

**Assignment -4**  
Python Programming

Assignment Date	30 OCTOBER 2022
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Maximum Marks	2 Marks

- Download the Dataset
- Import required library
- Read the dataset and do preprocessing
- Create Model
- Add Layers (LSTM,Dense-(Hidden Layers),Output)
- Compile The Model
- Fit The Model
- Save The Model
- Test The Model

```

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 tensorflow.keras.models import Model
from tensorflow.keras.layers import LSTM, Activation, Dense, Dropout,
Input, Embedding
from tensorflow.keras.optimizers import RMSprop
from tensorflow.keras.preprocessing.text import Tokenizer
from tensorflow.keras.preprocessing import sequence
from tensorflow.keras.utils import to_categorical
from tensorflow.keras.callbacks import EarlyStopping
%matplotlib inline

```

```
#read the dataset
```

```
df=pd.read_csv("/content/drive/MyDrive/spam (1).csv")
```

```
df.head()
```

	v1	v2	Unnamed: 2
0	ham	Go until jurong point, crazy.. Available only ...	NaN
1	ham	Ok lar... Joking wif u oni...	NaN
2	spam	Free entry in 2 a wkly comp to win FA Cup fina...	NaN
3	ham	U dun say so early hor... U c already then say...	NaN
4	ham	Nah I don't think he goes to usf, he lives aro...	NaN

	Unnamed: 3	Unnamed: 4
0	NaN	NaN
1	NaN	NaN
2	NaN	NaN
3	NaN	NaN
4	NaN	NaN

```

sns.countplot(df.v1)
plt.xlabel('Label')
plt.title('Number of ham and spam messages')

```

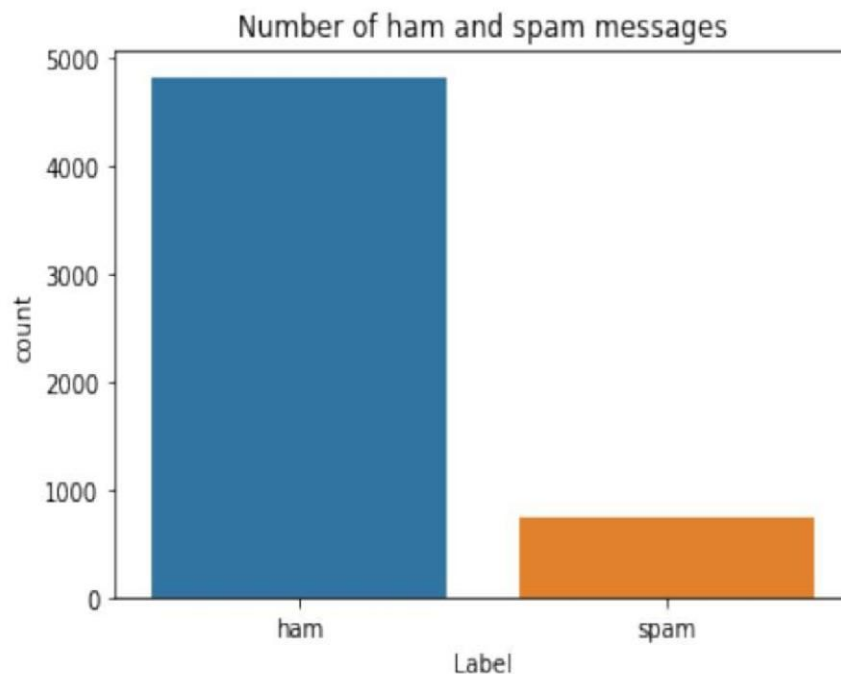
```

/usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43:
FutureWarning: Pass the following variable as a keyword arg: x. From
version 0.12, the only valid positional argument will be `data`, and
passing other arguments without an explicit keyword will result in an
error or misinterpretation.

```

```
FutureWarning
```

```
Text(0.5, 1.0, 'Number of ham and spam messages')
```



```
X = df.v2
Y = df.v1
le = LabelEncoder()
Y = le.fit_transform(Y)
Y = Y.reshape(-1,1)

X_train,X_test,Y_train,Y_test = train_test_split(X,Y,test_size=0.15)

max_words = 10000
max_len = 150
tok = Tokenizer(num_words=max_words)
tok.fit_on_texts(X_train)
sequences = tok.texts_to_sequences(X_train)
sequences_matrix = sequence.pad_sequences(sequences,maxlen=max_len)

def RNN():
    inputs = Input(name='inputs',shape=[max_len])
    layer = Embedding(max_words,50,input_length=max_len)(inputs)
    layer = LSTM(64)(layer)
    layer = Dense(256,name='FC1')(layer)
    layer = Activation('relu')(layer)
    layer = Dropout(0.5)(layer)
    layer = Dense(1,name='out_layer')(layer)
    layer = Activation('sigmoid')(layer)
    model = Model(inputs=inputs,outputs=layer)
    return model
```

```
27/27 [=====] - 1s 24ms/step - loss: 0.0696 -  
accuracy: 0.9797  
  
print('Test set\n Loss: {:.3f}\n Accuracy:  
{:.3f}'.format(accr[0],accr[1]))  
  
Test set  
Loss: 0.070  
Accuracy: 0.980  
  
model.save("./assignmodel.h5")  
  
from tensorflow.keras.models import load_model  
  
m2=load_model("./assignmodel.h5")  
  
m2.evaluate(test_sequences_matrix,Y_test)  
  
27/27 [=====] - 1s 22ms/step - loss: 0.0696 -  
accuracy: 0.9797  
  
[0.06962936371564865, 0.9796651005744934]
```