import pandas as pd

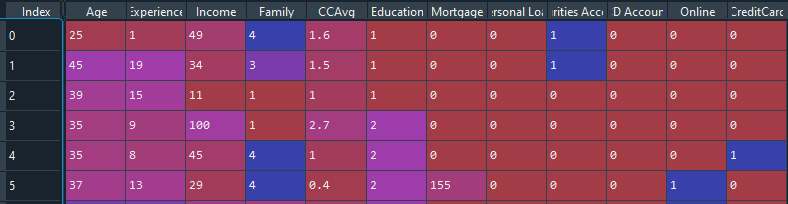
import numpy as np

import matplotlib.pyplot as plt

import seaborn as sns

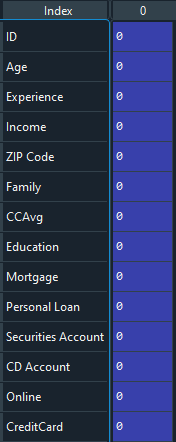
**###### Load data set**

dataset = pd.read\_excel("D:\\ML\\dataset\\Bank\_Personal\_Loan\_Modelling.xlsx",sheet\_name=1)

****

**#### Check null value in dataset**

dataset\_null = dataset.isnull().sum()



**#### Drop Unwanted Features**

dataset = dataset.drop(["ID","ZIP Code"],axis=1)

**##### To Model Creation**

from sklearn import tree

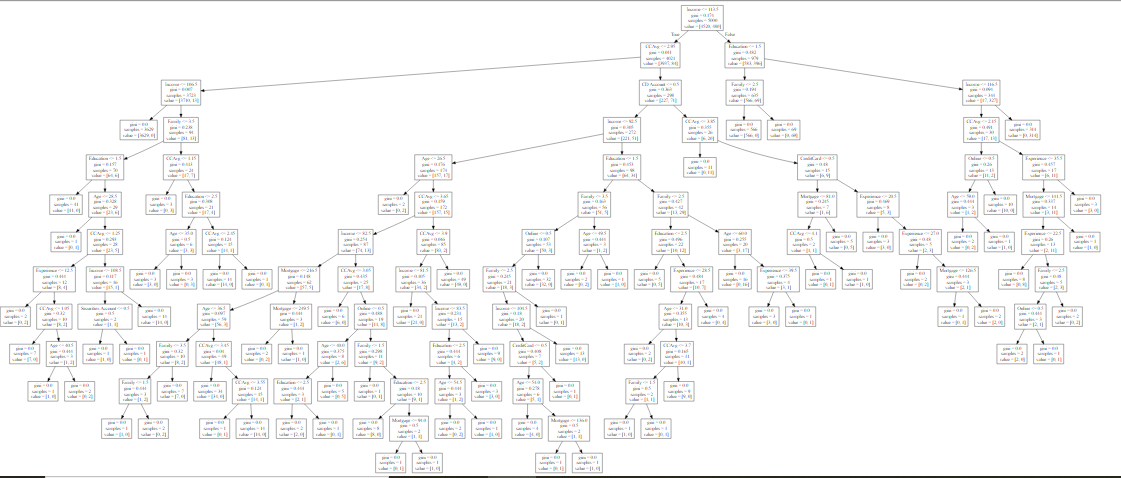
tree\_model = tree.DecisionTreeClassifier(max\_depth=22)

predictors = pd.DataFrame([dataset['Age'],dataset['Experience'],dataset['Income'],dataset['Family'],dataset['CCAvg'],dataset['Education'],dataset['Mortgage'],dataset['Securities Account'],dataset['CD Account'],dataset['Online'],dataset['CreditCard']]).T

tree\_model.fit(X = predictors,y=dataset['Personal Loan'])

