Spam Classification

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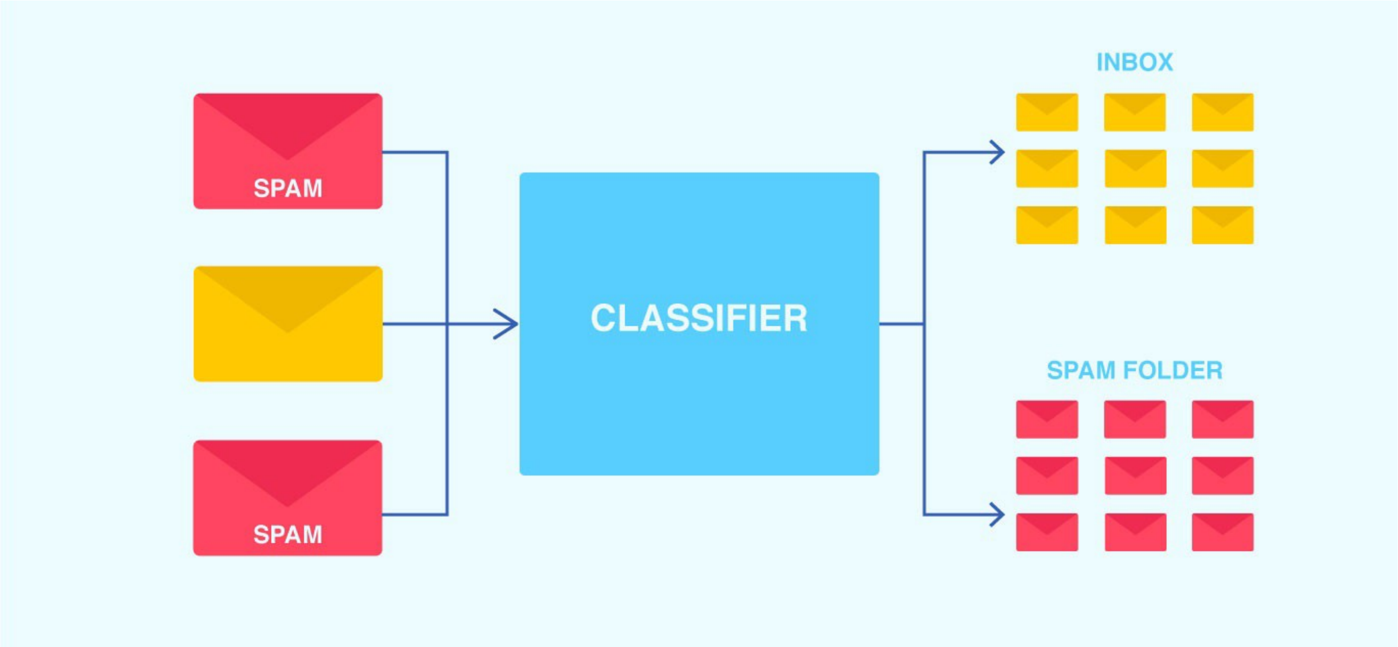

In [47]:

```
## Comment
## Observation
```

In [1]:

```
## Importing Pandas Library
import pandas as pd
```

In [2]:

```
## Importing Dataset
data = pd.read_csv("https://raw.githubusercontent.com/sunnysavita10/Naive-Bayes/main/SpamClassifier-with-ML/sm
```

In [3]:

```
## Checking Top 5 Rows
data.head()
```

Out[3]:

	label	message
0	ham	Go until jurong point, crazy.. Available only ...
1	ham	Ok lar... Joking wif u oni...
2	spam	Free entry in 2 a wkly comp to win FA Cup fina...
3	ham	U dun say so early hor... U c already then say...
4	ham	Nah I don't think he goes to usf, he lives aro...

