DIGITAL ASSIGNMENT 2

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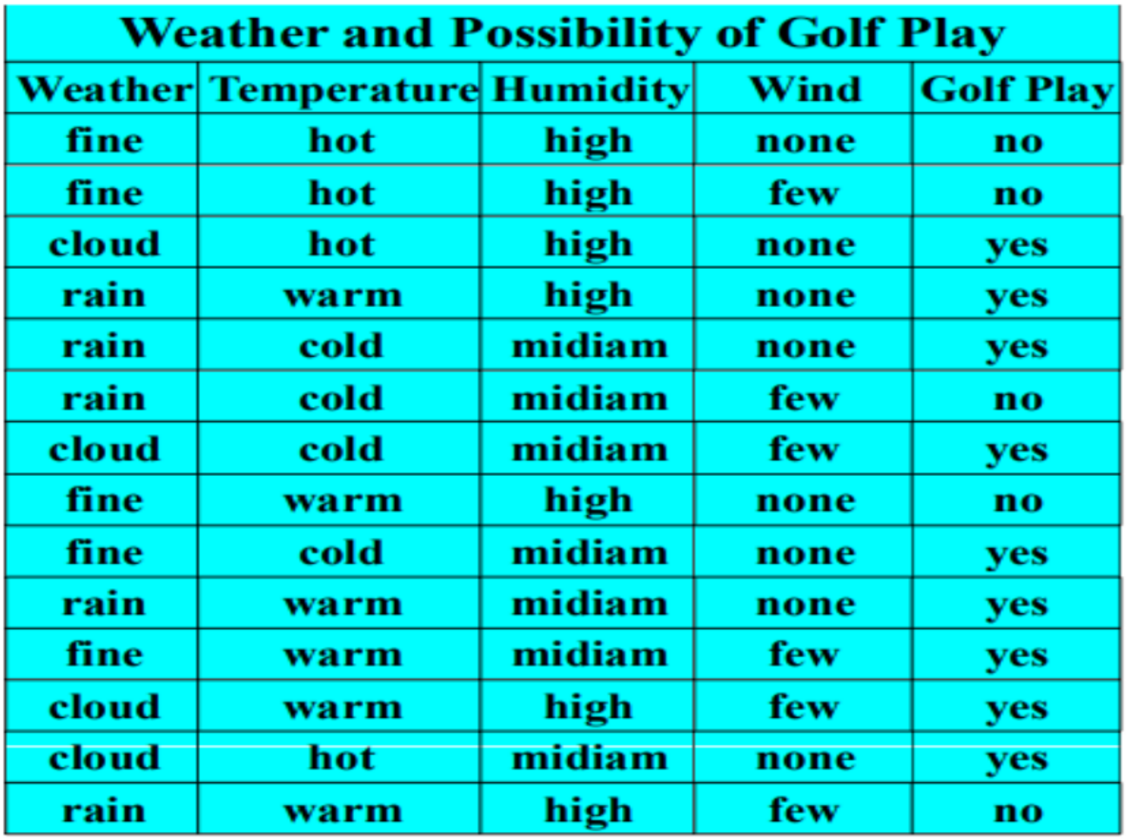
17BCE0437

Building a Classifier Using Naive Bayes to classify the possibility of play for the test model information given below. Test the model for a minimum of 3 query string.



Weather and Possibility of Golf Play

Weather	Temperature	Humidity	Wind	Golf Play
fine	hot	high	none	no
fine	hot	high	few	no
cloud	hot	high	none	yes
rain	warm	high	none	yes
rain	cold	midiam	none	yes
rain	cold	midiam	few	no
cloud	cold	midiam	few	yes
fine	warm	high	none	no
fine	cold	midiam	none	yes
rain	warm	midiam	none	yes
fine	warm	midiam	few	yes
cloud	warm	high	few	yes
cloud	hot	midiam	none	yes
rain	warm	high	few	no

□ Use any of the Toolkit / Package to perform the process

□ Print out the Accuracy and Confusion Matrix of Classification

□ Document the step by step process and upload with output and Code

In [6]:

```python
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
dataMain = pd.read_csv('data.csv')
```

In [7]:

```python
dataMain.head(10)
data=dataMain.head(10)
print(data)

```

```
  Weather Temperature Humidity  Wind Golf Play
0    fine         hot     high  none        no
1    fine         hot     high   few        no
2   cloud         hot     high  none       yes
3    rain        warm     high  none       yes
4    rain        cold   medium  none       yes
5    rain        cold   medium   few        no
6   cloud        cold   medium   few       yes
7    fine        warm     high  none        no
8    fine        cold   medium  none       yes
9    rain        warm   medium  none       yes
```