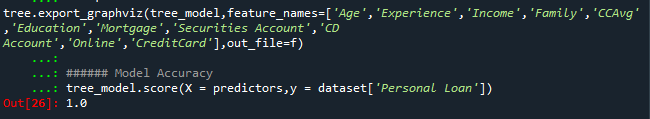
with open ("Dbank.dot",'w') as f:

f = tree.export\_graphviz(tree\_model,feature\_names=['Age','Experience','Income','Family','CCAvg','Education','Mortgage','Securities Account','CD Account','Online','CreditCard'],out\_file=f)



**###### Model Accuracy**

tree\_model.score(X = predictors,y = dataset['Personal Loan'])



**###### Random Forest Classifier**

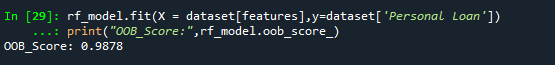
from sklearn.ensemble import RandomForestClassifier

rf\_model = RandomForestClassifier(n\_estimators=1000,max\_features=2,oob\_score=2)

features = ['Age','Experience','Income','Family','CCAvg','Education','Mortgage','Securities Account','CD Account','Online','CreditCard']

rf\_model.fit(X = dataset[features],y=dataset['Personal Loan'])

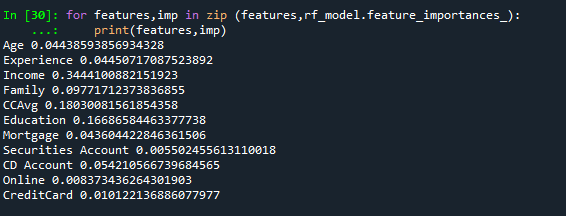
print("OOB\_Score:",rf\_model.oob\_score\_)

****

**#####To Find the Important variable**

for features,imp in zip (features,rf\_model.feature\_importances\_):

print(features,imp)



**###### To important variable are ”Income”,”CCAvg”,”Education”.**

**###### To make Decision tree for independent variable = ”Income”,”CCAvg”,”Education”, Dependent Variable = “Personal Loan”.**

**### Bulid the Tree Model**

tree\_model = tree.DecisionTreeClassifier()

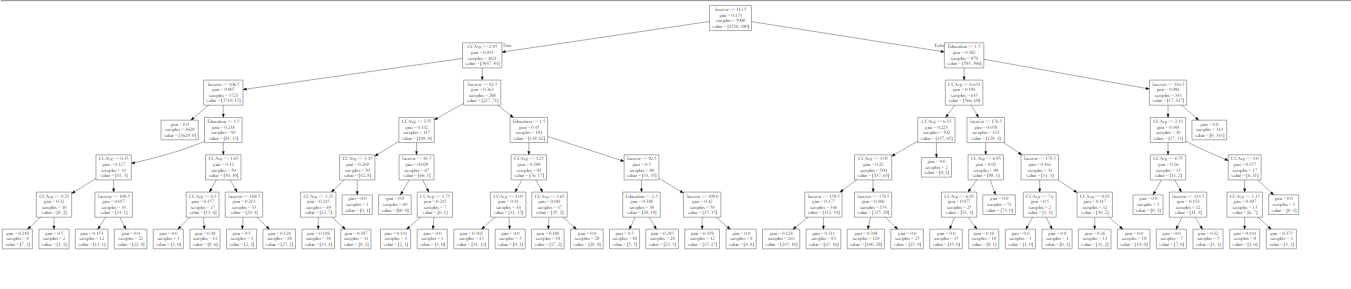
predictors = pd.DataFrame([dataset['Income'],dataset['CCAvg'],dataset['Education']]).T

tree\_model = tree.DecisionTreeClassifier(max\_depth=6)

tree\_model.fit(X = predictors, y = dataset['Personal Loan'])

with open ("Dbank1.dot",'w') as f:

f = tree.export\_graphviz(tree\_model,feature\_names=['Income','CCAvg','Education'],out\_file=f)

****

**##### Model Accuracy score:**

tree\_model.score(X=predictors, y=dataset['Personal Loan'])