In [4]:

```
## Checking Message Column Meassage first Rows.
data["message"][0]
```

Out[4]:

```
'Go until jurong point, crazy.. Available only in bugis n great world la e buffet... Cine there got
amore wat...'
```

In [5]:

```
## Checking Message Column Meassage 40th Rows.
data["message"][40]
```

Out[5]:

```
'Pls go ahead with watts. I just wanted to be sure. Do have a great weekend. Abiola'
```

In [6]:

```
## Checking Shape of a dataset
data.shape
```

Out[6]:

```
(5572, 2)
```

In [7]:

```
## Importing NLTK (Natural Language Toolkit)
import nltk
```

In [8]:

```
## Importing Regular Expression
import re
```

In [9]:

```
## Downloading Soppwords from NLTK library
nltk.download("stopwords")
```

```
[nltk_data] Downloading package stopwords to
[nltk_data]     C:\Users\Lenovo\AppData\Roaming\nltk_data...
[nltk_data]   Package stopwords is already up-to-date!
```

Out[9]:

```
True
```

In [10]:

```
## Importing stopwords
from nltk.corpus import stopwords
```

In [11]:

```
## Importing PorterStemmer
from nltk.stem.porter import PorterStemmer
```

In [12]:

```
ps = PorterStemmer()
```

In [13]:

```
## Checking all Stopworks present in NLTK
stopwords.words('english')
```

Out[13]:

```
['i',
 'me',
 'my',
 'myself',
 'we',
 'our',
 'ours',
 'ourselves',
 'you',
 "you're",
 "you've",
 "you'll",
 "you'd",
 'your',
 'yours',
 'yourself',
 'yourselves',
 'he',
```

In [14]:

```
##Checking Sub-string
rev =re.sub('[^a-zA-Z]', ' ',data['message'][0])
```

In [15]:

```
rev
```

Out[15]:

```
'Go until jurong point  crazy   Available only in bugis n great world la e buffet    Cine there got
amore wat   '
```

In [16]:

```
## Ching all sub-string into lower case
rev.lower()
```

Out[16]:

```
'go until jurong point  crazy   available only in bugis n great world la e buffet    cine there got
amore wat   '
```

In [17]:

```
## Splitting every sub-string
rev.split()
```

Out[17]:

```
['Go',
 'until',
 'jurong',
 'point',
 'crazy',
 'Available',
 'only',
 'in',
 'bugis',
 'n',
 'great',
 'world',
 'la',
 'e',
 'buffet',
 'Cine',
 'there',
 'got',
 'amore',
 'wat']
```

In [18]:

```
## Seperating every sub-string which is not present in stopwords
rev = [ps.stem(word) for word in rev if not word in stopwords.words('english')]
```

In [19]:

```
rev
```

```
Out[19]:
```

In [20]:

```
## creating black list as corpus
corpus = []
```

In [21]:

```
## doing for loop and extracting all sentences which ignore stopwords and return in lower case.
for i in range(0,len(data)):
    review= re.sub('[^a-zA-Z]', ' ',data['message'][i])
    review= review.lower()
    review= review.split()

    review= [ps.stem(word) for word in review if not word in stopwords.words('english')]
    review =' '. join(review)
    corpus.append(review)
```

In [22]:

```
## Returning 1st sentences which are without Stopwords present in lower cases
corpus[0]
```

Out[22]:

```
'go jurong point crazi avail bugi n great world la e buffet cine got amor wat'
```

In [23]:

```
## Returning all sentences which are without Stopwords present in lower cases
corpus
```

Out[23]:

```
['go jurong point crazi avail bugi n great world la e buffet cine got amor wat',
 'ok lar joke wif u oni',
 'free entri wkli comp win fa cup final tkt st may text fa receiv entri question std txt rate c ap
pli',
 'u dun say earli hor u c alreadi say',
 'nah think goe usf live around though',
 'freemsg hey darl week word back like fun still tb ok xxx std chg send rcv',
 'even brother like speak treat like aid patent',
 'per request mell mell oru minnaminungint nurungu vettam set callertun caller press copi friend c
allertun',
 'winner valu network custom select receivea prize reward claim call claim code kl valid hour',
 'mobil month u r entitl updat latest colour mobil camera free call mobil updat co free',
 'gonna home soon want talk stuff anymor tonight k cri enough today',
 'six chanc win cash pound txt csh send cost p day day tsandc appli repli hl info',
 'urgent week free membership prize jackpot txt word claim c www dbuk net lccltd pobox ldnw rw',
 'search right word thank breather promis wont take help grant fulfil promis wonder bless time',
 'date sunday',
 'xxxmobilemovieclub use credit click wap link next txt messag click http wap xxxmobilemovieclub c
```

