

**Import all librarys**

```
import numpy as np
import pandas as pd
```

```
data=pd.read_csv("/content/IMDB_Dataset.csv")
data.head()
```

	review	sentiment
0	One of the other reviewers has mentioned that ...	positive
1	A wonderful little production.   The...	positive
2	I thought this was a wonderful way to spend ti...	positive
3	Basically there's a family where a little boy ...	negative
4	Petter Mattei's "Love in the Time of Money" is...	positive

```
from sklearn.preprocessing import LabelEncoder
from sklearn.feature_extraction.text import CountVectorizer
from sklearn.model_selection import train_test_split
from sklearn.naive_bayes import MultinomialNB
from sklearn.metrics import accuracy_score, classification_report, confusion_matrix
```

```
import nltk
import re
from nltk.corpus import stopwords
from nltk.stem import PorterStemmer
```

```
import pickle
import seaborn as sns
```

```
nltk.download('stopwords')
```

```
[nltk_data] Downloading package stopwords to /root/nltk_data...
[nltk_data]   Unzipping corpora/stopwords.zip.
True
```

**Import dataset**

```
data.shape
```

```
(50000, 2)
```

```
data.isnull().sum()
```

```
review      0
sentiment    0
```

```
dtype: int64
```

```
data["sentiment"].unique()
```

```
array(['positive', 'negative'], dtype=object)
```

```
data["sentiment"].value_counts()
```

```
positive    25000
negative    25000
Name: sentiment, dtype: int64
```

```
label=LabelEncoder()
```

```
data["sentiment"]=label.fit_transform(data["sentiment"])
```

```
data.head()
```

	review	sentiment
0	One of the other reviewers has mentioned that ...	1
1	A wonderful little production.   The...	1
2	I thought this was a wonderful way to spend ti...	1
3	Basically there's a family where a little boy ...	0
4	Petter Mattei's "Love in the Time of Money" is...	1

```
x=data["review"]
```

```
y=data["sentiment"]
```

```
ps=PorterStemmer()
```

```
corpus=[]
```

```
for i in range(len(x)):
```

```
    print(i)
```

```
    review = re.sub("[^a-zA-Z]", " ", x[i])
```

```
    review = review.lower()
```

```
    review = review.split()
```

```
    review = [ps.stem(word) for word in review if word not in set(stopwords.words("english"))]
```

```
    review = " ".join(review)
```

```
    corpus.append(review)
```

**Streaming output truncated to the last 5000 lines.**

```
45000
```

```
45001
```

```
45002
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```
45003
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45004
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45008
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45053  
45054  
45055  
45056

corpus

