ARTIFICIAL INTELLIGENCE

NATURAL DISASTER INTENSITY ANALYSIS AND CLASSIFICATION

ASSIGNMENT 4

READ DATASET AND DO PREPROCESSING

Input

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

df.head()
```

Output

	v1	v2	unnamed:2	unnamed:3	unnamed:4
0	ham	Go until jurong point, crazy.. Available only ...	NaN	NaN	NaN
1	ham	Ok lar... Joking wif u oni...	NaN	NaN	NaN
2	spam	Free entry in 2 a wkly comp to win FA Cup fina...	NaN	NaN	NaN
3	ham	U dun say so early hor... U c already then say...	NaN	NaN	NaN
4	ham	Nah I don't think he goes to usf, he lives aro...	NaN	NaN	NaN

Input

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

df.info
```

Output

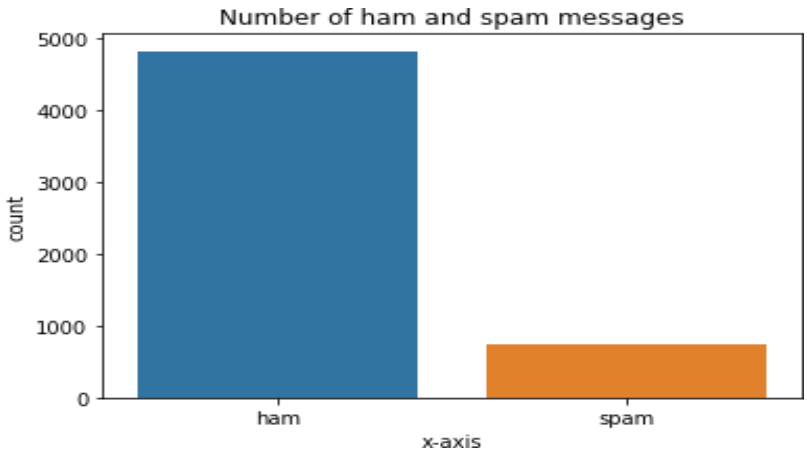
```
RangeIndex: 5572 entries, 0 to 5571
Data columns (total 2 columns):
 #   Column  Non-Null Count  Dtype
---  ------  --------------  -----
 0   v1      5572 non-null   object
 1   v2      5572 non-null   object
dtypes: object(2)
memory usage: 87.2+ KB
```

Input

```
sns.countplot(df.v1)
plt.xlabel('x-axis')
plt.title('Number of ham and spam messages')
```

Output

```
Text(0.5, 1.0, 'Number of ham and spam messages')
```



CREATE INPUT VECTORS AND PROCESS LABELS

```
X = df.v2

Y = df.v1


le = LabelEncoder()
Y = le.fit_transform(Y)

Y = Y.reshape(-1,1)
```

SPLIT THE TRAINING AND TESTING DATA

```
X_train,X_test,Y_train,Y_test = train_test_split(X,Y,test_size=0.20)
```

PROCESS THE DATA

```
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)
```

CREATE MODELS AND ADD LAYERS

Input

```
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: "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.compile(loss='binary_crossentropy',optimizer=RMSprop(),metrics=['accuracy
','mse','mae'])
```

FIT THE MODEL

Input

```
model.fit(sequences_matrix,Y_train,batch_size=128,epochs=100,
```

Output

```
validation_split=0.2,callbacks=[EarlyStopping(monitor='val_loss',min_delta=0.00
01)])
Epoch 1/100
28/28 [==============================] - 13s 460ms/step - loss: 0.0961 - accura
cy: 0.9778 - mse: 0.0358 - mae: 0.1438 - val_loss: 0.1271 - val_accuracy: 0.983
2 - val_mse: 0.0568 - val_mae: 0.2060
Epoch 2/100
28/28 [==============================] - 14s 507ms/step - loss: 0.0728 - accura
cy: 0.9885 - mse: 0.0607 - mae: 0.2129 - val_loss: 0.1175 - val_accuracy: 0.982
1 - val_mse: 0.0766 - val_mae: 0.2416
```

Input

```
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)
```

Output

```
35/35 [==============================] - 3s 92ms/step - loss: 0.1390 - accuracy
: 0.9821 - mse: 0.0779 - mae: 0.2393
```

Input

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

Output

```
Test set
  Loss: 0.139
  Accuracy: 0.982
```

SAVE THE MODEL

```
 model.save(r"C:\Users\aruna\OneDrive\Desktop\model_lSTM.h5")
```

TEST THE MODEL

Input

```
from tensorflow.keras.models import load_model
m2 = load_model(r"C:\Users\aruna\OneDrive\Desktop\model_lSTM.h5")

m2.evaluate(test_sequences_matrix,Y_test)
```

Output

```
35/35 [==============================] - 4s 68ms/step - loss: 0.1390 -
accuracy: 0.9821 - mse: 0.0779 - mae: 0.2393

[0.13899557292461395,
 0.9820627570152283,
 0.07788368314504623,
 0.23931345343589783]
```