experimentalrun2

April 19, 2021

```python
[1]: #step1 import all the required libraries
     #install this version of transformers and pytorch
     !pip install transformers==2.8.0
     !pip install torch==1.4.0
     from transformers import T5Tokenizer, T5ForConditionalGeneration
     import tensorflow_datasets as tfds
     import torch
     import pandas as pd
     import numpy as np
     import matplotlib.pyplot as plt
     import tensorflow as tf
     from tensorflow import keras
     import nltk,spacy,re,string,random,time
     import matplotlib.pyplot as plt
     from gensim.parsing.preprocessing import STOPWORDS
     from spacy.lang.en.stop_words import STOP_WORDS
     from nltk.tokenize import word_tokenize
     from nltk.corpus import stopwords
     from sklearn.model_selection import train_test_split
     from collections import Counter
     from keras.preprocessing.sequence import pad_sequences
     from tensorflow.keras.layers import␣
      ↪Input,LSTM,Embedding,Dense,Concatenate,TimeDistributed,Bidirectional
     from tensorflow.keras.models import Model
     from tensorflow.keras.callbacks import EarlyStopping,ReduceLROnPlateau
     from attension import AttentionLayer
     from keras.initializers import Constant
     from keras.optimizers import Adam
     from keras import backend as K
     from rouge import rouge_n,rouge_l_sentence_level,rouge
     from bleau import compute_bleu
     #disable eager execution
     #tf.compat.v1.disable_eager_execution()
     #stopwords removal list
     nltk.download('stopwords')
     #punkt for tokenization
     nltk.download('punkt')
```

```python
#for tokenaizations
nltk.download('wordnet')
#combine all the stopwords and create one single list of stopwords
s1=stopwords.words('english')
s2=list(STOP_WORDS)
s3=list(STOPWORDS)
#final list of stopwords
stop_words = s1+s2+s3
#use cuda if available
device = torch.device("cuda:0" if torch.cuda.is_available() else "cpu")
```

```
Collecting transformers==2.8.0
  Downloading https://files.pythonhosted.org/packages/a3/78/92cedda0555239
8352ed9784908b834ee32a0bd071a9b32de287327370b7/transformers-2.8.0-py3-none-
any.whl (563kB)
     |                    | 573kB 6.9MB/s
Collecting boto3
  Downloading https://files.pythonhosted.org/packages/6d/13/e9288321f4d0a8
a6d93c28b90b52b76788adc799da4234e2f6d8421563d5/boto3-1.17.48.tar.gz (99kB)
     |                    | 102kB 9.3MB/s
Requirement already satisfied: requests in /usr/local/lib/python3.7/dist-
packages (from transformers==2.8.0) (2.23.0)
Collecting sentencepiece
  Downloading https://files.pythonhosted.org/packages/f5/99/e0808cb947ba10
f575839c43e8fafc9cc44e4a7a2c8f79c60db48220a577/sentencepiece-0.1.95-cp37-cp37m-m
anylinux2014_x86_64.whl (1.2MB)
     |                    | 1.2MB 35.4MB/s
Collecting tokenizers==0.5.2
  Downloading https://files.pythonhosted.org/packages/d6/e3/5e49e9a83fb605
aaa34a1c1173e607302fecae529428c28696fb18f1c2c9/tokenizers-0.5.2-cp37-cp37m-manyl
inux1_x86_64.whl (5.6MB)
     |                    | 5.6MB 47.2MB/s
Requirement already satisfied: regex!=2019.12.17 in
/usr/local/lib/python3.7/dist-packages (from transformers==2.8.0) (2019.12.20)
Collecting sacremoses
  Downloading https://files.pythonhosted.org/packages/08/cd/342e584ee544d0
44fb573ae697404ce22ede086c9e87ce5960772084cad0/sacremoses-0.0.44.tar.gz (862kB)
     |                    | 870kB 32.5MB/s
Requirement already satisfied: filelock in /usr/local/lib/python3.7/dist-
packages (from transformers==2.8.0) (3.0.12)
Requirement already satisfied: numpy in /usr/local/lib/python3.7/dist-packages
(from transformers==2.8.0) (1.19.5)
Requirement already satisfied: tqdm>=4.27 in /usr/local/lib/python3.7/dist-
packages (from transformers==2.8.0) (4.41.1)
Collecting botocore<1.21.0,>=1.20.48
  Downloading https://files.pythonhosted.org/packages/36/23/987dd3560d1914
c161f04133c8f392d1636e1b53fa7a91b2e4fcb5136c99/botocore-1.20.48-py2.py3-none-
```

any.whl (7.4MB)
```
     |                       | 7.4MB 49.5MB/s
```
Collecting jmespath<1.0.0,>=0.7.1
  Downloading https://files.pythonhosted.org/packages/07/cb/5f001272b6faeb23c1c9
e0acc04d48eaaf5c862c17709d20e3469c6e0139/jmespath-0.10.0-py2.py3-none-any.whl
Collecting s3transfer<0.4.0,>=0.3.0
  Downloading https://files.pythonhosted.org/packages/98/14/0b4be62b65c52d
6d1c442f24e02d2a9889a73d3c352002e14c70f84a679f/s3transfer-0.3.6-py2.py3-none-
any.whl (73kB)
```
     |                       | 81kB 6.9MB/s
```
Requirement already satisfied: idna<3,>=2.5 in
/usr/local/lib/python3.7/dist-packages (from requests->transformers==2.8.0)
(2.10)
Requirement already satisfied: urllib3!=1.25.0,!=1.25.1,<1.26,>=1.21.1 in
/usr/local/lib/python3.7/dist-packages (from requests->transformers==2.8.0)
(1.24.3)
Requirement already satisfied: certifi>=2017.4.17 in
/usr/local/lib/python3.7/dist-packages (from requests->transformers==2.8.0)
(2020.12.5)
Requirement already satisfied: chardet<4,>=3.0.2 in
/usr/local/lib/python3.7/dist-packages (from requests->transformers==2.8.0)
(3.0.4)
