

Assignment_4

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```
[118]: import numpy as np
import pandas as pd
```

```
[57]: df= pd.read_csv("/spam.csv" , encoding='latin-1')
```

```
[17]: df.head()
```

```
[17]:      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
```

```
[58]: df=df.drop(["Unnamed: 2","Unnamed: 3","Unnamed: 4"],axis=1)
```

```
[19]: 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
```

```
[59]: df["v1"].unique()
```

```
[59]: array(['ham', 'spam'], dtype=object)
```

```
[60]: from sklearn.preprocessing import LabelEncoder
le=LabelEncoder()
le.fit(df["v1"].unique())
df["v1"] = le.transform(df["v1"])
```

```
[55]: y = df["v1"].values
```

```
[61]: from sklearn.feature_extraction.text import CountVectorizer

cv = CountVectorizer()
x = cv.fit_transform(df['v2']).toarray()
x
```

```
[61]: array([[0, 0, 0, ..., 0, 0, 0],
          [0, 0, 0, ..., 0, 0, 0],
          [0, 0, 0, ..., 0, 0, 0],
          ...,
          [0, 0, 0, ..., 0, 0, 0],
          [0, 0, 0, ..., 0, 0, 0],
          [0, 0, 0, ..., 0, 0, 0]])
```

```
[62]: x.shape
```

```
[62]: (5572, 8672)
```

```
[65]: x = np.reshape(x, (5572, 8672, 1))
```

```
[66]: x.shape
```

```
[66]: (5572, 8672, 1)
```

```
[67]: from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense, LSTM
```

```
[86]: model = Sequential()
model.add(LSTM(10, input_shape=(8672, 1)))
model.add(Dense(2, activation='relu'))
model.add(Dense(1, activation='sigmoid'))
```

```
[87]: model.compile(optimizer='adam', loss='binary_crossentropy', metrics=['accuracy'])
```

```
[88]: model.fit(x, y, epochs=5)
```

```
Epoch 1/5
175/175 [=====] - 412s 2s/step - loss: 0.4721 -
accuracy: 0.8656
Epoch 2/5
```

```
175/175 [=====] - 406s 2s/step - loss: 0.3948 -  
accuracy: 0.8659  
Epoch 3/5  
175/175 [=====] - 406s 2s/step - loss: 0.3941 -  
accuracy: 0.8659  
Epoch 4/5  
175/175 [=====] - 411s 2s/step - loss: 0.3947 -  
accuracy: 0.8659  
Epoch 5/5  
175/175 [=====] - 403s 2s/step - loss: 0.3944 -  
accuracy: 0.8659
```

```
[88]: <keras.callbacks.History at 0x7f7a527f0210>
```

```
[89]: model.save('spam_ham_lstm.h5')
```

```
[113]: x_test= x[:20]
```

```
[114]: y_pred = model.predict(x_test)
```

```
1/1 [=====] - 1s 1s/step
```

```
[115]: y[:20]
```

```
[115]: array([0, 0, 1, 0, 0, 1, 0, 0, 1, 1, 0, 1, 1, 0, 0, 1, 0, 0, 0, 1])
```