Assignment-IV

Real Time Communication System Powered By AI For Specially Abled

Date	26 October 2022
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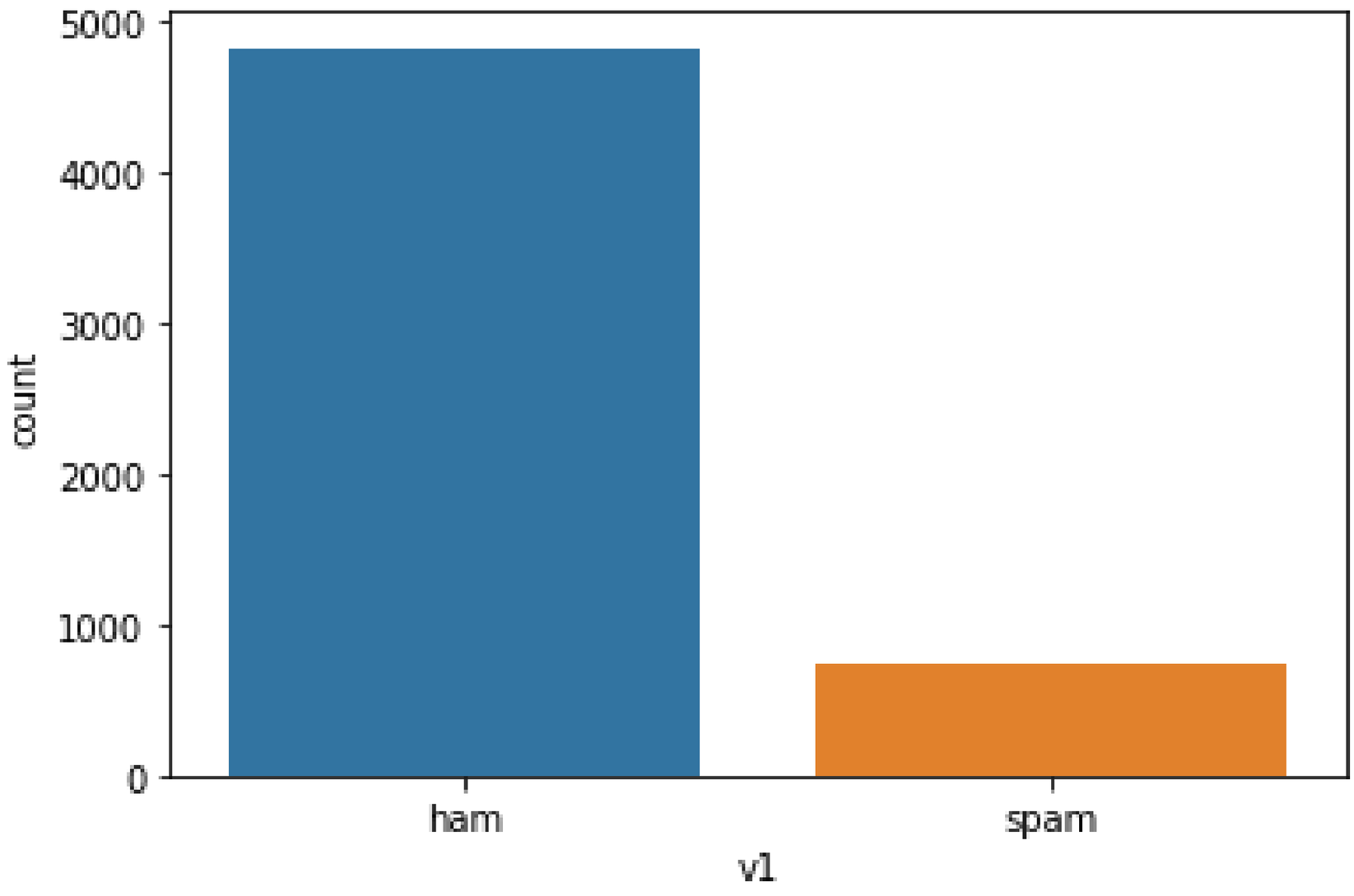
Maximum marks	2 marks

```
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 = 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
[0.158998250961303 7,
0.981165945529937 7,
0.045060317963361 74,
0.173338264226913 45]
```