Requirement already satisfied: six in /usr/local/lib/python3.7/dist-packages
(from sacremoses->transformers==2.8.0) (1.15.0)
Requirement already satisfied: click in /usr/local/lib/python3.7/dist-packages
(from sacremoses->transformers==2.8.0) (7.1.2)
Requirement already satisfied: joblib in /usr/local/lib/python3.7/dist-packages
(from sacremoses->transformers==2.8.0) (1.0.1)
Requirement already satisfied: python-dateutil<3.0.0,>=2.1 in
/usr/local/lib/python3.7/dist-packages (from
botocore<1.21.0,>=1.20.48->boto3->transformers==2.8.0) (2.8.1)
Building wheels for collected packages: boto3, sacremoses
  Building wheel for boto3 (setup.py) … done
  Created wheel for boto3: filename=boto3-1.17.48-py2.py3-none-any.whl
size=128779
sha256=8029803e88d6e1af3783e3981f90218dbe253bc3e5289bfba3c89902f76def47
  Stored in directory: /root/.cache/pip/wheels/f8/c7/1c/21169a0a35009f804c99f5e8
33a0eee9ddaf12a0d788756dbc
  Building wheel for sacremoses (setup.py) … done
  Created wheel for sacremoses: filename=sacremoses-0.0.44-cp37-none-any.whl
size=886084
sha256=a76bf92dbbddd246a94496bc08c06ef37030c5a93ff063f91941104b8e0c612c
  Stored in directory: /root/.cache/pip/wheels/3e/fb/c0/13ab4d63d537658f44836674
4654323077c4d90069b6512f3c
Successfully built boto3 sacremoses
ERROR: botocore 1.20.48 has requirement urllib3<1.27,>=1.25.4, but you'll

have urllib3 1.24.3 which is incompatible.

```
Installing collected packages: jmespath, botocore, s3transfer, boto3,
sentencepiece, tokenizers, sacremoses, transformers
Successfully installed boto3-1.17.48 botocore-1.20.48 jmespath-0.10.0
s3transfer-0.3.6 sacremoses-0.0.44 sentencepiece-0.1.95 tokenizers-0.5.2
transformers-2.8.0
Collecting torch==1.4.0
  Downloading https://files.pythonhosted.org/packages/1a/3b/fa92ece1e58a6a
48ec598bab327f39d69808133e5b2fb33002ca754e381e/torch-1.4.0-cp37-cp37m-manylinux1
_x86_64.whl (753.4MB)
      |                        | 753.4MB 22kB/s
ERROR: torchvision 0.9.1+cu101 has requirement torch==1.8.1, but you'll

have torch 1.4.0 which is incompatible.
ERROR: torchtext 0.9.1 has requirement torch==1.8.1, but you'll have torch

1.4.0 which is incompatible.
Installing collected packages: torch
  Found existing installation: torch 1.8.1+cu101
    Uninstalling torch-1.8.1+cu101:
      Successfully uninstalled torch-1.8.1+cu101
Successfully installed torch-1.4.0
[nltk_data] Downloading package stopwords to /root/nltk_data…
[nltk_data]   Unzipping corpora/stopwords.zip.
[nltk_data] Downloading package punkt to /root/nltk_data…
[nltk_data]   Unzipping tokenizers/punkt.zip.
[nltk_data] Downloading package wordnet to /root/nltk_data…
[nltk_data]   Unzipping corpora/wordnet.zip.
```

```python
[14]: #step2
      #contraction are used to replace words with their longer meaningfull counter␣
       ↪parts
      contraction = {
      "ain't": "am not / are not / is not / has not / have not",
      "aren't": "are not / am not",
      "can't": "cannot",
      "can't've": "cannot have",
      "'cause": "because",
      "could've": "could have",
      "couldn't": "could not",
      "couldn't've": "could not have",
      "didn't": "did not",
      "doesn't": "does not",
      "don't": "do not",
      "hadn't": "had not",
      "hadn't've": "had not have",
      "hasn't": "has not",
      "haven't": "have not",
      "he'd": "he had / he would",
```

```
"he'd've": "he would have",
"he'll": "he shall / he will",
"he'll've": "he shall have / he will have",
"he's": "he has / he is",
"how'd": "how did",
"how'd'y": "how do you",
"how'll": "how will",
"how's": "how has / how is / how does",
"I'd": "I had / I would",
"I'd've": "I would have",
"I'll": "I shall / I will",
"I'll've": "I shall have / I will have",
"I'm": "I am",
"I've": "I have",
"isn't": "is not",
"it'd": "it had / it would",
"it'd've": "it would have",
"it'll": "it shall / it will",
"it'll've": "it shall have / it will have",
"it's": "it has / it is",
"let's": "let us",
"ma'am": "madam",
"mayn't": "may not",
"might've": "might have",
"mightn't": "might not",
"mightn't've": "might not have",
"must've": "must have",
"mustn't": "must not",
"mustn't've": "must not have",
"needn't": "need not",
"needn't've": "need not have",
"o'clock": "of the clock",
"oughtn't": "ought not",
"oughtn't've": "ought not have",
"shan't": "shall not",
"sha'n't": "shall not",
"shan't've": "shall not have",
"she'd": "she had / she would",
"she'd've": "she would have",
"she'll": "she shall / she will",
"she'll've": "she shall have / she will have",
"she's": "she has / she is",
"should've": "should have",
"shouldn't": "should not",
"shouldn't've": "should not have",
"so've": "so have",
"so's": "so as / so is",
```

```
"that'd": "that would / that had",
"that'd've": "that would have",
"that's": "that has / that is",
"there'd": "there had / there would",
"there'd've": "there would have",
"there's": "there has / there is",
"they'd": "they had / they would",
"they'd've": "they would have",
"they'll": "they shall / they will",
"they'll've": "they shall have / they will have",
"they're": "they are",
