PracticalNo:8

Aim: Implement Naive Bayes learning algorithm for the restaurant waiting problem.

Program code:

```
class NaiveBayes:
    def __init__(self, f, r):
        self.features = f
        self.response = r
    def predict(self,custcase):
        anskeys = list(self.response.keys())
        ansvalues = dict.fromkeys(anskeys,0)

        for key in anskeys :
            ansvalues[key] = self.response[key]
            for ikey, ival in custcase.items() :
                ansvalues[key] = ansvalues[key] * self.features[ikey][ival][key]
        print(ansvalues)

        maxkey=""
        maxans=-1
        for ikey, ival in ansvalues.items():
            if ival > maxans :
                maxans= ival
                maxkey = ikey
        return maxkey

response = {"Wait":0.4, "Leave":0.6}
features = {
    "Reservation":
                {
                    "Yes" : {"Wait":0.5, "Leave":0.666667},
                     "No" : {"Wait":0.5, "Leave":0.333333}
                } ,
    "Time>30":
                {
                    "Yes" : {"Wait":0.25, "Leave":0.83333},
                     "No" : {"Wait":0.75, "Leave":0.16667}
                }
}
nb = NaiveBayes(features, response)
print("Probability :", nb.features["Reservation"]["Yes"]["Wait"])
print("Probability :", nb.features["Time>30"]["No"]["Leave"])
resstatus = input("Manager asks Customer, Have you reserved the table?(Yes/No):")
```

```
timestatus = input("Customer asks Manager, Will it take more than 30 mins?(Yes/No):")
custcase = {"Reservation":resstatus, "Time>30":timestatus}
print("Manager predicts that Customer will: " , nb.predict(custcase) )

print("Performed By 713 krunal dhavle")
```

Output:

```
Probability : 0.5
Probability : 0.16667
Manager asks Customer, Have you reserved the table?(Yes/No):Yes
Customer asks Manager, Will it take more than 30 mins?(Yes/No):Yes
{'Wait': 0.05, 'Leave': 0.33333216666599996}
Manager predicts that Customer will:  Leave
Performed By 713 krunal dhavle
>>>
```

```
Probability : 0.5
Probability : 0.16667
Manager asks Customer, Have you reserved the table?(Yes/No):No
Customer asks Manager, Will it take more than 30 mins?(Yes/No):No
{'Wait': 0.15000000000000002, 'Leave': 0.033333966666}
Manager predicts that Customer will:  Wait
Performed By 713 krunal dhavle
>>>
```

```
Probability : 0.5
Probability : 0.16667
Manager asks Customer, Have you reserved the table?(Yes/No):Yes
Customer asks Manager, Will it take more than 30 mins?(Yes/No):No
{'Wait': 0.15000000000000002, 'Leave': 0.066668033334}
Manager predicts that Customer will:  Wait
Performed By 713 krunal dhavle
>>>
```

```
Probability : 0.5
Probability : 0.16667
Manager asks Customer, Have you reserved the table?(Yes/No):No
Customer asks Manager, Will it take more than 30 mins?(Yes/No):Yes
{'Wait': 0.05, 'Leave': 0.16666583333399998}
Manager predicts that Customer will:  Leave
Performed By 713 krunal dhavle
>>>
```