```
['one review mention watch oz episod hook right exactli happen br br first thing struck oz brutal unflinch scene violenc set right word go trust show faint heart timid show pull punch regard  
drug sex violenc hardcor classic use word br br call oz nicknam given oswald maximum secur state penitentari focus mainli emerald citi experiment section prison cell glass front face inward  
privaci high agenda em citi home mani aryan muslim gangsta latino christian italian irish scuffl death stare dodgi deal shadi agreement never far away br br would say main appeal show due fact  
goe show dare forget pretti pictur paint mainstream audienc forget charm forget romanc oz mess around first episod ever saw struck nasti surreal say readi watch develop tast oz got accustom  
high level graphic violenc violenc injustic crook guard sold nickel inmat kill order get away well manner middl class inmat turn prison bitch due lack street skill prison experi watch oz may  
becom comfort uncomfort view that get touch darker side',  
'wonder littl product br br film techniqu unassum old time bbc fashion give comfort sometim discomfort sens realism entir piec br br actor extrem well chosen michael sheen got polari voic pat
```

truli see seamless edit guid refer william diari entri well worth watch terrificli written perform piec master product one great master comedi life br br realism realli come home littl thing fantasi guard rather use tradit dream techniqu remain solid disappear play knowledg sens particularli scene concern orton halliwell set particularli flat halliwell mural decor everi surfac terribl well done',

'thought wonder way spend time hot summer weekend sit air condit theater watch light heart comedi plot simplist dialogu witti charact likabl even well bread suspect serial killer may disappoint realiz match point risk addict thought proof woodi allen still fulli control style mani us grown love br br laugh one woodi comedi year dare say decad never impress scarlet johanson manag tone sexi imag jump right averag spirit young woman br br may crown jewel career wittier devil wear prada interest superman great comedi go see friend',

'basic famili littl boy jake think zombi closet parent fight time br br movi slower soap opera suddenli jake decid becom rambo kill zombi br br ok first go make film must decid thriller drama drama movi watchabl parent divorc argu like real life jake closet total ruin film expect see boogeyman similar movi instead watch drama meaningless thriller spot br br well play parent descent dialog shot jake ignor',

'petter mattei love time money visual stun film watch mr mattei offer us vivid portrait human relat movi seem tell us money power success peopl differ situat encount br br variat arthur schnitzler play theme director transfer action present time new york differ charact meet connect one connect one way anoth next person one seem know previou point contact stylishli film sophist luxuri look taken see peopl live world live habitat br br thing one get soul pictur differ stage loneli one inhabit big citi exactli best place human relat find sincer fulfil one discern case peopl encount br br act good mr mattei direct steve buscemi rosario dawson carol kane michael imperioli adrian grenier rest talent cast make charact come aliv br br wish mr mattei good luck await anxious next work',

'probabl time favorit movi stori selfless sacrific dedic nobl caus preachi bore never get old despit seen time last year paul luka perform bring tear eye bett davi one truli sympathet role delight kid grandma say like dress midget children make fun watch mother slow awaken happen world roof believ startl dozen thumb movi',

'sure would like see resurrect date seahunt seri tech today would bring back kid excit grew black white tv seahunt gunsmok hero everi week vote comeback new sea hunt need chang pace tv would work world water adventur oh way thank outlet like view mani viewpoint tv mani movi ole way believ got wanna say would nice read plu point sea hunt rhyme would line would let submit leav doubt quit must go let',

'show amaz fresh innov idea first air first year brilliant thing drop show realli funni anymor continu declin complet wast time today br br truli disgrac far show fallen write pain bad perform almost bad mildli entertain respit guest host show probabl still air find hard believ creator hand select origin cast also chose band hack follow one recogn brillianc see fit replac mediocr felt must give star respect origin cast made show huge success show aw believ still air',

'encourag posit comment film look forward watch film bad mistak seen film truli one worst aw almost everi way edit pace storylin act soundtrack film song lame countri tune play less four time film look cheap nasti bore extrem rare happi see end credit film br br thing prevent give score harvey keitel far best perform least seem make bit effort one keitel obsess',

'like origin gut wrench laughter like movi young old love movi hell even mom like br br great camp',

'phil alien one quirki film humour base around odd everyth rather actual punchlin br br first odd pretti funni movi progress find joke odd funni anymor br br low budget film that never problem pretti interest charact eventu lost interest br br imagin film would appeal stoner current partak br br someth similar better tri brother anoth planet',

'saw movi came recal scariest scene big bird eat men dangl helplessly parachut right air horror horror br br young kid go cheesi b film saturday afternoon still tire formula monster type movi usual includ hero beauti woman might daughter professor happi resolut monster die end care much romant angl year old predict plot love unintent humor br br year later saw psycho came love star janet leigh bump earli film sat took notic point sinc screenwrit make stori make scari possibl well worn formula rule',

'im big fan boll work mani enjoy movi postal mayb im one boll appar bought right use far cri long ago even game even finsish br br peopl enjoy kill merc infiltr secret research lab locat tropic island warn far cri someth mr boll scheme togeth along legion schmuck feel loneley set mr boll invit three countrymen play player go name til schweiger udo kier ralf moeller br br three name actual made self pretti big movi biz tale goe like jack carver play til schweiger ye carver german hail bratwurst eat dude howev find til act movi pretti badass peopl complain realli stay true whole carver agenda saw carver first person perspect realli know look like kick br br howev storylin film beyond dement see evil mad scientist dr kriegler play udo kier make genet mutat soldier gm call perform top secret research island remind spoiler vancouv reason that right palm tree instead got nice rich lumberjack wood even gone far start cri meheh cannot go wanna stay true boll shenanigan go see movi disappoint deliv true boll experi mean suck br br thing worth mention would impli boll good work area film nice boat fight scene whole crome albino gm squad enter scene everyth make laugh movi far cri reek scheiss poop simpleton fa r wanna take wiff go ahead btw carver get annoy sidekick make wanna shoot first three minut screen',

'cast play shakespeare br br shakespeare lost br br appreci tri bring shakespeare mass ruin someth good br br scottish play favorit shakespeare know know certain rev bowdler henc bowdler tri someth similar victorian era br br word cannot improv perfect br br write write least ten line text english composit never fort keep go say movi say goe cut',

'fantast movi three prison becom famou one actor georg clooney fan roll bad anoth good thing movi soundtrack man constant sorrow recommand movi everybodi greet bart',

'kind drawn erot scene realiz one amateurish unbeliev bit film ever seen sort like high school film project rosanna arquett think stock charact bizarr suppos midwest town pretti hard get involv one lesson learn brilliant insight stilt quit ridicul lot skin intrigu videotap nonsens bisexu relationship nowher heterosexu encount absurd danc everybodi play stereotyp role give one pass like million mile bad wast film money could spent starv children aid africa',

'film simpli remad one bad film fail captur flavor terror film titl liam neeson excel alway cast hold except owen wilson bring right feel charact luke major fault version stray far shirley jackson stori attempt grandios lost thrill earlier film trade snazzier special effect say bad film enjoy friction terror older version much',

'movi made one top aw movi horribl br br continu minut fight one monster anoth chanc charact develop busi run one sword fight anoth emot attach except big bad machin want destroy br br scene blatantli stolen movi lotr star war matrix br br exampl br br ghost scene end stolen final scene old star war yoda obe one vader br br spider machin begin exactli like frodo attack spider return king elijah wood victim film wait hypnot sting victim wrap uh hello br br whole machin vs human theme matrix termin br br exampl wast time someon tell nazi nazi br br juvenil stori line rush juvenil conclus movi could decid children movi adult movi much either br br aw real disappoint say least save money',

'rememb film first film watch cinema pictur dark place nervou back dad took brother sister newburi cinema newburi berkshir england recal tiger lot snow film also appear grizzli adam actor dan kenny think one time got shot die even knew fied did etc close let knew cinema time fit club big cinema respect cinema wife guys would love been other cool film like'

