, 34]
class = Iris-versicolor
entropy = 0.0
samples = 30
value = [0, 30, 0]
class = Iris-virginica
SepalLengthCm <= 0.297
entropy = 0.811
samples = 4
value = [0, 1, 3]
class = Iris-versicolor
SepalWidthCm <= 0.161
entropy = 0.811
samples = 4
value = [0, 1, 3]
class = Iris-versicolor
entropy = 0.0
samples = 31
value = [0, 0, 31]
class = Iris-versicolor
entropy = 0.0
samples = 1
value = [0, 1, 0]
class = Iris-virginica
entropy = 0.0
samples = 3
value = [0, 0, 3]
class = Iris-versicolor
entropy = 0.0
samples = 3
value = [0, 0, 3]
class = Iris-versicolor
entropy = 0.0
samples = 1
value = [0, 1, 0]
class = Iris-virginica