ASSIGNMENT 4 YAMUNA V

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DATE : 31 October, 2022 Import

the necessary libraries

```
import pandas as pd import numpy as np import matplotlib.pyplot as plt
import seaborn as sns from sklearn.model_selection import train_test_split
from sklearn.preprocessing import LabelEncoder from keras.models import
Model from keras.layers import LSTM, Activation, Dense, Dropout, Input,
Embedding from keras.optimizers import RMSprop from
keras.preprocessing.text import Tokenizer from keras.preprocessing import
sequence from keras.utils import to_categorical from keras.callbacks import
EarlyStopping
%matplotlib inline
```

Load the data into Pandas

```
df = pd.read_csv('/content/spam.csv',delimiter=',',encoding='latin-1')
df.head()
```

	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 say...	NaN	NaN	NaN
4	ham	Nah I don't think he goes to usf, he lives aro...	NaN	NaN	NaN

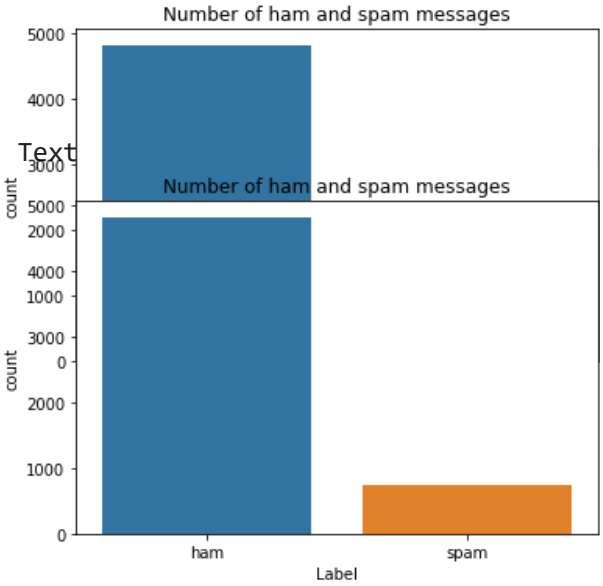
```
df.tail()
```

	v1	v2	Unnamed: 2	Unnamed: 3	Unnamed: 4
5567	spam	This is the 2nd time we have tried 2 contact u...	NaN	NaN	NaN
5568	ham	Will Ì_ b going to esplanade fr home?	NaN	NaN	NaN
5569	ham	Pity, * was in mood for that. So...any other s...	NaN	NaN	NaN
5570	ham	The guy did some bitching but I acted like i'd...	NaN	NaN	NaN
5571	ham	Rofl. Its true to its name	NaN	NaN	NaN

```
    # Checking datatype df.info()
          <class 'pandas.core.frame.DataFrame'>
          RangeIndex: 5572 entries, 0 to 5571
          Data columns (total 5 columns):
            # Column        Non-Null Count Dtype
          ---- -------      ----------------- ------
            0      v1     5572 non-null object
            1      v2     5572 non-null object
            2      Unnamed: 2 50 non-null   object
            3      Unnamed: 3 12 non-null object 4 Unnamed: 4 6 non-null object
           dtypes: object(5) memory usage: 217.8+ KB
df.drop(['Unnamed:  2',  'Unnamed:  3',  'Unnamed:  4'],axis=1,inplace=True)
    df.info()
          <class 'pandas.core.frame.DataFrame'>
          RangeIndex: 5572 entries, 0 to 5571
          Data columns (total 2 columns):
           # Column Non-Null Count Dtype


          -----  ----------  ---------------------  ----------

           0 v1    5572 non-null object 1  v2
          5572 non-null  object dtypes:
          object(2) memory usage: 87.2+ KB
sns.countplot(df.v1) plt.xlabel('Label')
    plt.title('Number of ham and spam
    messages')
```




```
Text                                                    messages')
     /usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43:
       FutureWarning: Pass t FutureWarning
     Text(0.5, 1.0, 'Number of ham and spam messages')
```

```
# Convert list into array

x_train,y_train = np.array(x_train),np.array(y_train)

# Building model
 from   tensorflow.keras.models   import   Sequential   from
tensorflow.keras.layers import LSTM, Dense model = Sequential()
model.add(LSTM(50, input_shape=(60, 1),return_sequences=True))
model.add(LSTM(50,return_sequences=True))
model.add(LSTM(50,return_sequences=True))
model.add(LSTM(50,return_sequences=True)) model.add(Dense(1))
model.compile(optimizer='adam',loss='mse')

# save model

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