In [8]:

```python
#Training  data set consists of the first 10 rows
target =data.values[:,4]
print(target)
```

```
['no' 'no' 'yes' 'yes' 'yes' 'no' 'yes' 'no' 'yes' 'yes']
```

In [9]:

```python
#For target variable
c=0
P_yes,P_no=0,0
for i in target:
    c=c+1
    if i=='yes':
        P_yes=P_yes+1;
P_yes=P_yes/c
P_no=1-P_yes
print(P_yes," ",P_no)
```

```
0.6   0.4
```

In [10]:

```python
#For class: Wind
Wind_none_y,Wind_none_n, Wind_few_y, Wind_few_n=0,0,0,0
n=0
m=0
counter=-1
var=data.values[:,3]
for i in var:
    counter=counter+1
    #print(target[counter])
    if i=='none':
        print(i)
        n=n+1
    if i=='none' and target[counter]=='yes':
        Wind_none_y=Wind_none_y+1
    if i=='few':
        m=m+1
    if i=='few' and target[counter]=='yes':
        Wind_few_y=Wind_few_y+1

Wind_none_y=Wind_none_y/n
Wind_none_n=1-Wind_none_y
Wind_few_y=Wind_few_y/m
Wind_few_n=1-Wind_few_y

print(Wind_none_y," ",Wind_none_n)
print(Wind_few_y," ",Wind_few_n)

```

```
none
none
none
none
none
none
none
0.7142857142857143   0.2857142857142857
0.3333333333333333   0.6666666666666667
```

In [11]:

```
#For class: Humidity
Hu_high_y,Hu_high_n, Hu_medium_y, Hu_medium_n=0,0,0,0
n=0
m=0
counter=-1
var=data.values[:,2]
for i in var:
    counter=counter+1
    #print(target[counter])
    if i=='high':
        #print(i)
        n=n+1
    if i=='high' and target[counter]=='yes':
        Hu_high_y=Hu_high_y+1
    if i=='medium':
        m=m+1
    if i=='medium' and target[counter]=='yes':
        Hu_medium_y=Hu_medium_y+1
Hu_high_y=Hu_high_y/n
Hu_high_n=1-Hu_high_y
Hu_medium_y=Hu_medium_y/m
Hu_medium_n=1-Hu_medium_y

```

In [12]:

```
#For class: Temperature
temp_hot_y, temp_hot_n, temp_warm_y, temp_warm_n, temp_cold_y, temp_cold_n=0,0,0,0,0,0
n=0
m=0
o=0
counter=-1
var=data.values[:,1]
print(var)
for i in var:
    counter=counter+1
    #print(target[counter])
    if i=='hot':
        #print(i)
        n=n+1
    if i=='hot' and target[counter]=='yes':
        temp_hot_y=temp_hot_y+1
    if i=='warm':
        m=m+1
        if target[counter]=='yes':
            temp_warm_y=temp_warm_y+1
    if i=='cold':
        o=o+1
        if target[counter]=='yes':
            temp_cold_y=temp_cold_y+1
temp_hot_y=temp_hot_y/n
temp_hot_n= 1-temp_hot_y
temp_warm_y=temp_warm_y/m
temp_warm_n=1-temp_warm_y
temp_cold_y=temp_cold_y/o
temp_cold_n=1-temp_cold_y
```

```
['hot' 'hot' 'hot' 'warm' 'cold' 'cold' 'cold' 'warm' 'cold' 'warm']
```

In [13]:

```
#For class: Weather
w_rain_y, w_rain_n, w_cloud_y, w_cloud_n, w_fine_y, w_fine_n=0,0,0,0,0,0
n=0
m=0
o=0
counter=-1
var=data.values[:,0]
print(var)
for i in var:
    counter=counter+1
    #print(target[counter])
    if i=='rain':
        #print(i)
        n=n+1
        if target[counter]=='yes':
            w_rain_y=w_rain_y+1
    if i=='cloud':
        m=m+1
        if target[counter]=='yes':
            w_cloud_y=w_cloud_y+1
    if i=='fine':
        o=o+1
        if target[counter]=='yes':
            w_fine_y=w_fine_y+1
w_rain_y=w_rain_y/n
w_rain_n=1-w_rain_y
w_cloud_y=w_cloud_y/m
w_cloud_n=1-w_cloud_y
w_fine_y=w_fine_y/o
w_fine_n=1-w_fine_y

```

```
['fine' 'fine' 'cloud' 'rain' 'rain' 'rain' 'cloud' 'fine' 'fine' 'rain']
```

In [16]:

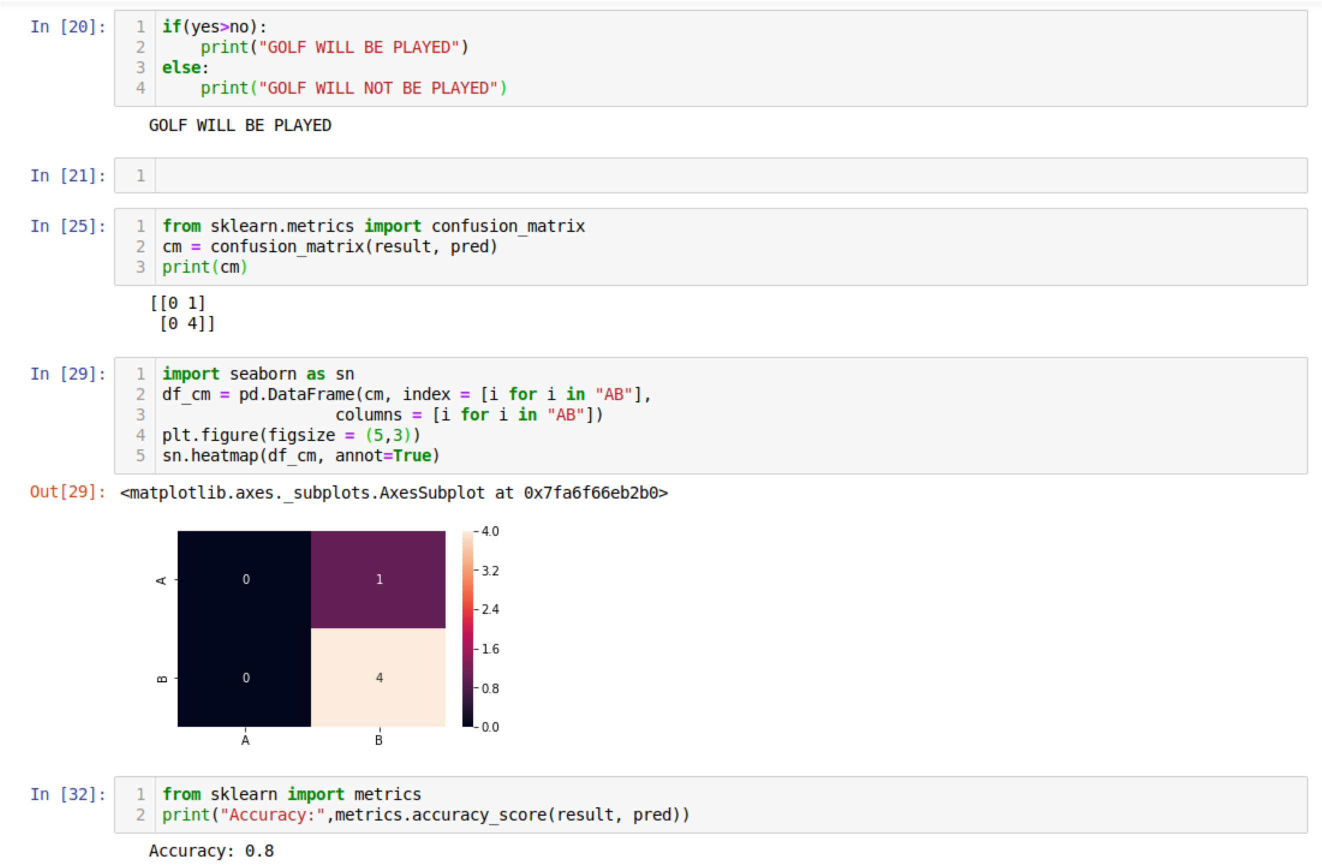
```python
#Prediction Based on the testing data set
dataTest=dataMain.tail(5) #Making the test dataset
print(dataTest)
wY =[]
tY =list()
hY =list()
wndY =list()
result =list()
pred=list()

print(dataTest.loc[10]['Weather'])


for i in range(10,15):
    wY.append(dataTest.loc[i-1]['Weather'])
    tY.append(dataTest.loc[i-1]['Temperature'])
    hY.append(dataTest.loc[i-1]['Humidity'])
    wndY.append(dataTest.loc[i-1]['Wind'])
    result.append(dataTest.loc[i-1]['Golf Play'])



for i in range(10,15):
    w0='w_'+wY[i-10]+'_'
    t0='temp_'+tY[i-10]+'_'
    h0='Hu_'+hY[i-10]+'_'
    wnd0='Wind_'+wndY[i-10]+'_'
    yes=eval(w0+'y')*eval(t0+'y')*eval(h0+'y')*eval(wnd0+'y')
    no=eval(w0+'n')*eval(t0+'n')*eval(h0+'n')*eval(wnd0+'n')
    print("yes:",yes,"  no:",no)
    yes=P_yes*yes
    no=P_no*no
    if(yes>no):
        print("ITERATION",(i-10),"     PREDICTED: YES      ACTUAL: ",result[i-10])
        pred.append(1)
    else:
        print("ITERATION",(i-10),"     PREDICTED: NO      ACTUAL: ",result[i-10])
        pred.append(0)
    if(result[i-10]=='yes'):
        result[i-10]=1
    else:
        result[i-10]=0