"they've": "they have",
"to've": "to have",
"wasn't": "was not",
"we'd": "we had / we would",
"we'd've": "we would have",
"we'll": "we will",
"we'll've": "we will have",
"we're": "we are",
"we've": "we have",
"weren't": "were not",
"what'll": "what shall / what will",
"what'll've": "what shall have / what will have",
"what're": "what are",
"what's": "what has / what is",
"what've": "what have",
"when's": "when has / when is",
"when've": "when have",
"where'd": "where did",
"where's": "where has / where is",
"where've": "where have",
"who'll": "who shall / who will",
"who'll've": "who shall have / who will have",
"who's": "who has / who is",
"who've": "who have",
"why's": "why has / why is",
"why've": "why have",
"will've": "will have",
"won't": "will not",
"won't've": "will not have",
"would've": "would have",
"wouldn't": "would not",
"wouldn't've": "would not have",
"y'all": "you all",
"y'all'd": "you all would",
"y'all'd've": "you all would have",
"y'all're": "you all are",
```

```
"y'all've": "you all have",
"you'd": "you had / you would",
"you'd've": "you would have",
"you'll": "you shall / you will",
"you'll've": "you shall have / you will have",
"you're": "you are",
"you've": "you have",
"rec'd": "received"
}
#rec'd this is my addition to the list of contractions

#step3
#process_text function is used to remove unwanted characters, stopwords, and
 →format the text to create fewer nulls word embeddings
def process_text(text,contractions,remove_stopwords = True):
    #convert words to lower case
    text = text.lower()

    #replace contractions with their longer forms
    if True:
        text = text.split()
        new_text = []
        for word in text:
            if word in contractions:
                new_text.append(contractions[word])
            else:
                new_text.append(word)
        text = " ".join(new_text)

    #format words and remove unwanted characters
    text = re.sub(r'https?:\/\/.*[\r\n]*', '', text, flags=re.MULTILINE)
 →#remove https string
    text = re.sub(r'\<a href', ' ', text) #remove hyperlink
    text = re.sub(r'&amp;', '', text) #remove & in text
    text = re.sub(r'[_"\-;%()|+&=*%.,!?:#$@\[\]/]', ' ', text) #remove unwanted
 →charecters like puntuation and others
    text = re.sub(r'<br />', ' ', text) #remove new line spaces
    text = re.sub(r'\'', ' ', text) #remove slashes
    text = " ".join(text.split()) #remove trailing spaces
    #string.printable returns all sets of punctuation, digits, ascii_letters
 →and whitespace.
    printable = set(string.printable)
    #filter to remove punctuations,digits, ascii_letters and whitespaces
    text = "".join(list(filter(lambda x: x in printable, text)))
    #remove stop words is true then remove stopwords also
    if remove_stopwords:
        text = text.split()
```

```python
        text = [w for w in text if not w in stop_words]
        text = " ".join(text)

    return text


#step4
#get_data function gets the data from gz file into a dataframe and process the
 ↪columns
#stops are not removed for summary they are only removed from text this is done
 ↪to get more human like summaries
#after processing it returns a dataframe
def get_data(contractions):
  st=time.time()
  #load the data into a dataframe
  df = pd.read_json('/content/drive/MyDrive/
 ↪reviews_Clothing_Shoes_and_Jewelry_5.json.gz', lines=True,
 ↪compression='gzip')
  #drop unwanted columns
  df.drop(columns=['reviewerID', 'asin', 'reviewerName',
 ↪'helpful','overall','unixReviewTime', 'reviewTime'],inplace=True)
  print("length of the data",len(df))
  #apply preprocess function on the columns of the dataframe
  df['reviewText'] = df['reviewText'].apply(lambda x:
 ↪process_text(x,contractions,remove_stopwords = True))
  df['summary'] = df[ 'summary'].apply(lambda x:
 ↪process_text(x,contractions,remove_stopwords = False))
  #write preprocesssed data to csv file
  df.to_csv("/content/drive/MyDrive/product_reviews.csv",index=False)
  print("total time to generate data and write in csv file ",time.time()-st)



#step5
#get_embeddings function is used to gett te word embeddings
#i am using conceptual number batch word embeddings
def get_embeddings():
  #get word embeddings
  embeddings_index = {}
  with open('/content/drive/MyDrive/numberbatch-en-19.08.txt',
 ↪encoding='utf-8') as f:
    for line in f:
      values = line.split(' ')
      word = values[0]
      embedding = np.asarray(values[1:], dtype='float32')
      embeddings_index[word] = embedding

  print('Word embeddings:', len(embeddings_index))
```

```python
    return embeddings_index

#step6
#this function is used to build vocabulary
def get_vocab(embeddings_index,word_counts,threshold):
  #get the number of missing words
  missing_words={k:v for k,v in word_counts.items() if v >= threshold if k not
 ↪in embeddings_index.keys()}
  missing_ratio = round(len(missing_words)/len(word_counts),4)*100
  print("Number of words missing from word_embeddings:", len(missing_words))
  print("Percent of words that are missing from our vocabulary: {}%".
