**Assignment no 4**

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**Title:** Create a machine learning model using Decision Tree

# Solution:

import pandas as pd

import numpy as np

dataset = pd.read\_csv("bill\_authentication.csv")

#print dataset.shape

#print dataset.head() # prints first five enteries of the dataset

X = dataset.iloc[:,:4]

Y = dataset.iloc[:,4]

#print X.head()

#print Y

from sklearn.cross\_validation import train\_test\_split

X\_train,X\_test,Y\_train,Y\_test = train\_test\_split(X,Y,test\_size=0.2) # X and Y will be devided into 2-2 parts each

# i.e. X train Xtest and Y train Y test

from sklearn.tree import DecisionTreeClassifier

clf= DecisionTreeClassifier()

clf.fit(X\_train,Y\_train) # train the algo with predicter variable and response variable

a = clf.predict(X\_test) # test the response

#print a.shape

#print a

from sklearn.metrics import classification\_report, confusion\_matrix

print confusion\_matrix(Y\_test,a)

new = np.array([[0.74521,3.9357,-4.4044,-4.1414]])

npred = clf.predict(new)

print npred

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) # describe the characterstics of the graph

# round boxes, filled colors

#graph= pydotplus.graph\_from\_dot\_data(dot\_data.getvalue()) # creates the graph

#graph.write\_png('tree.png') # saves the graph in current working directory

Output:

|  |  |
| --- | --- |
|  | Variance Skewness Curtosis Entropy Class |
| 0 | 3.62160 8.6661-2.8073-0.44699 0 |
| 1 | 4.54590 8.1674-2.4586-1.46210 0 |
| 2 | 3.86600-2.6383 1.92420.10645 0 |
| 3 | 3.45660 9.5228-4.0112-3.594400 |
| 4 | 0.32924-4.4552 4.5718-0.98880 0 |

[[1421]

[ 0 132]]

precision recallf1-scoresupport

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 0 | 0.99 | 1.00 | 1.00 | 142 |
| 1 | 1.00 | 0.99 | 1.00 | 133 |
| avg/total | 1.00 | 1.00 | 1.00 | 275 |