```
from sklearn.feature_extraction.text import TfidfVectorizer
cv=TfidfVectorizer(max_features=5000)
x=cv.fit_transform(corpus).toarray()
```

```
x.shape
```

```
(50000, 5000)
```

```
x_train, x_test, Y_train, Y_test = train_test_split(x, y, test_size=0.2, random_state=101)
```

```
x_train.shape , x_test.shape , Y_train.shape , Y_test.shape
```

```
((40000, 5000), (10000, 5000), (40000,), (10000,))
```

```
mnb = MultinomialNB()
mnb.fit(x_train, Y_train)
```

```
▾ MultinomialNB
MultinomialNB()
```

```
pred = mnb.predict(x_test)
```

```
print(accuracy_score(Y_test, pred))
```

```
print(confusion_matrix(Y_test, pred))
```

```
0.8518
[[4215  744]
 [ 738 4303]]
```

```
pd.DataFrame(np.c_[Y_test , pred], columns=["Actual", "predict"])
```

	Actual	predict
0	1	1
1	1	1
2	1	1
3	1	1
4	1	1
...	...	...
9995	1	1
9996	0	0
9997	0	0
9998	1	1
9999	1	1

```
10000 rows × 2 columns
```

```
pickle.dump(cv , open("count-Vectorizer.pkl", "wb"))
pickle.dump(mnb, open("Movies_Review_Classification.pkl", "wb"))
```

```
save_cv = pickle.load(open('count-Vectorizer.pkl', 'rb'))  
model = pickle.load(open('Movies_Review_Classification.pkl', 'rb' ))
```

```
def test_model (sentence):  
    sen = save_cv.transform([sentence]).toarray()  
    res = model.predict(sen)[0]  
    if res==1:  
        return 'Positive review'  
    else:  
        return 'Negative Feview'
```

```
sen='it is a mind blowing movie realy i enjoy this movie '  
res=test_model(sen)  
print(res)
```

Positive review

```
sen='it is a booring movie total waste of time and money '  
res=test_model(sen)  
print(res)
```

Negative Feview