

Assignment -4

PROJECT NAME	REAL TIME COMMUNICATION SYSTEM POWERED BY AI FOR SPECIAL
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1. Download the dataset

Dataset Downloaded and uploaded to drive <https://www.kaggle.com/code/kredy10/simple-lstm-fortextclassification/data>

2. 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
pad_sequences from keras.utils import to_categorical from
keras.callbacks import EarlyStopping
```

3. Read dataset and do pre-processing

(i) Read dataset

```
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 FAfi Cupna...	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



(ii) Preprocessing the dataset

```
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
```

```
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 = 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
```

```
= pad_sequences(sequences,maxlen=max_len)
```

4..5. Create model and Add Layers(LSTM ,Dense-(Hidden Layers), Output)

```
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) model.summary()
```

```
Model: "model"
```

Layer (type)	Output Shape	Param #
inputs (InputLayer)	[(None, 150)]	0
embedding (Embedding)	(None, 150, 50)	50000
lstm (LSTM)	(None, 64)	29440
FC1 (Dense)	(None, 256)	16640
activation (Activation)	(None, 256)	0
dropout (Dropout)	(None, 256)	0
out_layer (Dense)	(None, 1)	257
activation_1 (Activation)	(None, 1)	0
Total params: 96,337		
Trainable params: 96,337		
Non-trainable params: 0		

6. Compile the model

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

7. Train and Fit the model

```
model.fit(sequences_matrix,Y_train,batch_size=128,epochs=10, validation_split=0.2)
```

Epoch 1/10

30/30 [=====] - 8s 263ms/step - loss: 0.0060 - accurac

Epoch 2/10

30/30 [=====] - 8s 263ms/step - loss: 0.0036 - accurac

Epoch 3/10

30/30 [=====] - 8s 263ms/step - loss: 0.0572 - accurac

Epoch 4/10

30/30 [=====] - 8s 262ms/step - loss: 0.0038 - accurac Epoch 5/10

30/30 [=====] - 8s 261ms/step - loss: 0.0018 - accurac

```

Epoch 6/10
30/30 [=====] - 8s 263ms/step - loss: 0.0022 - accurac
Epoch 7/10
30/30 [=====] - 9s 310ms/step - loss: 0.0020 - accurac
Epoch 8/10
30/30 [=====] - 8s 261ms/step - loss: 0.0015 - accurac
Epoch 9/10
30/30 [=====] - 8s 264ms/step - loss: 0.0015 - accurac
Epoch 10/10
30/30 [=====] - 8s 263ms/step - loss: 0.0021 - accurac
<keras.callbacks.History at 0x7f2b60b5f110>

```

8. Save the model

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

Preprocessing the Test Dataset

```
test_sequences = tok.texts_to_sequences(X_test) test_sequences_matrix =
pad_sequences(test_sequences, maxlen=max_len)
```

9. Testing the model

```
accr = model.evaluate(test_sequences_matrix,Y_test)
```

```
27/27 [=====] - 1s 21ms/step - loss: 0.2618 - accuracy
```

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

```

Test set Loss:
0.262
Accuracy: 0.977

```