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CLASS : IV-ECE

ASSIGNMENT-4

n[37]:

```
#@titleImportLibraries
```

In[38]:

```
importpandasaspdimportn
umpyasnpimport
tensorflowastf
importmatplotlib.pyplotaspltimportse
abornassns
from sklearn.model_selection import
train_test_splitfromsklearn.preprocessingimportLabel
Encoder
fromkeras.modelsimportModel
fromkeras.layersimportLSTM, Activation, Dense, Dropout, Input,
Embeddingfromkeras.optimizersimportRMSprop
from keras.preprocessing.text import
Tokenizerfromkeras.preprocessingimportsequence
fromkeras.utilsimportto_categoricalfromke
ras.utilsimportpad_sequencesfromkeras.cal
lbacksimportEarlyStopping
%matplotlibinline
```

In[39]:

```
#@titleLoadthedata
```

In[40]:

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

Out[40]:

	v1	v2	Unnamed:2	Unnamed:3	Unnamed:4
0	ham	Gountiljurongpoint,crazy..Availableonly...	NaN	NaN	NaN
1	ham	Oklar...Jokingwifuoni...	NaN	NaN	NaN
2	spam	FreeentryIn2awklycomptowinFACup fina...	NaN	NaN	NaN
3	ham	Udunsaysoearlyhor...Ucalreadythensay...	NaN	NaN	NaN
4	ham	Nahldon'tthinkhegoestousf,helivesaro...	NaN	NaN	NaN

In[41]:

```
#@titleDropunnecessarycolumns
```

In[42]:

```
df.drop(['Unnamed:2','Unnamed:3','Unnamed:4'],axis=1,inplace=True)df.info()
```

```
<class'pandas.core.frame.DataFrame'>Ra
ngeIndex: 5572 entries, 0 to
5571Datacolumns(total2columns):
 #   ColumnNon-NullCountDtype
---  ------  --------------  -------
 0   v1      5572non-null    object
 1   v2      5572non-null    object
dtypes:
```

```
object(2)memoryusage:8
7.2+KB
```

In[43]:

```
#@titleCreateinputandoutputvectorsandprocessthelabels
```

In[44]:

```
X
=
d
f
```

In[45]:

```
#@titleSplitthedatasetfortrainingandtest.
```

In[46]:

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

In[47]:

```
#@titleProcessthedata
```

In[48]:

```
max_words=1000
max_len=150
tok=Tokenizer(num_words=m
ax_words)tok.fit_on_texts
(X_train)
```

In[49]:

```
#@titleDefinethemodel
```

In[50]:

```
defRNN():
    inputs=Input(name='inputs',shape=[max_len])
    layer =
    Embedding(max_words,50,input_length=max_len)(input
    s)layer=LSTM(64)(layer)
    layer =
    Dense(256,name='FC1')
     (layer)layer
    =Activation('relu')(l
    ayer)layer=Dropout(0
```

In[51]:

```
#@titleCallthefunctionandcompilethemodel
```

In[52]:

```
m
o
d
```

```
Model:"model_1"
_________________________________________________________________
 Layer(type)                  OutputShape               Param#
=================================================================
 inputs(InputLayer)           [(None,150)]              0

 embedding_1(Embedding)       (None, 150, 50)           50000

 lstm_1(LSTM)                 (None, 64)                29440

 FC1(Dense)                   (None, 256)               16640

 activation_2(Activation)     (None, 256)               0
 dropout_1(Dropout)          (None, 256)             0

 out_layer(Dense)            (None, 1)               257

 activation_3(Activation)    (None, 1)               0

=================================================================
Totalparams:96,337
Trainableparams:96,337
Non-trainableparams:0
_________________________________________________________________
```

In[53]:

```
#@titleFitthemodel
```

In[54]:

```
model.fit(sequences_matrix,Y_train,batch_size=128,epochs=10,validation_split=0.2,callbacks=[Ea
          rlyStopping(monitor='val_loss',min_delta=0.0
001)])
```

```
Epoch1/10
30/30[==============================]-10s267ms/step-loss:0.3345-accuracy:0.8730
- val_loss:0.1491-
val_accuracy:0.9462Epoch2/10
30/30[==============================]-8s251ms/step-loss:0.0887-accuracy:0.9794
- val_loss:0.0625-

val_accuracy:0.9821Out[54]:

<keras.callbacks.Historyat0x7f0a5c167750>
```

In[55]:

```
#@titleProcessthetestdata
```

In[56]:

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

In[57]:

```
#@titleEvaluatethemodelwiththetest
```

In[58]:

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

```
27/27[==============================]-1s21ms/step-loss:0.0643-accuracy:0.9797
```

In[59]:

```
print('Test set\nLoss: {:0.3f}\nAccuracy:
```

```
{:0.3f}'.format(accr[0],accr[1]))Testset
  Loss:0.064
  Accuracy:0.980
```