import tensorflow as tf

import numpy as np

import pandas as pd

import matplotlib.pyplot as plt

import seaborn as sns

from tensorflow.keras.layers

import TextVectorization

import re,string

from tensorflow.keras.layers

import LSTM,Dense,Embedding,Dropout,LayerNormalization

df=pd.read\_csv('/kaggle/input/simple-dialogs-for-chatbot/dialogs.txt',sep='\t',names=['question','answer'])

print(f'Dataframe size: {len(df)}')

df.head()

df['question tokens']=df['question'].apply(lambda x:len(x.split()))

df['answer tokens']=df['answer'].apply(lambda x:len(x.split()))

plt.style.use('fivethirtyeight')

fig,ax=plt.subplots(nrows=1,ncols=2,figsize=(20,5))

sns.set\_palette('Set2')

sns.histplot(x=df['question tokens'],data=df,kde=True,ax=ax[0])

sns.histplot(x=df['answer tokens'],data=df,kde=True,ax=ax[1])

sns.jointplot(x='question tokens',y='answer tokens',data=df,kind='kde',fill=True,cmap='YlGnBu')

plt.show()

def clean\_text(text):

text=re.sub('-',' ',text.lower())

text=re.sub('[.]',' . ',text)

text=re.sub('[1]',' 1 ',text)

text=re.sub('[2]',' 2 ',text)

text=re.sub('[3]',' 3 ',text)

text=re.sub('[4]',' 4 ',text)

text=re.sub('[5]',' 5 ',text)

text=re.sub('[6]',' 6 ',text)

text=re.sub('[7]',' 7 ',text)

text=re.sub('[8]',' 8 ',text)

text=re.sub('[9]',' 9 ',text)

text=re.sub('[0]',' 0 ',text)

text=re.sub('[,]',' , ',text)

text=re.sub('[?]',' ? ',text)

text=re.sub('[!]',' ! ',text)

text=re.sub('[$]',' $ ',text)

text=re.sub('[&]',' & ',text)

text=re.sub('[/]',' / ',text)

text=re.sub('[:]',' : ',text)

text=re.sub('[;]',' ; ',text)

text=re.sub('[\*]',' \* ',text)

text=re.sub('[\']',' \' ',text)

text=re.sub('[\"]',' \" ',text)

text=re.sub('\t',' ',text)

return text

df.drop(columns=['answer tokens','question tokens'],axis=1,inplace=True)

df['encoder\_inputs']=df['question'].apply(clean\_text)

df['decoder\_targets']=df['answer'].apply(clean\_text)+' <end>'

df['decoder\_inputs']='<start> '+df['answer'].apply(clean\_text)+' <end>'

df['encoder input tokens']=df['encoder\_inputs'].apply(lambda x:len(x.split()))

df['decoder input tokens']=df['decoder\_inputs'].apply(lambda x:len(x.split()))

df['decoder target tokens']=df['decoder\_targets'].apply(lambda x:len(x.split()))

plt.style.use('fivethirtyeight')

fig,ax=plt.subplots(nrows=1,ncols=3,figsize=(20,5))

sns.set\_palette('Set2')

sns.histplot(x=df['encoder input tokens'],data=df,kde=True,ax=ax[0])

sns.histplot(x=df['decoder input tokens'],data=df,kde=True,ax=ax[1])

sns.histplot(x=df['decoder target tokens'],data=df,kde=True,ax=ax[2])

sns.jointplot(x='encoder input tokens',y='decoder target tokens',data=df,kind='kde',fill=True,cmap='YlGnBu')

plt.show()

print(f"After preprocessing: {' '.join(df[df['encoder input tokens'].max()==df['encoder input tokens']]['encoder\_inputs'].values.tolist())}")

print(f"Max encoder input length: {df['encoder input tokens'].max()}")

print(f"Max decoder input length: {df['decoder input tokens'].max()}")

print(f"Max decoder target length: {df['decoder target tokens'].max()}")

df.drop(columns=['question','answer','encoder input tokens','decoder input tokens','decoder target tokens'],axis=1,inplace=True)

params={

"vocab\_size":2500,

"max\_sequence\_length":30,

"learning\_rate":0.008,

"batch\_size":149,

"lstm\_cells":256,

"embedding\_dim":256,

"buffer\_size":10000

}

learning\_rate=params['learning\_rate']

batch\_size=params['batch\_size']

embedding\_dim=params['embedding\_dim']

lstm\_cells=params['lstm\_cells']

vocab\_size=params['vocab\_size']

buffer\_size=params['buffer\_size']

max\_sequence\_length=params['max\_sequence\_length']

df.head(10)

vectorize\_layer=TextVectorization(

max\_tokens=vocab\_size,

standardize=None,

output\_mode='int',

output\_sequence\_length=max\_sequence\_length

)

vectorize\_layer.adapt(df['encoder\_inputs']+' '+df['decoder\_targets']+' <start> <end>')

vocab\_size=len(vectorize\_layer.get\_vocabulary())

print(f'Vocab size: {len(vectorize\_layer.get\_vocabulary())}')

print(f'{vectorize\_layer.get\_vocabulary()[:12]}')

def sequences2ids(sequence):

return vectorize\_layer(sequence)

def ids2sequences(ids):

decode=''

if type(ids)==int:

ids=[ids]

for id in ids:

decode+=vectorize\_layer.get\_vocabulary()[id]+' '

return decode

x=sequences2ids(df['encoder\_inputs'])

yd=sequences2ids(df['decoder\_inputs'])

y=sequences2ids(df['decoder\_targets'])

print(f'Question sentence: hi , how are you ?')

print(f'Question to tokens: {sequences2ids("hi , how are you ?")[:10]}')

print(f'Encoder input shape: {x.shape}')

print(f'Decoder input shape: {yd.shape}')

print(f'Decoder target shape: {y.shape}')

print(f'Encoder input: {x[0][:12]} ...')

print(f'Decoder input: {yd[0][:12]} ...')

print(f'Decoder target: {y[0][:12]} ...')