Practical No. - 6

Name- Bhavesh Kewalramani

Roll No.- A-25

Section- A

Semester- 6th

Shift- 1st

Aim:

Write a program to implement Naïve Bayes algorithm..

Code:

```
import csv

import time


a = []


filepath = input("Enter Path of CSV File : ")


print("\n")


with open(filepath,'r')as file:
    filecontent=csv.reader(file)
    for row in filecontent:
        print(row)
        a.append(row)
```

```
headings = a[0]
unique=[]
d={}

a.remove(a[0])

temp = [[] for _ in range(len(headings))]

for i in range(len(a)):
    for j in range(len(a[i])):
        temp[j].append(a[i][j])

n=len(headings)
m=len(temp[0])

temp1 = [[] for _ in range(len(headings))]

for i in range(len(temp)):
    for j in range(len(temp[i])):
        if temp[i][j] not in temp1[i]:
            temp1[i].append(temp[i][j])
    d.update({headings[i]:temp1[i]})

n1 = temp1[-1]
```

```
temp1.remove(temp1[-1])


print(n1)
print(temp1)
print(temp)


d1={}
d2={}
for i in range(len(n1)):
    count=0
    for j in range(len(temp[-1])):
        if n1[i]==temp[-1][j]:
            count+=1
    d1.update({n1[i]:count})


print(d1) #Total Yes/No


total=[]
d5={}
d8=[]
d6=[]
for i in range(len(n1)):
    d3=[]
    d7=[]
    for j in range(len(headings)-1):
```

```
        d4={}
        for k in range(len(temp1[j])):
            count=0
            count1=0
            for l in range(len(temp[j])):
                if temp1[j][k]==temp[j][l] and n1[i]==temp[-1][l]:
                    count+=1
                if n1[i]==temp[-1][l]:
                    count1+=1
            d4.update({temp1[j][k]:count})
            d6.append([n1[i],temp1[j][k],count/count1])
        d3.append(d4)
#         d7.append(d6)
    d5.update({n1[i]:d3})
#     d8.append(d7)

print("\n Count : \n")
print(d5)
print("\n\n Probabilities \n")
print(d6)

start=time.time()
while True:
    print("\n\n")
    for k,v in d.items():
```

```
        print(k,"\t",v)
    print("\n\n")
    prob=[1 for _ in range(len(n1))]
    decision={}
    t=[]
    for i in range(len(headings)-1):
        print("Enter the ",headings[i]," : ",end=" ")
        t.append(input())
    for i in range(len(n1)):
        for j in range(len(t)):
            for k in range(len(d6)):
                if n1[i].lower()==d6[k][0].lower() and t[j].lower()==d6[k][1].lower():
                    prob[i]*=d6[k][2]

        prob[i]*=(d1[n1[i]]/len(temp[0]))
        decision.update({n1[i]:prob[i]})

#     print()
#     print(decision)

    maxx=-999999
    ny=""

    print("\n\n")
    for k,v in decision.items():
```

```
        print("Probability of '",k,"' : ",v)
        if maxx<decision[k]:
            maxx=decision[k]
            ny=k
    print("\n")
    print("Our Decision is ",ny)

    print("\n")
    ans=input("Do you Wish to Continue [y/n] : ")

    if ans.lower()=="n":
        break

end=time.time()
print("\n\n")
print("Time Taken by the Algorithm : ",end-start)
```

Output:

```
Enter Path of CSV File : C:\Users\bhave\Downloads\PlayTennis.csv
['Outlook', 'Temperature', 'Humidity', 'Wind', 'Play Tennis']
['Sunny', 'Hot', 'High', 'Weak', 'No']
['Sunny', 'Hot', 'High', 'Strong', 'No']
['Overcast', 'Hot', 'High', 'Weak', 'Yes']
['Rain', 'Mild', 'High', 'Weak', 'Yes']
['Rain', 'Cool', 'Normal', 'Weak', 'Yes']
['Rain', 'Cool', 'Normal', 'Strong', 'No']
['Overcast', 'Cool', 'Normal', 'Strong', 'Yes']
['Sunny', 'Mild', 'High', 'Weak', 'No']
['Sunny', 'Cool', 'Normal', 'Weak', 'Yes']
['Rain', 'Mild', 'Normal', 'Weak', 'Yes']
['Sunny', 'Mild', 'Normal', 'Strong', 'Yes']
['Overcast', 'Mild', 'High', 'Strong', 'Yes']
['Overcast', 'Hot', 'Normal', 'Weak', 'Yes']
['Rain', 'Mild', 'High', 'Strong', 'No']
['No', 'Yes']
[['Sunny', 'Overcast', 'Rain'], ['Hot', 'Mild', 'Cool'], ['High', 'Normal'], ['Weak', 'Strong']]
[['Sunny', 'Sunny', 'Overcast', 'Rain', 'Rain', 'Rain', 'Overcast', 'Sunny', 'Sunny', 'Rain', 'Sunny', 'Overcast', 'Overcast',
'Rain'], ['Hot', 'Hot', 'Hot', 'Mild', 'Cool', 'Cool', 'Cool', 'Mild', 'Cool', 'Mild', 'Mild', 'Mild', 'Hot', 'Mild'], ['High',
'High', 'High', 'High', 'Normal', 'Normal', 'Normal', 'High', 'Normal', 'Normal', 'Normal', 'High', 'Normal', 'High'], ['Weak',
'Strong', 'Weak', 'Weak', 'Weak', 'Strong', 'Strong', 'Weak', 'Weak', 'Weak', 'Strong', 'Strong', 'Weak', 'Strong'], ['No', 'N
o', 'Yes', 'Yes', 'Yes', 'No', 'Yes', 'No', 'Yes', 'Yes', 'Yes', 'Yes', 'Yes', 'No']]
{'No': 5, 'Yes': 9}

 Count :
```

```
 Count :

{'No': [{'Sunny': 3, 'Overcast': 0, 'Rain': 2}, {'Hot': 2, 'Mild': 2, 'Cool': 1}, {'High': 4, 'Normal': 1}, {'Weak': 2, 'Stron
g': 3}], 'Yes': [{'Sunny': 2, 'Overcast': 4, 'Rain': 3}, {'Hot': 2, 'Mild': 4, 'Cool': 3}, {'High': 3, 'Normal': 6}, {'Weak':
6, 'Strong': 3}]}


 Probabilities

[['No', 'Sunny', 0.6], ['No', 'Overcast', 0.0], ['No', 'Rain', 0.4], ['No', 'Hot', 0.4], ['No', 'Mild', 0.4], ['No', 'Cool', 0.
2], ['No', 'High', 0.8], ['No', 'Normal', 0.2], ['No', 'Weak', 0.4], ['No', 'Strong', 0.6], ['Yes', 'Sunny', 0.222222222222222
2], ['Yes', 'Overcast', 0.4444444444444444], ['Yes', 'Rain', 0.3333333333333333], ['Yes', 'Hot', 0.2222222222222222], ['Yes',
'Mild', 0.4444444444444444], ['Yes', 'Cool', 0.3333333333333333], ['Yes', 'High', 0.3333333333333333], ['Yes', 'Normal', 0.6666
666666666666], ['Yes', 'Weak', 0.6666666666666666], ['Yes', 'Strong', 0.3333333333333333]]


Outlook          ['Sunny', 'Overcast', 'Rain']
Temperature      ['Hot', 'Mild', 'Cool']
Humidity         ['High', 'Normal']
Wind     ['Weak', 'Strong']
Play Tennis      ['No', 'Yes']
```

```
Enter the  Outlook   :  sunny
Enter the  Temperature   :  hot
Enter the  Humidity   :  high
Enter the  Wind   :  weak


Probability of ' No ' :  0.02742857142857143
Probability of ' Yes ' :  0.007054673721340387


Our Decision is  No
Do you Wish to Continue [y/n] : n


Time Taken by the Algorithm :  21.968231439590454
```