



+ Code + Text

Connect ▾

Editing



Implementation of LSTM using word Embedding technique



```
[ ] from google.colab import drive
    drive.mount('/content/drive')
```

Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.mount("/content/drive", force_remount=True).

```
[ ] import pandas as pd
    df = pd.read_csv('/content/drive/MyDrive/Python_dataset/train.csv')
```

```
[ ] df.shape

(38932, 5)
```

```
[ ] # Checking for null values
    df.isna().sum()
```

```
User_ID      0
Description   0
Browser_Used  0
Device_Used   0
Is_Response   0
dtype: int64
```

Tensorflow_impl...ipynb ^

Show all x



Type here to search





Tensorflow_implementation(LSTM).ipynb

File Edit View Insert Runtime Tools Help Last edited on 25 November

Comment

Share



+ Code + Text

Connect

Editing



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

	User_ID	Description	Browser_Used	Device_Used	Is_Response
0	id10326	The room was kind of clean but had a VERY stro...	Edge	Mobile	not happy
1	id10327	I stayed at the Crown Plaza April -- - April -...	Internet Explorer	Mobile	not happy
2	id10328	I booked this hotel through Hotwire at the low...	Mozilla	Tablet	not happy
3	id10329	Stayed here with husband and sons on the way t...	InternetExplorer	Desktop	happy
4	id10330	My girlfriends and I stayed here to celebrate ...	Edge	Tablet	not happy

```
[ ] df.drop(columns = ['User_ID', 'Browser_Used', 'Device_Used'], inplace = True)
```

```
# cleaning dataset
import re
import string

#This function converts to lower-case, removes numbers and punctuation,remove square brackets
def text_clean_1(text):
    text = text.lower()
    text = re.sub('\[.*?\]', '', text)
    text = re.sub('%s' % re.escape(string.punctuation), '', text)
    text = re.sub('\w*\d\w*', '', text)
    return text

cleaned1 = lambda x: text_clean_1(x)
```

```
[ ] # Updated text
```



Tensorflow_impl...ipynb

Show all



Type here to search



17:00
29-11-2020



0	The room was kind of clean but had a VERY stro...	not happy	the room was kind of clean but had a very stro...
1	I stayed at the Crown Plaza April -- - April -...	not happy	i stayed at the crown plaza april april th...
2	I booked this hotel through Hotwire at the low...	not happy	i booked this hotel through hotwire at the low...
3	Stayed here with husband and sons on the way t...	happy	stayed here with husband and sons on the way t...
4	My girlfriends and I stayed here to celebrate ...	not happy	my girlfriends and i stayed here to celebrate ...
5	We had - rooms. One was very nice and clearly ...	happy	we had rooms one was very nice and clearly ha...
6	My husband and I have stayed in this hotel a f...	not happy	my husband and i have stayed in this hotel a f...
7	My wife & I stayed in this glorious city a whi...	happy	my wife i stayed in this glorious city a whil...
8	My boyfriend and I stayed at the Fairmont on a...	happy	my boyfriend and i stayed at the fairmont on a...
9	Wonderful staff, great location, but it was de...	not happy	wonderful staff great location but it was defi...

```
[ ] # cleaning quotes and new line
def text_clean_2(text):
    text = re.sub('[\'"\"...]', '', text)
    text = re.sub('\n', '', text)
    return text
```

```
cleaned2 = lambda x: text_clean_2(x)
```

```
[ ] # Updating changes
df['cleaned_description_new'] = pd.DataFrame(df['cleaned_description'].apply(cleaned2))
df.head(10)
```

Decription Te Deennce

cleaned description

cleaned description new

Tensorflow_impl....ipynb ^

[Show all](#)



Tensorflow_implementation(LSTM).ipynb

File Edit View Insert Runtime Tools Help [Last edited on 25 November](#)

Comment

Share



+ Code + Text

Connect

Editing



	Description	Is_Response	cleaned_description	cleaned_description_new
0	The room was kind of clean but had a VERY stro...	not happy	the room was kind of clean but had a very stro...	the room was kind of clean but had a very stro...
1	I stayed at the Crown Plaza April -- April -...	not happy	i stayed at the crown plaza april april th...	i stayed at the crown plaza april april th...
2	I booked this hotel through Hotwire at the low...	not happy	i booked this hotel through hotwire at the low...	i booked this hotel through hotwire at the low...
3	Stayed here with husband and sons on the way t...	happy	stayed here with husband and sons on the way t...	stayed here with husband and sons on the way t...
4	My girlfriends and I stayed here to celebrate ...	not happy	my girlfriends and i stayed here to celebrate ...	my girlfriends and i stayed here to celebrate ...
5	We had - rooms. One was very nice and clearly ...	happy	we had rooms one was very nice and clearly ha...	we had rooms one was very nice and clearly ha...
6	My husband and I have stayed in this hotel a f...	not happy	my husband and i have stayed in this hotel a f...	my husband and i have stayed in this hotel a f...
7	My wife & I stayed in this glorious city a whil...	happy	my wife i stayed in this glorious city a whil...	my wife i stayed in this glorious city a whil...
8	My boyfriend and I stayed at the Fairmont on a...	happy	my boyfriend and i stayed at the fairmont on a...	my boyfriend and i stayed at the fairmont on a...
9	Wonderful staff, great location, but it was de...	not happy	wonderful staff great location but it was defi...	wonderful staff great location but it was defi...

```
[ ] # Assigning input and output variables
```

```
Independent_var = df.cleaned_description_new
Dependent_var = df.Is_Response
```

```
[ ] # Converting into one hot representation in a vocabulary size of 10,000
```

```
from tensorflow.keras.preprocessing.text import one_hot
voc_size=10000
onehot_repr=[one_hot(words,voc_size)for words in Independent_var]
onehot_repr
```

Tensorflow_impl...ipynb

Show all

Type here to search



17:00
29-11-2020



Tensorflow_implementation(LSTM).ipynb ☆

File Edit View Insert Runtime Tools Help [Last edited on 25 November](#)

Comment

Share



+ Code + Text

Connect ▾

Editing



```
[ ] 8475,  
    3938,  
    8462,  
    6746
```

```
[ ] from tensorflow.keras.layers import Embedding  
    from tensorflow.keras.preprocessing.sequence import pad_sequences  
    from tensorflow.keras.models import Sequential
```

```
[ ] # Padding in order to fill missing values  
    sent_length=8  
    embedded_docs=pad_sequences(onehot_repr,padding='pre',maxlen=sent_length)  
    print(embedded_docs)
```

```
[[8462 762 9277 ... 5391 7921 68]  
 [1067 3635 8253 ... 5883 7204 8847]  
 [7583 4193 6211 ... 5391 3257 2911]  
 ...  
 [8071 1212 5038 ... 5822 5883 6768]  
 [6130 9277 192 ... 2079 5038 8468]  
 [8657 3633 1108 ... 9980 9696 3838]]
```

▶ embedded_docs[0]

```
↳ array([8462, 762, 9277, 3719, 8080, 5391, 7921, 68], dtype=int32)
```

+ Code

+ Text

```
[ ] # Creating model  
    from tensorflow.keras.layers import LSTM  
    from tensorflow.keras.layers import Dense,Dropout  
    from tensorflow.keras.layers import Flatten
```

Tensorflow_impl...ipynb ^

Show all ×



Type here to search



17:01
29-11-2020





Tensorflow_implementation(LSTM).ipynb ☆

File Edit View Insert Runtime Tools Help [Last edited on 25 November](#)

Comment Share ⚙ S

+ Code + Text Connect Editing ^

```
# Creating model
from tensorflow.keras.layers import LSTM
from tensorflow.keras.layers import Dense,Dropout
from tensorflow.keras.layers import Flatten

output_size=40
model=Sequential()
model.add(Embedding(voc_size,output_size,input_length=sent_length))
model.add(LSTM(100,activation='relu'))
model.add(Dropout((0.5)))

model.add(Dense(1,activation='sigmoid'))
model.compile(loss='binary_crossentropy',optimizer='adam',metrics=['accuracy'])
print(model.summary())
```