 ↪format(missing_ratio))

  #mapping vocab to index
  lr=iter([item for item in range(0,len(word_counts))])
  vocab_to_int={k:next(lr) for k,v in word_counts.items() if v >= threshold or
 ↪k in embeddings_index.keys()}

  #mapping index to vocab
  lr=iter([item for item in range(0,len(word_counts))])
  int_to_vocab={next(lr):k for k,v in word_counts.items() if v >= threshold or
 ↪k in embeddings_index.keys()}

  # Special tokens that will be added to our vocab
  codes = ["<UNK>","<PAD>","<EOS>","<GO>"]

  # Add codes to vocab
  for code in codes:
      vocab_to_int[code] = len(vocab_to_int)
      int_to_vocab[len(int_to_vocab)] = code

  #print usage of words in our model and their percent
  usage_ratio = round(len(vocab_to_int) / len(word_counts),4)*100
  print("Total number of unique words:", len(word_counts))
  print("Number of words we will use:", len(vocab_to_int))
  print("Percent of words we will use: {}%".format(usage_ratio))
  print("length vocab_to_int",len(vocab_to_int))
  print("length int_to_vocab",len(int_to_vocab))

  return vocab_to_int,int_to_vocab

#step7
#function to map words with its word embeddings
#if embeddings not found for the word then map it with a random number in
 ↪range(-1.0,1.0)
def word_embedding_index(vocab_to_int,embeddings_index):
  #using 300 for embedding dimensions to match CN's vectors.
```

```python
    embedding_dim = 300
    nb_words = len(vocab_to_int)

    # Create matrix with default values of zero
    word_embedding_matrix = np.zeros((nb_words, embedding_dim), dtype=np.float32)
    for word, i in vocab_to_int.items():
        if word in embeddings_index:
            word_embedding_matrix[i] = embeddings_index[word]
        else:
            # If word not in CN, create a random embedding for it
            new_embedding = np.array(np.random.uniform(-1.0, 1.0, embedding_dim))
            #embeddings_index[word] = new_embedding
            word_embedding_matrix[i] = new_embedding

    # Check if value matches len(vocab_to_int)
    print("length of word embedding matrix",len(word_embedding_matrix))
    return word_embedding_matrix

#step8
#append unk and eos tokens
#if eos is equal to true then append go and eos token at begining and end of
 ↪the summary
#add unknown token for word not found in vocabulary
def convert_to_ints(text,vocab_to_int,eos=False):
    ints = []
    for word in text.split():
        if word in vocab_to_int:
            ints.append(vocab_to_int[word])
        else:
            ints.append(vocab_to_int["<UNK>"])
    if eos:
        ints.insert(0,vocab_to_int["<GO>"])
        ints.insert(len(ints),vocab_to_int["<EOS>"])
    return ints

#step9
#count unknown tokens
def count_unk(text):
    unk=0
    eos=0
    #print(text)
    for value in text:
        if 41413 in value:
            unk+=1
    return unk

#step10
```

```python
def counts(val):
  c=0
  for i in val:
    try:
      if i==41413:
        c+=1
    except:
      pass
  return c


#step11
#remove rows from data frame that dosent staisfy the condition this is done so
 ↪model is trained with proper data
#redundancey is less and input text is accurate
def get_refined_output(df,max_rl,max_sl):
  unk_rl=1 #unknown token review limit
  unk_sl=0 #unknown token summary limit
  min_rl=2 #minimum review length
  #get the total length of reviewText this is used for sorting
  df["total_length"]=df['reviewText'].apply(lambda x: len(x))
  #get reviewText whose length is greater then minimum review length
  df=df[df['reviewText'].apply(lambda x: len(x)>=min_rl)]
  #get reviewText whose length is less than maximum review length
  df=df[df['reviewText'].apply(lambda x: len(x)<=max_rl)]
  #filter out the unknwon tokens based on unknown token reviewText limit
  df=df[df['reviewText'].apply(lambda x: counts(x)<=unk_rl)]
  #get summary whose length is less than maximum summary length
  df=df[df['summary'].apply(lambda x: len(x)<=max_sl)]
  #filter out the unkown tokens based on unkown token summary limit
  df=df[df['summary'].apply(lambda x: counts(x)<=unk_sl)]
  #sort the values in ascending order
  df.sort_values(by=["total_length"],ascending=True,inplace=True)
  #drop unwanted columns
  df.drop(columns=["total_length","word"],inplace=True)
  #reset index
  df.reset_index(drop=True,inplace=True)
  return df


#step12
#function to plot the length of training, validation and testing
def plot_tr_tval_tt_len(xtr,xval,xtt):
  names = ['Training','Validation','Testing']
  values = [len(xtr),len(xval),len(xtt)]
  plt.figure(figsize=(10,5))
  plt.subplot(131)
  plt.
 ↪bar(names,values,color=['darkorange','coral','coral'],edgecolor='darkblue')
```

```python
    plt.suptitle('Categorical Plotting')
    plt.show()

#step13
#function to plot loss and accuracy curves on training and validation set
def plotgraph(history):
  plt.figure(figsize=[8,6])
  plt.plot(history.history['loss'],'firebrick',linewidth=3.0)
  plt.plot(history.history['accuracy'],'turquoise',linewidth=3.0)
  plt.plot(history.history['val_loss'],'midnightblue',linewidth=3.0)
  plt.legend(['Training loss','Training Accuracy','Validation␣
 ↪loss'],fontsize=18)
  plt.xlabel('Epochs',fontsize=16)
  plt.ylabel('Loss and Accuracy',fontsize=16)
  plt.title('Loss Curves and Accuracy Curves for text␣
 ↪summarization',fontsize=16)

#step14
#this function is used to get the preprocessed csv file for our text summarizer
def Get_the_data():
  #lower the string in contractions and convert it into dict
  contractions = dict((k.lower(), v.lower()) for k, v in contraction.items())
  #till this step all data is processed and we get our csv file of cleaned texts
  get_data(contractions)

  #free memory
  del contractions
```

```python
[15]: #step15 is used to call function Get_the_data which get the preprocessed data␣
      ↪and writes it into a csv file
      #Get_the_data()
```

```python
[16]: #step16
      #this function combines all the above ouput generated by the above function in␣
      ↪a proper squence of steps
      def combining_all_steps():

        st=time.time()
        #get the final cleaned data
        df=pd.read_csv('/content/drive/MyDrive/product_reviews.csv')[:180000]
        print("The length of dataset is ",len(df))
        #combine reviewText and summary so common vocabulary can be created by␣
       ↪finding frequent words
        df["word"]=df[['reviewText','summary']].apply(lambda x : '{} {}'.
