

Assignment-4

VirtualEye - Life Guard for Swimming Pools to Detect Active Drowning

Assignment Date	November 14, 2022
Student Name	S.SIDDHA
Student Roll Number	2127190801075
Maximum Marks	2 Marks

Question-1:

Download the dataset

Solution:

Download the given dataset in the given attached link.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	v1	v2																	
2	ham	Go until jurong point, crazy.. Available only in bugis n great world la e buffet... Cine there got amore wat...																	
3	ham	Ok lar... Joking wif u oni...																	
4	spam	Free entry in 2 a wkly comp to win FA Cup final tkts 21st May 2005. Text FA to 87121 to receive entry question(std txt rate)T&C's apply 08452810075over18's																	
5	ham	U dun say so early hor... U c already then say...																	
6	ham	Nah I don't think he goes to usf, he lives around here though																	
7	spam	FreeMsg Hey there darling it's been 3 week's now and no word back! I'd like some fun you up for it still? Tb ok! XxX std chgs to send, £1.50 to rcv																	
8	ham	Even my brother is not like to speak with me. They treat me like aids patent.																	
9	ham	As per your request 'Melle Melle (Oru Minnaminunginte Nurrungu Vettam)' has been set as your callertune for all Callers. Press *9 to copy your friends Callertune																	
10	spam	WINNER!! As a valued network customer you have been selected to receive a £900 prize reward! To claim call 09061701461. Claim code KL341. Valid 12 hours only.																	
11	spam	Had your mobile 11 months or more? U R entitled to Update to the latest colour mobiles with camera for Free! Call The Mobile Update Co FREE on 08002986030																	
12	ham	I'm gonna be home soon and i don't want to talk about this stuff anymore tonight, k? I've cried enough today.																	
13	spam	SIX chances to win CASH! From 100 to 20,000 pounds txt> CSH11 and send to 87575. Cost 150p/day, 6days, 16+ TsandCs apply Reply HL 4 info																	
14	spam	URGENT! You have won a 1 week FREE membership in our £100,000 Prize Jackpot! Txt the word: CLAIM to No: 81010 T&C www.dbuk.net LCCLTD POBOX 4403LDNW1A7RW18																	
15	ham	I've been searching for the right words to thank you for this breather. I promise i wont take your help for granted and will fulfil my promise. You have been wonderful and a blessing at all times.																	
16	ham	I HAVE A DATE ON SUNDAY WITH WILL!!																	
17	spam	XXXMobileMovieClub: To use your credit, click the WAP link in the next txt message or click here>> http://wap.xxxmobilemovieclub.com?n=QJKGIGHJGCBL																	
18	ham	Oh k...i'm watching here)																	
19	ham	Eh u remember how 2 spell his name... Yes i did. He v naughty make until i v wet.																	
20	ham	Fine if that's the way u feel. That's the way its gota b																	
21	spam	England v Macedonia - dont miss the goals/team news. Txt ur national team to 87077 Try:WALES, SCOTLAND 4txt/11.20 POBOXox36504W45WQ 16+																	
22	ham	Is that seriously how you spell his name?																	
23	ham	I'm going to try for 2 months ha ha only joking																	
24	ham	So I pay first lar... Then when is da stock comin...																	
25	ham	Aft i finish my lunch then i go str down lor. Ard 3 smth lor. U finish ur lunch already?																	
26	ham	Fffffff. Alright no way i can meet up with you sooner?																	
27	ham	Just forced myself to eat a slice. I'm really not hungry tho. This sucks. Mark is getting worried. He knows I'm sick when I turn down pizza. Lol																	
28	ham	Lol your always so convincing.																	
29	ham	Did you catch the bus ? Are you frying an egg ? Did you make a tea? Are you eating your mom's left over dinner ? Do you feel my Love ?																	
30	ham	I'm back & amp; we're nacking the car now. I'll let you know if there's room.																	

Question-2:

Import required library

Solution:

import pandas as pd

import numpy as np

import matplotlib.pyplot as plt

import seaborn as sns

import tensorflow as tensorflow

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
```

```
In [1]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import tensorflow as tensorflow
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
```

Question 3:

Read dataset and do pre-processing

Solution:

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

```
In [2]: df = pd.read_csv(r'spam.csv',encoding='latin-1')
df.head()
```

Out[2]:

	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

```
In [3]: 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
```

Question 4:

- Create Model
- Add Layers (LSTM, Dense-(Hidden Layers), Output)
- Compile the Model
- Fit the Model
- Save The Model
- Test The Model

Solution:

