

## Assignment-4

### Fertilizer recommendation system for Disease prediction

Date	27 October 2022
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Maximum marks	2 marks

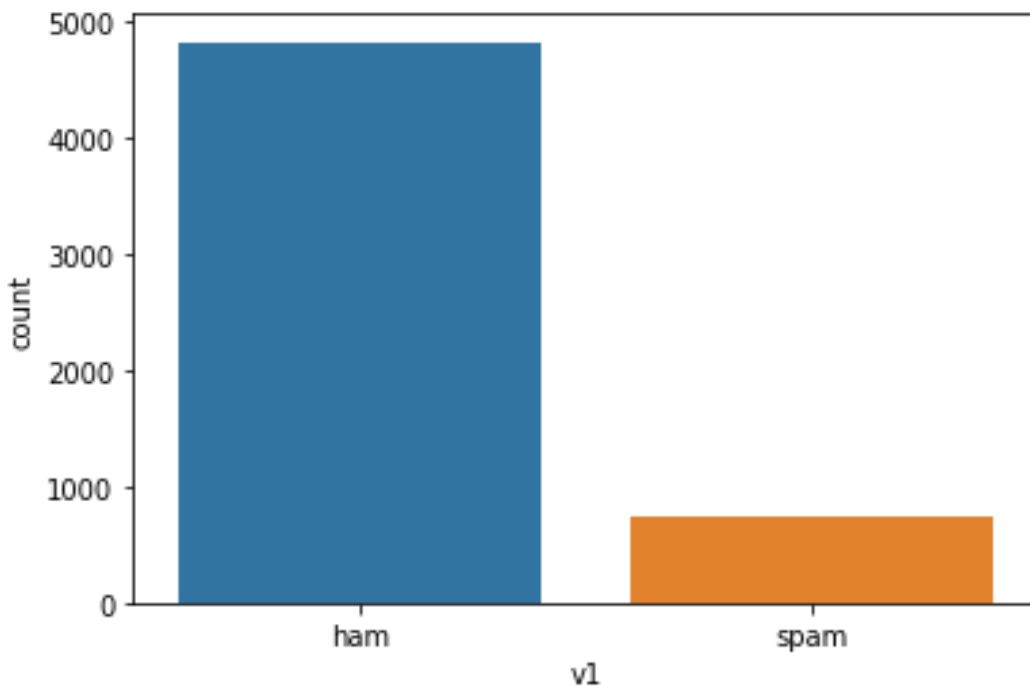
```
import pandas as pd import numpy as np import
matplotlib.pyplot as plt import seaborn as sns from
sklearn.model_selection import train_test_split from
sklearn.preprocessing import LabelEncoder from
tensorflow.keras.models import Model
from tensorflow.keras.layers import LSTM,Activation, Dense,
Dropout, 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 = 10000 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:

```

"model"

Layer (type)	Output Shape	Param #	
(InputLayer)	[(None, 150)]	0	inputs
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: {:.3f}\n Accuracy: {:.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]

```