       ↪format(x[0],x[1]), axis=1)
        #get frequency of words
```

```python
word_counts=pd.Series(np.concatenate([x.split() for x in df.word])).
→value_counts()
word_counts=word_counts.to_dict()
#print(type(word_counts))
print("vocab length",len(word_counts))
#set the threshold
threshold = 20
max_rl=30 #maximum review length
max_sl=8 #maximum summary length
#get the embeddings matrix
embeddings_index= get_embeddings()
#get vocab to index and index to vocab mapping of words
vocab_to_int,int_to_vocab=get_vocab(embeddings_index,word_counts,threshold)
#get word embedding for the words in vocab
word_embedding_matrix=word_embedding_index(vocab_to_int,embeddings_index)
#convert words to integers based on their index positions
df['reviewText'] = df['reviewText'].apply(lambda x:␣
→convert_to_ints(str(x),vocab_to_int,eos=False))
df['summary'] = df[ 'summary'].apply(lambda x:␣
→convert_to_ints(str(x),vocab_to_int,eos=True))
print("after word to index for reviewText",df["reviewText"][0])
print("after word to index for summary",df["summary"][0])
rvunk=count_unk(df["reviewText"])
smunk=count_unk(df["summary"])
print("total number of unk token are",rvunk+smunk)
#apply the filters and get the final preprocessed data
df=get_refined_output(df,max_rl,max_sl)
print("length of dataset that will be used",len(df))
#split data into 75% train, 15% validation and 15% test datasets
␣
→x_tr,x_val,y_tr,y_val=train_test_split(df['reviewText'],df['summary'],test_size=0.
→3,random_state=1,shuffle=True)
x_tt,x_val,y_tt,y_val=train_test_split(x_val,y_val,test_size=0.
→5,random_state=1,shuffle=True)
print("length of split datasets train {}, test {} and validation {}".
→format(len(x_tr),len(x_tt),len(x_val)))
print("Vocabulary Size: {}".format(len(vocab_to_int)))
␣
→print("voc_to_int_",vocab_to_int['<UNK>'],vocab_to_int['<PAD>'],vocab_to_int['<EOS>'])
#reset index
x_tr=x_tr.reset_index()
y_tr=y_tr.reset_index()
x_tt=x_tt.reset_index()
y_tt=y_tt.reset_index()
x_val=x_val.reset_index()
y_val=y_val.reset_index()
```

```python
    #find max lenght just to verfiy the output of get refined function
    #max([len(sentence) for sentence in y_tt["summary"]])
    #pad the reviewText and summary to the specified max length
    xtr=pad_sequences(x_tr["reviewText"], padding='post',maxlen=max_rl,
 value=vocab_to_int["<PAD>"])
    ytr=pad_sequences(y_tr["summary"], padding='post',maxlen=max_sl,
 value=vocab_to_int["<PAD>"])
    xtt=pad_sequences(x_tt["reviewText"], padding='post',maxlen=max_rl,
 value=vocab_to_int["<PAD>"])
    ytt=pad_sequences(y_tt["summary"], padding='post',maxlen=max_sl,
 value=vocab_to_int["<PAD>"])
    xval=pad_sequences(x_val["reviewText"], padding='post',maxlen=max_rl,
 value=vocab_to_int["<PAD>"])
    yval=pad_sequences(y_val["summary"], padding='post',maxlen=max_sl,
 value=vocab_to_int["<PAD>"])
    #find the number of unique tokens in the list
    #flat_list_rt = [item for sublist in df["reviewText"] for item in sublist]
    #flat_list_s = [item for sublist in df["summary"] for item in sublist]
    #rt=len(np.unique(flat_list_rt))
    #st=len(np.unique(flat_list_s))
    #print("number of unique tokens reviewText {} and summary {}".format(rt,st))
    #plot the length of training, validation and testing
    plot_tr_tval_tt_len(xtr,xval,xtt)
    print("total time to complete all the above steps and get final data ",time.
 time()-st)
    #free memory delete values stored in variables which are not required further
    del df,word_counts,embeddings_index,x_tr,x_val,y_tr,y_val,x_tt,y_tt

    return
 xtr,ytr,xtt,ytt,xval,yval,vocab_to_int,int_to_vocab,word_embedding_matrix,max_rl,max_sl
```

```python
#step17
#function to get summary given a sequence
def seq_to_summary(seq,vocab_to_int,int_to_vocab):
    newstring=''
    for i in seq:
        if((i!=0 and i!=vocab_to_int['<GO>']) and i!=vocab_to_int['<EOS>']):
            newstring=newstring+int_to_vocab[i]+' '
    return newstring
```

```python
#step18
#function to get text given a sequence
def seq_to_text(seq,int_to_vocab):
    newstring=''
    for i in seq:
        if(i!=0):
```

```
                newstring=newstring+int_to_vocab[i]+' '
        return newstring
```

```
[19]:  #step19
       #this function get the data for the pretrained model t5small
       def combining_all_steps_t5():
         #get the final cleaned data
         df=pd.read_csv('/content/drive/MyDrive/product_reviews.csv')[:117799]
         print("The length of dataset is ",len(df))

         #set the threshold
         threshold = 20
         max_rl=200 #maximum review length
         max_sl=10 #maximum summary length
         max_rl=200
         max_sl=10

         #get reviewText whose length is less than maximum review length
         df['reviewText']=df['reviewText'].str.slice(0,max_rl)

         #get summary whose length is less than maximum summary length
         df['summary']=df['summary'].str.slice(0,max_rl)

         #split data into 75% train, 15% validation and 15% test datasets
         ␣
       ↪x_tr,x_val,y_tr,y_val=train_test_split(df['reviewText'],df['summary'],test_size=0.