Model: "sequential_2"

Layer (type)	Output Shape	Param #
embedding_2 (Embedding)	(None, 8, 40)	400000
lstm_2 (LSTM)	(None, 100)	56400
dropout_1 (Dropout)	(None, 100)	0
dense_1 (Dense)	(None, 1)	101
Total params: 456,501		
Trainable params: 456,501		
Non-trainable params: 0		
None		

Tensorflow_impl...ipynb ^

Show all ×



Tensorflow_implementation(LSTM).ipynb ☆

File Edit View Insert Runtime Tools Help Last edited on 25 November

Comment

Share



+ Code + Text

Connect ▾

Editing



```
[ ]
```

```
[ ] X_final.shape,y_final.shape
```

```
((38932, 8), (38932,))
```

```
[ ] y_final=pd.get_dummies(y_final)
y_final=y_final['happy']
```

```
[ ] from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X_final, y_final, test_size=0.33, random_state=42)
```

```
[ ] model.fit(X_train,y_train,validation_data=(X_test,y_test),epochs=20,batch_size=64)
```

Epoch 1/20

408/408 [=====] - 12s 30ms/step - loss: 0.5539 - accuracy: 0.7091 - val_loss: 0.5207 - val_accuracy: 0.7364

Epoch 2/20

408/408 [=====] - 7s 17ms/step - loss: 0.4781 - accuracy: 0.7671 - val_loss: 0.5163 - val_accuracy: 0.7445

Epoch 3/20

408/408 [=====] - 7s 17ms/step - loss: 0.4379 - accuracy: 0.7910 - val_loss: 0.5280 - val_accuracy: 0.7421

Epoch 4/20

408/408 [=====] - 7s 17ms/step - loss: 0.4037 - accuracy: 0.8086 - val_loss: 0.5506 - val_accuracy: 0.7370

Epoch 5/20

408/408 [=====] - 7s 18ms/step - loss: 0.3694 - accuracy: 0.8265 - val_loss: 0.6514 - val_accuracy: 0.7276

Epoch 6/20

408/408 [=====] - 7s 17ms/step - loss: 0.3358 - accuracy: 0.8424 - val_loss: 0.7282 - val_accuracy: 0.7289

Epoch 7/20

408/408 [=====] - 7s 17ms/step - loss: 0.3061 - accuracy: 0.8584 - val_loss: 0.9323 - val_accuracy: 0.7226

Epoch 8/20

408/408 [=====] - 7s 17ms/step - loss: 0.2808 - accuracy: 0.8692 - val_loss: 0.9188 - val_accuracy: 0.7222

Tensorflow_impl...ipynb ^

Show all



Type here to search



17:01

29-11-2020





Tensorflow_implementation(LSTM).ipynb ☆

File Edit View Insert Runtime Tools Help [Last edited on 25 November](#)

Comment

Share



+ Code + Text

Connect ▾

Editing



```
408/408 [-----] - 75 17ms/step - loss: 0.1317 - accuracy: 0.9501 - val_loss: 1.7390 - val_accuracy: 0.7071  
<tensorflow.python.keras.callbacks.History at 0x7f574c594588>
```

```
[ ] # Evaluating model  
y_pred=model.predict_classes(X_test)
```

```
[ ] # Confusion matrix  
from sklearn.metrics import confusion_matrix  
confusion_matrix(y_test,y_pred)
```

```
array([[2190, 1897],  
       [1866, 6895]])
```

```
[ ] # Finding data accuracy  
from sklearn.metrics import accuracy_score  
accuracy_score(y_test,y_pred)
```

```
0.7071139476961394
```

```
[ ] model.save('hotel_1.h5')
```

```
[ ] from google.colab import files
```

```
[ ] files.download("hotel_1.h5")
```

Tensorflow_impl...ipynb ^

Show all



Type here to search



17:01
29-11-2020