In [24]:

```
## Importing CountVectorizer from sklearn
from sklearn.feature_extraction.text import CountVectorizer
```

In [25]:

```
cv = CountVectorizer(max_features = 2500)
```

```
 ' ',
 ' ']
```

In [26]:

```
## Fitting the model
X = cv.fit_transform(corpus).toarray()
```

In [27]:

```
#1 set of unique words
#2 finally it is creating a vector

X.shape
```

Out[27]:

```
(5572, 2500)
```

In [28]:

```
X[0]
```

Out[28]:

```
array([0, 0, 0, ..., 0, 0, 0], dtype=int64)
```

In [29]:

```
len(X[0])
```

Out[29]:

```
2500
```

In [30]:

```
data['label']
```

Out[30]:

```
0        ham
1        ham
2       spam
3        ham
4        ham
        ... 
5567    spam
5568     ham
5569     ham
5570     ham
5571     ham
Name: label, Length: 5572, dtype: object
```

In [31]:

```
y= pd.get_dummies(data['label'],drop_first=True)
```

In [32]:

```
X
```

Out[32]:

```
array([[0, 0, 0, ..., 0, 0, 0],
       [0, 0, 0, ..., 0, 0, 0],
       [0, 0, 0, ..., 0, 0, 0],
       ...,
       [0, 0, 0, ..., 0, 0, 0],
       [0, 0, 0, ..., 0, 0, 0],
       [0, 0, 0, ..., 0, 0, 0]], dtype=int64)
```

In [33]:

```
y
```

Out[33]:

	spam
0	0
1	0
2	1
3	0
4	0
...	...
5567	1
5568	0
5569	0
5570	0
5571	0

5572 rows × 1 columns

Splitting Train_Test_

In [34]:

```
## Splitting Train_Test_
from sklearn.model_selection import train_test_split
```

In [35]:

```
X_train, X_test, y_train, y_test=train_test_split(X,y,test_size=0.25,random_state=10)
```

Building Model using GaussianNB

In [36]:

```
from sklearn.naive_bayes import GaussianNB
```

In [37]:

```
model=GaussianNB()
```

In [38]:

```
## Fitting a GaussianNB Model.
model.fit(X_train,y_train)
```

```
C:\Users\Lenovo\anaconda3\lib\site-packages\sklearn\utils\validation.py:1111: DataConversionWarning:
A column-vector y was passed when a 1d array was expected. Please change the shape of y to (n_sample
s, ), for example using ravel().
  y = column_or_1d(y, warn=True)
```

Out[38]:

```
▾ GaussianNB
GaussianNB()
```

In [39]:

```
## Predicting the model
y_pred=model.predict(X_test)
```

In [40]:

```
## Importing accuracy_score from sklearn
from sklearn.metrics import accuracy_score
```

In [41]:

```
## Checkig Accuracy of the Model
accuracy_score(y_test,y_pred)
```

Out[41]:

```
0.8628858578607322
```

Building Model using MultinomialNB

In [42]:

```
from sklearn.naive_bayes import MultinomialNB
```

In [43]:

```
model2=MultinomialNB()
```

In [44]:

```
## Fitting the MultinomialNB Model
model2.fit(X_train,y_train)
```

```
C:\Users\Lenovo\anaconda3\lib\site-packages\sklearn\utils\validation.py:1111: DataConversionWarning:
A column-vector y was passed when a 1d array was expected. Please change the shape of y to (n_sample
s, ), for example using ravel().
  y = column_or_1d(y, warn=True)
```

Out[44]:

```
▾ MultinomialNB
MultinomialNB()
```

In [45]:

```
## Predicting the Model
y_pred2=model2.predict(X_test)
```

In [46]:

```
## Checking the accuracy_score of the model.
accuracy_score(y_test,y_pred2)
```

Out[46]:

```
0.9770279971284996
```

Thank You