Decision Tree classifier in Scikit-Learn

June 22, 2021

0.1 22 June 2021

0.2 ML Lab 2

0.2.1 Decision Tree classifier in Scikit-Learn

0.2.2 Dr Neeraj Gupta

[3]:
```
import pandas as pd
from sklearn.tree import DecisionTreeClassifier
from sklearn.model_selection import train_test_split
from sklearn import metrics
```

[4]:
```
pima = pd.read_csv("image/diabetes.csv")
```

[5]:
```
pima.head()
```

[5]:

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFunction	Age	Outcome
0	6	148	72	35	0	33.6	0.627	50	1
1	1	85	66	29	0	26.6	0.351	31	0
2	8	183	64	0	0	23.3	0.672	32	1
3	1	89	66	23	94	28.1	0.167	21	0
4	0	137	40	35	168	43.1	2.288	33	1

[9]:
```
feature_cols = ['Pregnancies', 'Glucose',␣
↪'BloodPressure','SkinThickness','Insulin','BMI','DiabetesPedigreeFunction','Age']
X = pima[feature_cols]
y = pima.Outcome
print(X)
print(y)
```

```
     Pregnancies  Glucose  BloodPressure  SkinThickness  Insulin   BMI  \
0              6      148             72             35        0  33.6
```

```
1              1       85             66             29        0  26.6
2              8      183             64              0        0  23.3
3              1       89             66             23       94  28.1
4              0      137             40             35      168  43.1
..           ...      ...            ...            ...      ...  ...
763           10      101             76             48      180  32.9
764            2      122             70             27        0  36.8
765            5      121             72             23      112  26.2
766            1      126             60              0        0  30.1
767            1       93             70             31        0  30.4

     DiabetesPedigreeFunction  Age
0                       0.627   50
1                       0.351   31
2                       0.672   32
3                       0.167   21
4                       2.288   33
..                        ...  ...
763                     0.171   63
764                     0.340   27
765                     0.245   30
766                     0.349   47
767                     0.315   23

[768 rows x 8 columns]
0      1
1      0
2      1
3      0
4      1
      ..
763    0
764    0
765    0
766    1
767    0
Name: Outcome, Length: 768, dtype: int64
```

[10]:
```
#Split dataset into training and test set
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.30,␣
 ↪random_state=1 )
```

[12]:
```
#Create Descision Tree Classifier Object
clf = DecisionTreeClassifier()

#Train Decision Tree Classifier
clf.fit(X_train, y_train)
```

```
#Predict the response for test dataset
y_pred = clf.predict(X_test)
```

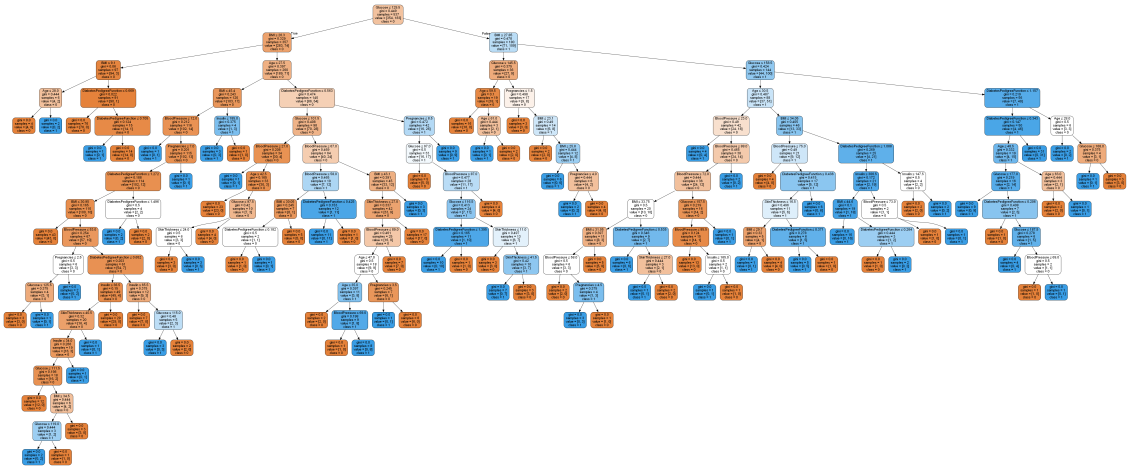
[13]:
```
#Model Accuracy
print("Accuracy:", metrics.accuracy_score(y_test, y_pred))
```

```
Accuracy: 0.696969696969697
```

[14]:
```
from sklearn.tree import export_graphviz
from sklearn.externals.six import StringIO
from IPython.display import Image
import pydotplus
dot_data = StringIO()
export_graphviz(clf, out_file=dot_data,
filled=True, rounded=True,
special_characters=True,feature_names =feature_cols,class_names=['0','1'])
graph = pydotplus.graph_from_dot_data(dot_data.getvalue())
graph.write_png('diabetes.png')
Image(graph.create_png())
```

```
C:\ProgramData\Anaconda3\lib\site-packages\sklearn\externals\six.py:31:
DeprecationWarning: The module is deprecated in version 0.21 and will be removed
in version 0.23 since we've dropped support for Python 2.7. Please rely on the
official version of six (https://pypi.org/project/six/).
  "(https://pypi.org/project/six/).", DeprecationWarning)
```

[14]:



1 Optimizing Decision Tree Performance

[15]:
```
# Create Decision Tree classifer object
clf = DecisionTreeClassifier(criterion="entropy", max_depth=3)

# Train Decision Tree Classifer
clf = clf.fit(X_train,y_train)

#Predict the response for test dataset
y_pred = clf.predict(X_test)

# Model Accuracy, how often is the classifier correct?
print("Accuracy:",metrics.accuracy_score(y_test, y_pred))
```

```
Accuracy: 0.7705627705627706
```

[16]:
```
from sklearn.externals.six import StringIO
from IPython.display import Image
from sklearn.tree import export_graphviz
import pydotplus
dot_data = StringIO()
export_graphviz(clf, out_file=dot_data,
filled=True, rounded=True,
special_characters=True, feature_names =feature_cols,class_names=['0','1'])
graph = pydotplus.graph_from_dot_data(dot_data.getvalue())
graph.write_png('diabetes.png')
Image(graph.create_png())
```

[16]: