

## **CODE:**

```
import nltk
from nltk.corpus import stopwords
from nltk.tokenize import word_tokenize
from nltk.stem import PorterStemmer
from sklearn.feature_extraction.text import CountVectorizer
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.model_selection import train_test_split
from sklearn.naive_bayes import MultinomialNB
from sklearn.metrics import precision_score, recall_score, f1_score
import pandas as pd
import numpy as np

dataset=pd.read_csv('Restaurant_Reviews.tsv', delimiter = '\t', quoting = 3)
print(dataset)

dataset.head()

dataset['Liked']=dataset['Liked'].map({1:1,0:2})

x = dataset['Review']
y = dataset['Liked']
print(x)
print(y)

vectorizer=TfidfVectorizer(stop_words = 'english')
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size = 0.4, shuffle = False)
x_train_vec = vectorizer.fit_transform(x_train)
print(x_train_vec)
x_test_vec = vectorizer.transform(x_test)
nb = MultinomialNB()
nb.fit(x_train_vec, y_train)
nb.score(x_test_vec, y_test)
prediction = nb.predict(x_test_vec)
print(prediction.shape)
print(y_test.shape)
np.array(y_test)
print('Precision : ', precision_score(y_test, prediction, average = 'macro'))
print('Recall : ', recall_score(y_test, prediction, average = 'macro'))
print('F1 : ', f1_score(y_test, prediction, average = 'macro'))
```

## OUTPUT:

```
IPython console
Console 1/A X

0          Wow... Loved this place.      Review    Liked
1          Crust is not good.             0
2          Not tasty and the texture was just nasty.    0
3          Stopped by during the late May bank holiday of... 1
4          The selection on the menu was great and so wer... 1
...
995 I think food should have flavor and texture an...    0
996 Appetite instantly gone.                    0
997 Overall I was not impressed and would not go b...    0
998 The whole experience was underwhelming, and I ...    0
999 Then, as if I hadn't wasted enough of my life ...    0

[1000 rows x 2 columns]
0          Wow... Loved this place.
1          Crust is not good.
2          Not tasty and the texture was just nasty.
3          Stopped by during the late May bank holiday of...
4          The selection on the menu was great and so wer...
...
995 I think food should have flavor and texture an...
996 Appetite instantly gone.
997 Overall I was not impressed and would not go b...
998 The whole experience was underwhelming, and I ...
999 Then, as if I hadn't wasted enough of my life ...
Name: Review, Length: 1000, dtype: object
0          1
1          2
2          2
3          1
4          1
...
995          2
996          2
997          2
998          2
999          2
Name: Liked, Length: 1000, dtype: int64
(0, 848)    0.3849933425200048
(0, 674)    0.5967446204899043
(0, 1288)   0.7040426010772605
(1, 489)    0.46265157380633243
(1, 268)    0.8865401972017534
(2, 752)    0.563512768507916
(2, 619)    0.3852964302613635
(2, 1146)   0.563512768507916
(2, 1137)   0.46524550538929244
IPython console    History log
```

Permissions:

```
IPython console
Console 1/A X

(2, 752)    0.563512768507916
(3, 1081)    0.37201383428989043
(3, 951)     0.37201383428989043
(3, 554)     0.37201383428989043
(3, 833)     0.37201383428989043
(3, 35)      0.3495188965806733
(3, 1087)    0.3495188965806733
(3, 674)     0.2827232766979424
(3, 70)      0.5509590975380879
(4, 499)     0.37740134462467967
(4, 716)     0.5149193642767351
(4, 997)     0.5374666000863145
(5, 839)     0.4246200085959329
(5, 278)     0.4553269196075988
(5, 1248)    0.40283131085106315
(5, 40)      0.5078207307045661
...
(595, 556)   0.45820858480133436
(595, 856)   0.45820858480133436
(595, 404)   0.45820858480133436
(595, 1133)  0.3637094963307754
(596, 353)   0.4848500284164384
(596, 1274)  0.4455366156467598
(596, 555)   0.4455366156467598
(596, 492)   0.3921916385123016
(596, 278)   0.4627098625074658
(597, 1186)  0.49579253565301895
(597, 931)   0.4658129457071282
(597, 1086)  0.4445420881304322
(597, 840)   0.4445420881304322
(597, 661)   0.3767926816747744
(598, 394)   0.37919666539820457
(598, 165)   0.37919666539820457
(598, 262)   0.37919666539820457
(598, 379)   0.3399988207288942
(598, 1167)  0.3399988207288942
(598, 462)   0.3562673961375653
(598, 139)   0.29414028524761574
(598, 107)   0.24898424393219165
(598, 913)   0.24898424393219165
(599, 738)   0.8773868541205935
(599, 489)   0.47978360561441485
(400,)
(400,)
Precision : 0.7540380573072243
Recall : 0.7368794326241135
F1 : 0.7011383114314595
IPython console    History log
```

Precision : 0.7540380573072243

Recall : 0.7368794326241135

F1 : 0.7011383114314595

IPython console

History log