       ↪3,random_state=1,shuffle=True)
         x_tt,x_val,y_tt,y_val=train_test_split(x_val,y_val,test_size=0.
       ↪5,random_state=1,shuffle=True)

         #reset index
         x_tr=x_tr.reset_index()
         y_tr=y_tr.reset_index()
         x_tt=x_tt.reset_index()
         y_tt=y_tt.reset_index()
         x_val=x_val.reset_index()
         y_val=y_val.reset_index()
         print("train {}, val {}, test {}".format(len(x_tr),len(x_val),len(x_tt)))
         return x_tr,y_tr,x_tt,y_tt,x_val,y_val
```

```
[20]:  #step20
       #function to design and evaluate the model
       def␣
       ↪design_model_fit_eval(xtr,ytr,xval,yval,vocab_to_int,word_embedding_matrix,max_rl):
       ↪
         latent_dim = 100
         embedding_dim=300
```

```python
# Encoder
encoder_inputs = Input(shape=(max_rl,))

#embedding layer
enc_emb =  Embedding(len(vocab_to_int),
                     embedding_dim,
                     embeddings_initializer=Constant(word_embedding_matrix),
                     trainable=True)(encoder_inputs)


#encoder lstm 1
encoder_lstm1 =␣
↪LSTM(latent_dim,return_sequences=True,return_state=True,dropout=0.
↪4,recurrent_dropout=0.4)
encoder_output1, state_h1, state_c1 = encoder_lstm1(enc_emb)

#encoder lstm 2
encoder_lstm2=LSTM(latent_dim, return_state=True,␣
↪return_sequences=True,dropout=0.4,recurrent_dropout=0.4)
encoder_outputs, state_h, state_c= encoder_lstm2(encoder_output1)

# Set up the decoder, using `encoder_states` as initial state.
decoder_inputs = Input(shape=(None,))

#embedding layer
dec_emb_layer = Embedding(len(vocab_to_int),
                          embedding_dim,
                          ␣
↪embeddings_initializer=Constant(word_embedding_matrix),
                          trainable=True)

#decoder
dec_emb = dec_emb_layer(decoder_inputs)

decoder_lstm = LSTM(latent_dim, return_sequences=True,␣
↪return_state=True,dropout=0.4,recurrent_dropout=0.2)
decoder_outputs,decoder_fwd_state, decoder_back_state =␣
↪decoder_lstm(dec_emb,initial_state=[state_h, state_c])

# Attention layer
attn_layer = AttentionLayer(name='attention_layer')
attn_out, attn_states = attn_layer([encoder_outputs, decoder_outputs])

# Concat attention input and decoder LSTM output
decoder_concat_input = Concatenate(axis=-1,␣
↪name='concat_layer')([decoder_outputs, attn_out])
```

```python
  #dense layer
  decoder_dense =  TimeDistributed(Dense(len(vocab_to_int),
↪activation='softmax'))
  decoder_outputs = decoder_dense(decoder_concat_input)

  # Define the model
  model = Model([encoder_inputs, decoder_inputs], decoder_outputs)

  #print model summary
  model.summary()

  #compile the model
  opt = Adam(lr=1e-4, decay=1e-4/1)

  model.compile(optimizer=opt, loss='sparse_categorical_crossentropy',
↪metrics=['accuracy'])
  #reduce_lr method is used to reduce the learning rate if the learning rate is
↪stagnant or if there are no major improvements in training
  reduce_lr = ReduceLROnPlateau(monitor='val_loss', factor=0.2,
                                patience=5, min_lr=0.001)
  #early stopping condition
  es = EarlyStopping(monitor='loss', mode='min', verbose=1,patience=5)

  st=time.time()

  #fit te model
  history=model.fit([xtr,ytr[:,:-1]], ytr.reshape(ytr.shape[0],ytr.shape[1],
↪1)[:,1:],
                    epochs=5,callbacks=[es,reduce_lr],batch_size=128,
                    validation_data=([xval,yval[:,:-1]], yval.reshape(yval.
↪shape[0],yval.shape[1], 1)[:,1:]),
                    workers=50,
                    use_multiprocessing=True,
                    verbose=1)

  #plot loss and accuracy curves
  plotgraph(history)
  print("total time required for training ",time.time()-st)
  return encoder_inputs,encoder_outputs, state_h,
↪state_c,decoder_inputs,decoder_lstm,attn_layer,decoder_dense,dec_emb_layer
```

```python
[21]: #step21
      #design of inference function
      def design_inference(encoder_inputs,encoder_outputs, state_h,
      ↪state_c,decoder_inputs,decoder_lstm,attn_layer,decoder_dense,max_rl,dec_emb_layer):
      ↪
```

```python
#latent dimension
latent_dim = 100

#encode the input sequence to get the feature vector
encoder_model = Model(inputs=encoder_inputs,outputs=[encoder_outputs,
↪state_h, state_c])

#decoder setup
#below tensors will hold the states of the previous time step
decoder_state_input_h = Input(shape=(latent_dim,))
decoder_state_input_c = Input(shape=(latent_dim,))
decoder_hidden_state_input = Input(shape=(max_rl,latent_dim))

#get the embeddings of the decoder sequence
dec_emb2= dec_emb_layer(decoder_inputs)
#to predict the next word in the sequence, set the initial states to the
↪states from the previous time step
decoder_outputs2, state_h2, state_c2 = decoder_lstm(dec_emb2,
↪initial_state=[decoder_state_input_h, decoder_state_input_c])

#attention inference
attn_out_inf, attn_states_inf = attn_layer([decoder_hidden_state_input,
↪decoder_outputs2])
decoder_inf_concat = Concatenate(axis=-1, name='concat')([decoder_outputs2,
↪attn_out_inf])

#a dense softmax layer to generate prob dist. over the target vocabulary
decoder_outputs2 = decoder_dense(decoder_inf_concat)

#final decoder model
decoder_model = Model([decoder_inputs] +
↪[decoder_hidden_state_input,decoder_state_input_h, decoder_state_input_c],
                      [decoder_outputs2] + [state_h2, state_c2])

return encoder_model,decoder_model
```

```python
[26]: #step22
#fucntion to get the decoded squence for the given review
def
↪decode_sequence(input_seq,encoder_model,decoder_model,vocab_to_int,int_to_vocab,max_sl):