```

```
   Weather Temperature Humidity  Wind Golf Play
9     rain        warm   medium  none       yes
10    fine        warm   medium   few       yes
11   cloud        warm     high   few       yes
12   cloud         hot   medium  none       yes
13    rain        warm     high   few        no
fine
yes: 0.2857142857142857 5   no: 0.004761904761904761 5
ITERATION 0      PREDICTED: YES      ACTUAL:  yes
yes: 0.04444444444444444   no: 0.03333333333333333
ITERATION 1      PREDICTED: YES      ACTUAL:  yes
yes: 0.08888888888888888   no: 0.0
ITERATION 2      PREDICTED: YES      ACTUAL:  yes
yes: 0.19047619047619047   no: 0.0
ITERATION 3      PREDICTED: YES      ACTUAL:  yes
yes: 0.06666666666666667   no: 0.03333333333333334
ITERATION 4      PREDICTED: YES      ACTUAL:  no
```

In [54]:

```python
print("LETS PREDICT WHETHER GOLF WILL BE PLAYED OR NOT")
w=input(" Enter weather conditions (fine/rain/cloud):  ")
t=input(" Enter temperature conditions (hot/warm/cold):  ")
h=input(" Enter humidity conditions (high/medium):  ")
wnd=input(" Enter wind conditions (none/few):  ")
wY='w_'+w+'_'
tY='temp_'+t+'_'
hY='Hu_'+h+'_'
wndY='Wind_'+wnd+'_'
print(Hu_high_y)
yes=eval(wY+'y')*eval(tY+'y')*eval(hY+'y')*eval(wndY+'y')
no=eval(wY+'n')*eval(tY+'n')*eval(hY+'n')*eval(wndY+'n')
print(yes)
print(no)
yes=P_yes*yes
no=P_no*no
print(yes)
print(no)
```

```
LETS PREDICT WHETHER GOLF WILL BE PLAYED OR NOT
 Enter weather conditions (fine/rain/cloud):  fine
 Enter temperature conditions (hot/warm/cold):  cold
 Enter humidity conditions (high/medium):  medium
 Enter wind conditions (none/few):  none
0.4
0.10714285714285716
0.010714285714285711
0.0642857142857143
0.004285714285714284
```



```
In [20]:  if(yes>no):
              print("GOLF WILL BE PLAYED")
          else:
              print("GOLF WILL NOT BE PLAYED")

          GOLF WILL BE PLAYED

In [21]:  

In [25]:  from sklearn.metrics import confusion_matrix
          cm = confusion_matrix(result, pred)
          print(cm)

          [[0 1]
           [0 4]]

In [29]:  import seaborn as sn
          df_cm = pd.DataFrame(cm, index = [i for i in "AB"],
                            columns = [i for i in "AB"])
          plt.figure(figsize = (5,3))
          sn.heatmap(df_cm, annot=True)

Out[29]:  <matplotlib.axes._subplots.AxesSubplot at 0x7fa6f66eb2b0>
```

```
In [32]:  from sklearn import metrics
          print("Accuracy:",metrics.accuracy_score(result, pred))

          Accuracy: 0.8
```

OUTPUT:

```
LETS PREDICT WHETHER GOLF WILL BE PLAYED OR NOT
 Enter weather conditions (fine/rain/cloud):  fine
 Enter temperature conditions (hot/warm/cold):  warm
 Enter humidity conditions (high/medium):  medium
 Enter wind conditions (none/few):  none

    GOLF WILL BE PLAYED

LETS PREDICT WHETHER GOLF WILL BE PLAYED OR NOT


 Enter weather conditions (fine/rain/cloud):  rain
 Enter temperature conditions (hot/warm/cold):  cold
 Enter humidity conditions (high/medium):  high
 Enter wind conditions (none/few):  few


      GOLF WILL NOT BE PLAYED

LETS PREDICT WHETHER GOLF WILL BE PLAYED OR NOT


 Enter weather conditions (fine/rain/cloud):  fine
 Enter temperature conditions (hot/warm/cold):  warm
 Enter humidity conditions (high/medium):  high
 Enter wind conditions (none/few):  few

    GOLF WILL NOT BE PLAYED
```