```
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Team ID:PNT2022TMID38674
Date:01/11/2022
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1. Import required library

```
import pandas as pd
import numpy as np
import nltk
import re

nltk.download('stopwords')
from nltk.corpus import stopwords
from nltk.stem.porter import PorterStemmer
from sklearn.feature_extraction.text import CountVectorizer
from sklearn.preprocessing import LabelEncoder
```

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

2. Read dataset and do pre-processing

```
df=pd.read_csv('spam.csv',encoding="ISO-8859-1")
df
```

	v1	v2	Unnamed: 2	Unnamed: 3	Unnamed: 4
0	ham	Go until jurong point, crazy.. Available only ...	NaN	NaN	NaN
1	ham	Ok lar... Joking wif u oni...	NaN	NaN	NaN
2	spam	Free entry in 2 a wkly comp to win FA Cup fina...	NaN	NaN	NaN
3	ham	U dun say so early hor... U c already then	NaN	NaN	NaN

```
port=PorterStemmer()
cv = CountVectorizer()
dataset=[]

for i in range(0,len(df)):
  review = df['v2'][i] # Reading data
  review = re.sub('[^a-zA-Z]',' ',review) # Removing special character
  review = review.lower() # Convert capital letters into small letters
  review = review.split() # Split the input
  review = [port.stem(w) for w in review if w not in set(stopwords.words('english'))] # Stemm
  review = ' '.join(review) # join words
  dataset.append(review)

dataset
```

```
     getz co uk pobox w wq norm p tone ',
      'guarante award even cashto claim ur award call free stop getstop php rg jx',
      'k',
      'dled imp',
      'sure make sure know smokin yet',
      'boooo alway work quit',
      'take half day leav bec well',
      'ugh wanna get bed warm',
      'nervou lt gt',
      'ring come guy costum gift futur yowif hint hint',
      'congratul ur award either cd gift voucher free entri weekli draw txt music tnc www
     ldew com win ppmx age',
      'borrow ur bag ok',
      'u outbid simonwatson shinco dvd plyr bid visit sm ac smsreward end bid notif repli
     end',
      'boytoy miss happen',
      'lot use one babe model help youi bring match',
      'also bring galileo dobbi',
      'respond',
      'boo babe u enjoyin yourjob u seem b gettin well hunni hope ure ok take care
     llspeak u soonlot lovem xxxx',
      'good afternoon starshin boytoy crave yet ach fuck sip cappuccino miss babe teas
     kiss',
      'road cant txt',
      'smsservic yourinclus text credit pl goto www comuk net login qxj unsubscrib stop
     extra charg help comuk cm ae',
      'p alfi moon children need song ur mob tell ur txt tone chariti nokia poli chariti
     poli zed profit chariti',
      'good even ttyl',
```

```
 'hmm bit piec lol sigh',
 'hahaha use brain dear',
 'hey got mail',
 'sorri light turn green meant anoth friend want lt gt worth may around',
 'thank yesterday sir wonder hope enjoy burial mojibiola',
 'u secret admir reveal think u r special call opt repli reveal stop per msg recd
cust care',
 'hi mate rv u hav nice hol messag say hello coz sent u age start drive stay road
rvx',
 'dear voucher holder claim week offer pc pleas go http www e tlp co uk expressoff
ts cs appli stop text txt stop',
 'thank much skype wit kz sura didnt get pleasur compani hope good given ultimatum
oh countin aburo enjoy messag sent day ago',
 'sure result offer',
 'good morn dear great amp success day',
 'want anytim network min text new video phone five pound per week call repli
deliveri tomorrow',
 'sir late pay rent past month pay lt gt charg felt would inconsider nag someth give
great cost didnt speak howev recess wont abl pay charg month henc askin well ahead
month end pleas help thank',
 'tri contact offer new video phone anytim network min half price rental camcord
call repli deliveri wed',
 'last chanc claim ur worth discount voucher text ye savamob member offer mobil cs
sub remov txt x stop',
 'luv u soo much u understand special u r ring u morrow luv u xxx',
 'pl send comprehens mail pay much',
 'prashanthettan mother pass away last night pray famili',
 'urgent call landlin complimentari ibiza holiday cash await collect sae cs po box
sk wp ppm',
 'k k go'
```

```
x = cv.fit_transform(dataset).toarray()
x
```

```
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]])
```

```
enc=LabelEncoder()
y= enc.fit_transform(df['v1'])
y
```

```
array([0, 0, 1, ..., 0, 0, 0])
```

3. Create Model

```
from tensorflow.keras.models import Sequential
```

```
from tensorflow.keras.layers import Dense
model = Sequential()
```

4. Add Layers (LSTM, Dense-(Hidden Layers), Output)

```
model.add(Dense(1500, activation='relu'))
model.add(Dense(3000,activation='relu'))
model.add(Dense(1, activation='sigmoid'))
```

5. Compile the Model

```
model.compile(optimizer="adam",loss='binary_crossentropy',metrics=['accuracy'])
```

6. Fit the Model

```
model.fit(x,y,epochs=10)
```

```
Epoch 1/10
175/175 [==============================] - 25s 134ms/step - loss: 0.1118 - accuracy: 0.
Epoch 2/10
175/175 [==============================] - 26s 147ms/step - loss: 0.0111 - accuracy: 0.
Epoch 3/10
175/175 [==============================] - 22s 127ms/step - loss: 0.0016 - accuracy: 0.
Epoch 4/10
175/175 [==============================] - 23s 133ms/step - loss: 2.1320e-04 - accuracy
Epoch 5/10
175/175 [==============================] - 23s 133ms/step - loss: 8.8951e-05 - accuracy
Epoch 6/10
175/175 [==============================] - 22s 127ms/step - loss: 4.9310e-05 - accuracy
Epoch 7/10
175/175 [==============================] - 22s 125ms/step - loss: 3.0617e-05 - accuracy
Epoch 8/10
175/175 [==============================] - 22s 123ms/step - loss: 2.0622e-05 - accuracy
Epoch 9/10
175/175 [==============================] - 22s 124ms/step - loss: 1.4611e-05 - accuracy
Epoch 10/10
175/175 [==============================] - 22s 124ms/step - loss: 1.0845e-05 - accuracy
<keras.callbacks.History at 0x7fdf779e41d0>
```

7. Save The Model

```
model.save('nlp.h5')
```

8. Test the Model

```
# Test 1

text = 'Go until jurong point, crazy.. Available only in bugis n great world la e buffet... C
print(text +"\n")
text = re.sub('[^a-zA-Z]',' ',text)
text = text.lower()
text = text.split()
text = [port.stem(w) for w in text if w not in set(stopwords.words('english'))]
text = ' '.join(text)
text = cv.transform([text]).toarray()
pred = model.predict(text)
print("\nResult : ",end="")
if pred>0.5:
  print('Spam')
else: print('Ham')
```

```
Go until jurong point, crazy.. Available only in bugis n great world la e buffet... Cin

1/1 [==============================] - 0s 92ms/step

Result : Ham
```

```
# Test 1

text = 'England v Macedonia - dont miss the goals/team news. Txt ur national team to 87077 eg
print(text + "\n")
text = re.sub('[^a-zA-Z]',' ',text)
text = text.lower()
text = text.split()
text = [port.stem(w) for w in text if w not in set(stopwords.words('english'))]
text = ' '.join(text)
text = cv.transform([text]).toarray()
pred = model.predict(text)
print("\nResult : ",end="")
if pred>0.5:
  print('Spam')
else: print('Ham')
```

```
England v Macedonia - dont miss the goals/team news. Txt ur national team to 87077 eg E

1/1 [==============================] - 0s 25ms/step
```

```
Result : Spam
```

Colab paid products - Cancel contracts here

✓ 1s completed at 12:02 PM