↪
  # Encode the input as state vectors.
    e_out, e_h, e_c = encoder_model.predict(input_seq,workers=50,
↪use_multiprocessing=True)

    # Generate empty target sequence of length 1.
```

```python
    target_seq = np.zeros((1,1))

    # Populate the first word of target sequence with the start word.
    target_seq[0, 0] = vocab_to_int['<GO>']

    stop_condition = False
    decoded_sentence = ''
    while not stop_condition:

        output_tokens, h, c = decoder_model.predict([target_seq] + [e_out, e_h,
→e_c],

                                                     
→workers=50,use_multiprocessing=True)

        # Sample a token
        sampled_token_index = np.argmax(output_tokens[0, -1, :])
        sampled_token = int_to_vocab[sampled_token_index]

        if(sampled_token!='<EOS>'):
            decoded_sentence += ' '+sampled_token

        # Exit condition: either hit max length or find stop word.
        if (sampled_token == '<EOS>'  or len(decoded_sentence.split()) >=
→(max_sl-1)):
            stop_condition = True

        # Update the target sequence (of length 1).
        target_seq = np.zeros((1,1))
        target_seq[0, 0] = sampled_token_index

        # Update internal states
        e_h, e_c = h, c

    return decoded_sentence
```

```python
[27]: #step23
      #this function is used to get the score for LSTM scratch model designed and
      →puts output in a txt file
      def
      →test_scratch(xtt,ytt,int_to_vocab,vocab_to_int,encoder_model,decoder_model,max_sl,max_rl):
      →
       st=time.time()
       predictions = []
       real_og=[]
       pred_op=[]
       c=0
       b=50
```

```python
    for i in range(0,len(xtt)):
      #review
      review=seq_to_text(xtt[i],int_to_vocab)
      review=review.replace("<PAD>",'')
      #original summary
      og_summary=seq_to_summary(ytt[i],vocab_to_int,int_to_vocab)
      og_summary=og_summary.replace("<PAD>",'')
      real_og.append(str(og_summary))
      #predicted summary
      predict_summary=decode_sequence(xtt[i].
 reshape(1,max_rl),encoder_model,decoder_model,vocab_to_int,int_to_vocab,max_sl)
      predict_summary=predict_summary.replace("<PAD>",'')
      pred_op.append(str(predict_summary))
      #write to a text file name review_og_pred.txt
      predictions.append("review:"+review+"\t"+"orignal:
 "+og_summary+"\t"+"predicted:"+predict_summary+"\n")
      if c>b:
        print("Review: {}".format(review))
        print("Original Summary: {}".format(og_summary))
        print("Predicted Summary: {}".format(predict_summary))
        b+=b
      c+=1

    print("total time to complete {}".format(time.time()-st))
    file = open("/content/drive/MyDrive/LSTMscore.txt","w")
    file.writelines(predictions)
    file.close()

    bleu=compute_bleu(real_og,pred_op, max_order=4,smooth=False)
    rougen=rouge_n(pred_op, real_og, n=2)
    ro=rouge(pred_op, real_og)

    print("bleu, precisions, bp, ratio, translation_length,
 reference_length",bleu)
    print("rouge2",rougen)
    print("rouge",ro)
```

```python
[28]: #step24
      def lstmmodel():
        #this the model designed by me for text summarization
        st=time.time()
        #get the data

 xtr,ytr,xtt,ytt,xval,yval,vocab_to_int,int_to_vocab,word_embedding_matrix,max_rl,max_sl=com
        #call the model
        encoder_inputs,encoder_outputs, state_h,
 state_c,decoder_inputs,decoder_lstm,attn_layer,decoder_dense,dec_emb_layer=design_model_fit
```

```
    #get the inference output
    encoder_model,decoder_model=design_inference(encoder_inputs,encoder_outputs,
 ↪state_h,
 ↪state_c,decoder_inputs,decoder_lstm,attn_layer,decoder_dense,max_rl,dec_emb_layer)
    #call test

 ↪
 ↪test_scratch(xtt,ytt,int_to_vocab,vocab_to_int,encoder_model,decoder_model,max_sl,max_rl)
    print("total time required for completing whole process ",time.time()-st)
```

[29]:
```
lstmmodel()
```

```
The length of dataset is  180000
vocab length 68861
Word embeddings: 516783
Number of words missing from word_embeddings: 728
Percent of words that are missing from our vocabulary: 1.06%
Total number of unique words: 68861
Number of words we will use: 37429
Percent of words we will use: 54.35%
length vocab_to_int 37429
length int_to_vocab 37429
length of word embedding matrix 37429
after word to index for reviewText [0, 3923, 0, 17, 12, 119, 278, 209, 79, 905,
3923, 1534]
after word to index for summary [37428, 0, 3923, 70, 1153, 565, 37427]
total number of unk token are 0
length of dataset that will be used 121888
length of split datasets train 85321, test 18283 and validation 18284
Vocabulary Size: 37429
voc_to_int_ 37425 37426 37427
```
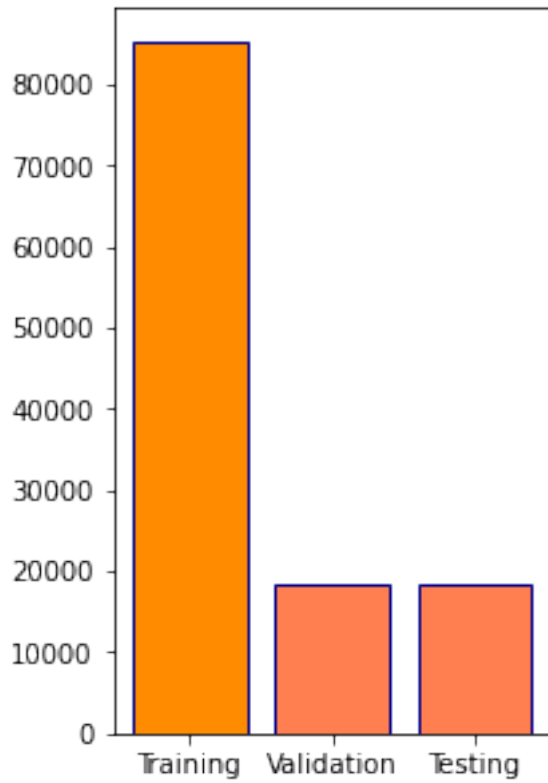
