Assignment-IV

Fertilizer recommendation system for disease prediction

Date	26 October 2022
Student name	Aswini.I
Student roll no	810019104012
Maximum marks	2 marks

```
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 import
csv
```

```
with open('/spam.csv', 'r') as csvfile:  reader
= csv.reader(csvfile) df =
pd.read_csv(r'/spam.csv',encoding='latin-1')
df.head()
```

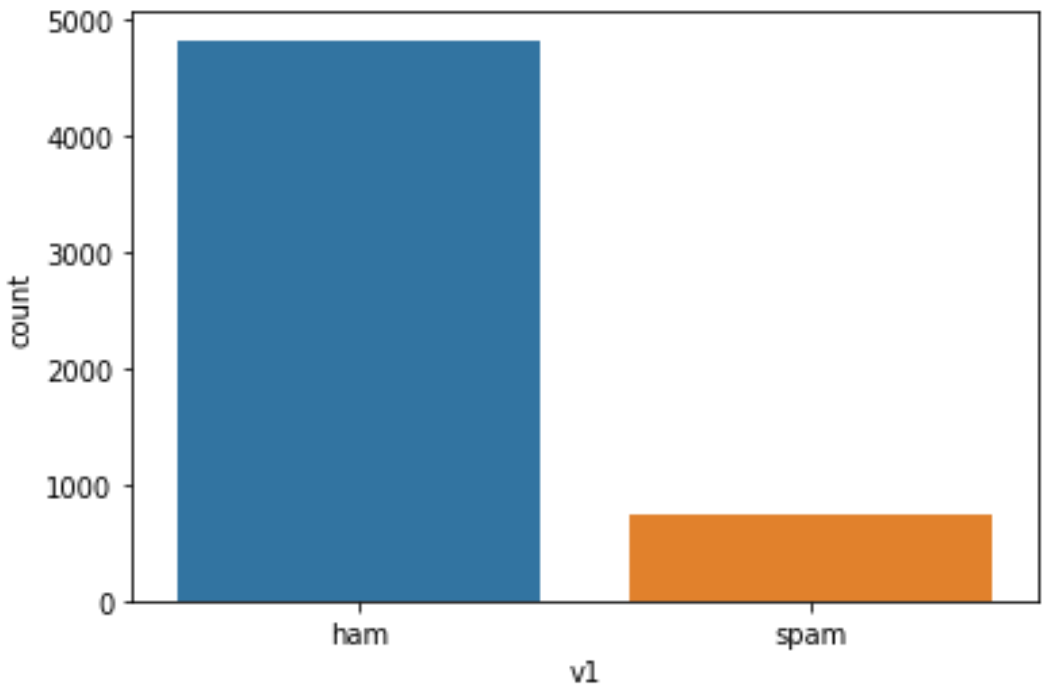
```
     v1                                                  v2 Unnamed: 2  \0
ham  Go until jurong point, crazy.. Available only ...         NaN
1   ham                      Ok lar... Joking wif u oni...         NaN
2   spam  Free entry in 2 a wkly comp to win FA Cup fina...          NaN
3   ham  U 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   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)
```

```
/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
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f5197dac250>
```




```
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=['accura
cy','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
_________________________________________________________________
```

```
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 [==============================] - 17s 486ms/step - loss: 0.2960 -
accuracy: 0.8819 - mse: 0.0821 - mae: 0.1563 - val_loss: 0.1341 -
val_accuracy: 0.9675 - val_mse: 0.0344 - val_mae: 0.1237 Epoch 2/10
28/28 [==============================] - 13s 462ms/step - loss: 0.1149 -
accuracy: 0.9764 - mse: 0.0381 - mae: 0.1538 - val_loss: 0.1321 -
val_accuracy: 0.9798 - val_mse: 0.0437 - val_mae: 0.1695
```

```
<keras.callbacks.History at 0x7f5193192590>
```

```
test_sequences = tok.texts_to_sequences(X_test) test_sequences_matrix =
sequence.pad_sequences(test_sequences,maxlen=max_len) accr =
model.evaluate(test_sequences_matrix,Y_test)
```

```
35/35 [==============================] - 3s 78ms/step - loss: 0.1590 -
accuracy: 0.9812 - mse: 0.0451 - mae: 0.1733
```

```
print('Test set\n  Loss: {:0.3f}\n  Accuracy:
{:0.3f}'.format(accr[0],accr[1]))
```

```
Test set
  Loss: 0.159   Accuracy: 0.981
```

```
model.save("./assign4model.h5")
```

```
from tensorflow.keras.models import load_model m2
= load_model("./assign4model.h5")
m2.evaluate(test_sequences_matrix,Y_test)
```

```
35/35 [==============================] - 3s 68ms/step - loss: 0.1590 -
accuracy: 0.9812 - mse: 0.0451 - mae: 0.1733
```

```
[0.1589982509613037,
 0.9811659455299377,
 0.04506031796336174,
 0.17333826422691345]
```