```
sns.countplot(df.v1)
```

```
plt.xlabel('Label')
```

```
plt.title('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=0.20)
max_words = 1000
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(128)(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('tanh')(layer)
    model = Model(inputs=inputs,outputs=layer)
    return model
model = RNN()
model.summary()
model.compile(loss='binary_crossentropy',optimizer=RMSprop(),metrics=['accuracy','mse','mae'])
model.save(r"C:\Users\MAGGIE\model_ISTM.h5")
from tensorflow.keras.models import load_model
m2 = load_model(r"C:\Users\MAGGIE\model_ISTM.h5")
m2.evaluate(test_sequences_matrix,Y_test)

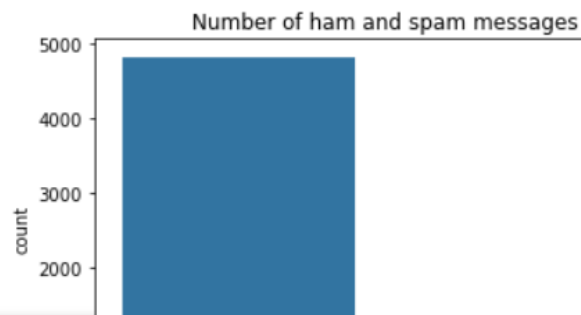
```

```
In [4]: sns.countplot(df.v1)
plt.xlabel('Label')
plt.title('Number of ham and spam messages')
```

C:\Users\MAGGIE\anaconda3\lib\site-packages\seaborn_decorators.py:36: 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.

warnings.warn(

Out[4]: Text(0.5, 1.0, 'Number of ham and spam messages')



```
In [5]: X = df.v2
Y = df.v1
le = LabelEncoder()
Y = le.fit_transform(Y)
Y = Y.reshape(-1,1)
```

```
In [6]: X_train,X_test,Y_train,Y_test = train_test_split(X,Y,test_size=0.20)
```

```
In [7]: max_words = 1000
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)
```

```
In [8]: def RNN():
    inputs = Input(name='inputs',shape=[max_len])
    layer = Embedding(max_words,50,input_length=max_len)(inputs)
    layer = LSTM(128)(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('tanh')(layer)
    model = Model(inputs=inputs,outputs=layer)
    return model
```

```
In [9]: model = RNN()
model.summary()
model.compile(loss='binary_crossentropy',optimizer=RMSprop(),metrics=['accuracy','mse','mae'])
```

Model: "model"

Layer (type)	Output Shape	Param #
inputs (InputLayer)	[(None, 150)]	0
embedding (Embedding)	(None, 150, 50)	50000
lstm (LSTM)	(None, 128)	91648
FC1 (Dense)	(None, 256)	33024
activation (Activation)	(None, 256)	0
dropout (Dropout)	(None, 256)	0
out_layer (Dense)	(None, 1)	257
activation_1 (Activation)	(None, 1)	0

```
=====
Total params: 174,929
Trainable params: 174,929
Non-trainable params: 0
=====
```

```
In [10]: model.fit(sequences_matrix,Y_train,batch_size=128,epochs=10,
validation_split=0.2,callbacks=[EarlyStopping(monitor='val_loss',min_delta=0.0001)])

Epoch 1/10
28/28 [=====] - 18s 512ms/step - loss: 0.2518 - accuracy: 0.9072 - mse: 0.0687 - mae: 0.1437 - val_loss: 0.1685 - val_accuracy: 0.9675 - val_mse: 0.0306 - val_mae: 0.1025
Epoch 2/10
28/28 [=====] - 12s 413ms/step - loss: 0.0801 - accuracy: 0.9843 - mse: 0.0195 - mae: 0.0883 - val_loss: 0.1846 - val_accuracy: 0.9720 - val_mse: 0.0306 - val_mae: 0.1086
```

Out[10]: <keras.callbacks.History at 0x2ac38ddae80>

```
In [11]: test_sequences = tok.texts_to_sequences(X_test)
test_sequences_matrix = sequence.pad_sequences(test_sequences,maxlen=max_len)
```

```
In [12]: accr = model.evaluate(test_sequences_matrix,Y_test)

35/35 [=====] - 2s 70ms/step - loss: 0.1396 - accuracy: 0.9794 - mse: 0.0257 - mae: 0.1030
```

```
In [13]: print('Test set\n Loss: {:.3f}\n Accuracy: {:.3f}'.format(accr[0],accr[1]))
```

```
Test set
Loss: 0.140
Accuracy: 0.979
```

```
In [18]: model.save(r"C:\Users\MAGGIE\model_lstm.h5")
```

```
In [19]: from tensorflow.keras.models import load_model
m2 = load_model(r"C:\Users\MAGGIE\model_lstm.h5")
```

```
In [20]: m2.evaluate(test_sequences_matrix,Y_test)

35/35 [=====] - 3s 57ms/step - loss: 0.1396 - accuracy: 0.9794 - mse: 0.0257 - mae: 0.1030
```

```
Out[20]: [0.13960915803909302,
0.9793722033500671,
0.02572023682296276,
0.10301480442285538]
```

In []: