Assignment-IV
fertilizer recommentation system for disease prediction

Date	19 october 2022
Team ID	PNT2022TMID43230
Project Name	Fertilizers Recommendation System For Disease Prediction
Maximum Marks	

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.mode1_selection import train_test_split
from sklearn.preprocessing import LabelEncoder
from tensorflow.keras.models import Model
from tensorflow.keras.models 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 %matplotlip inline
import csv

with open('spam.csv' , ')as csvfile :
    reader = csv.reader(csvfile)

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

```
.frame.dataFrame'>
RangeInbox:   5572 entries, 0 to     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 sat . . .             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
```

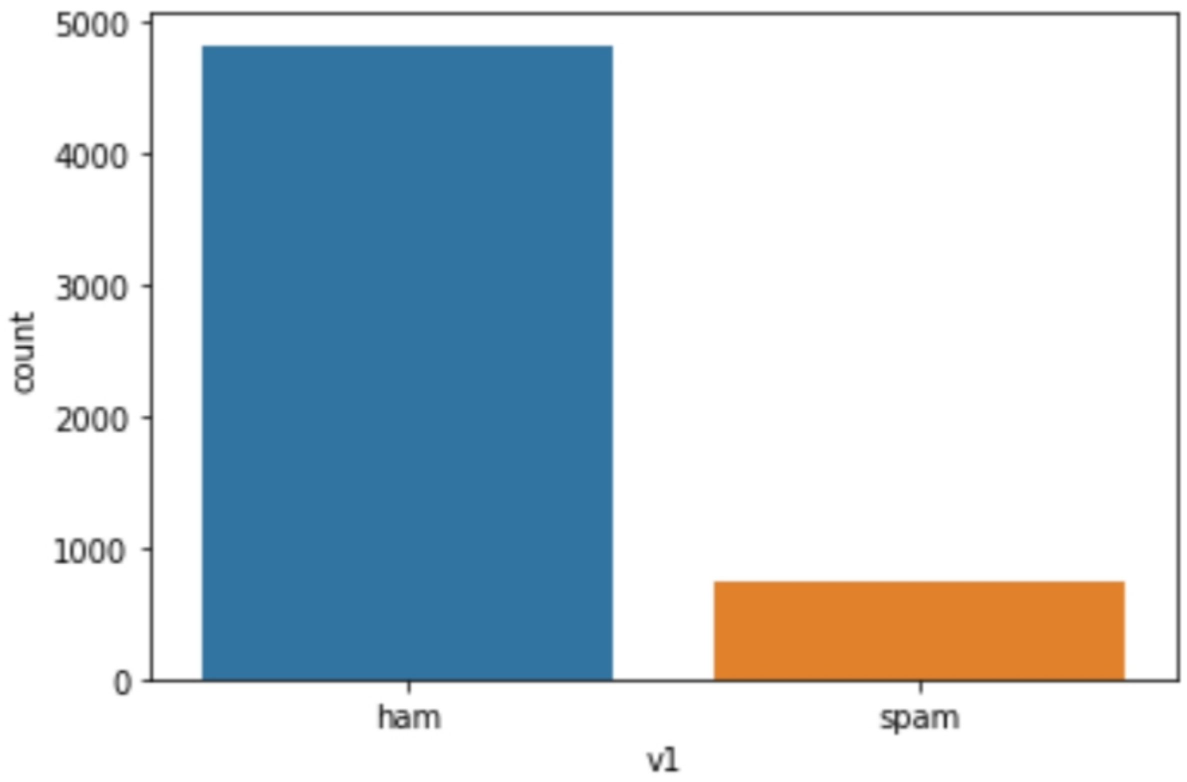
```
df.drop([ 'Unnamed :   2' ,     'Unnamed :    3' ,    'Unnamed :    4'],axis=1,inplace=true)
df.info()
```

```
<class 'pandas.core5571
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:
c250>FutureWarning: Pass the following variable as a keyboard arg :  x.  From version0.12, the
only valid positional argument will be 'data' , and passing other arguments without an explicit
keyboard willresult 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_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_lenth=max_len)(inputs)
    layer = LSTM(128)(layer)
```

```
        layer = Dense(256,name='FC1')(layer)
        layer = Activation('relu')(layer)
        layer = Dropout(0.5)(laye)
        layer = Dense(1,name='out_layer')(layer)
        layer = Activation('tanh')(layer)
        model = (inputs=inputs,outputs=layer)
         return model

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

```
________________________________________________________________________
 Layer (type)                         Output Shape                 Param #
========================================================================
inputs (InputLayer)                   [ (None, 150)]               0

embedding (Embedding)                  (None, 150 50)              50000

1stm (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 : 0.9698 - val_mse : 0.0437 - val_mae : 0.1695

<keras.callbacks.History at 0x7f519319250>
test_sequences = tok.texts_to_sequences(X_test)
test_sequences_matrix = sequence.pad_sequences(teat_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 : o.159
   Accuracy : 0.981

model save("./assign4model.h5)

from tensorflow.keras.models impoet 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 ]
```