total time to complete all the above steps and get final data 52.91390347480774
Model: "model"

```
----------------------------------------------------------------------------
-------------------
Layer (type)                  Output Shape            Param #     Connected to
============================================================================
==================
input_1 (InputLayer)          [(None, 30)]            0
----------------------------------------------------------------------------
-------------------
embedding (Embedding)         (None, 30, 300)         11228700    input_1[0][0]
----------------------------------------------------------------------------
-------------------
input_2 (InputLayer)          [(None, None)]          0
----------------------------------------------------------------------------
-------------------
lstm (LSTM)                   [(None, 30, 100), (N    160400      embedding[0][0]
----------------------------------------------------------------------------
-------------------
```

```
embedding_1 (Embedding)        (None, None, 300)    11228700    input_2[0][0]
----------------------------------------------------------------------------
------------------
lstm_1 (LSTM)                  [(None, 30, 100), (N  80400      lstm[0][0]
----------------------------------------------------------------------------
------------------
lstm_2 (LSTM)                  [(None, None, 100),   160400
embedding_1[0][0]
                                                                lstm_1[0][1]
                                                                lstm_1[0][2]
----------------------------------------------------------------------------
------------------
attention_layer (AttentionLayer ((None, None, 100),  20100      lstm_1[0][0]
                                                                lstm_2[0][0]
----------------------------------------------------------------------------
------------------
concat_layer (Concatenate)     (None, None, 200)     0          lstm_2[0][0]
attention_layer[0][0]
----------------------------------------------------------------------------
------------------
time_distributed (TimeDistribut (None, None, 37429)  7523229
concat_layer[0][0]
============================================================================
==================
Total params: 30,401,929
Trainable params: 30,401,929
Non-trainable params: 0
----------------------------------------------------------------------------
------------------
Epoch 1/5
667/667 [==============================] - 929s 1s/step - loss: 6.5747 -
accuracy: 0.4502 - val_loss: 2.9637 - val_accuracy: 0.5927
Epoch 2/5
667/667 [==============================] - 915s 1s/step - loss: 2.8853 -
accuracy: 0.5949 - val_loss: 2.7642 - val_accuracy: 0.6092
Epoch 3/5
667/667 [==============================] - 927s 1s/step - loss: 2.7085 -
accuracy: 0.6099 - val_loss: 2.6712 - val_accuracy: 0.6092
Epoch 4/5
667/667 [==============================] - 914s 1s/step - loss: 2.6321 -
accuracy: 0.6092 - val_loss: 2.6169 - val_accuracy: 0.6093
Epoch 5/5
667/667 [==============================] - 917s 1s/step - loss: 2.5702 -
accuracy: 0.6102 - val_loss: 2.5774 - val_accuracy: 0.6098
total time required for training  4603.201342821121
Review: like champion brand tee lives buy pink pretty
Original Summary: good product
Predicted Summary:  great
```

Review: couple years works buy wears love fact wrist
Original Summary: product
Predicted Summary: great
Review: hat came perfect condition fit husband head perfectly muss fuss totally
worth price buy recommend highly
Original Summary: buy
Predicted Summary: great
Review: hard 34 training bras 34 pre teen trick modest options local stores
Original Summary: comfortable and modest
Predicted Summary: great
Review: good watch price order problem box perfect conditions
Original Summary: good
Predicted Summary: great
Review: cute cute cute ozone women petunia pomme soleil socks orange size pricey
good socks cute design christmas stocking stuffers ~
Original Summary: cute cute cute
Predicted Summary: great
Review: shirt feels dries quickly hold odor outside extreme heat hours
Original Summary: shirt
Predicted Summary: great
Review: bought kid fits material good price
Original Summary: love them
Predicted Summary: great
Review: christmas gift hubby mentioned new wallet going needed loves fits things
manner previous rf shielding added bonus quality material nice buy seller
Original Summary: perfect
Predicted Summary: great
total time to complete 3048.544232606888
bleu, precisions, bp, ratio, translation_length, reference_length (0.0,
[0.6355175117139784, 0.0, 0.0, 0.0], 1.0, 6.0, 109698, 18283)
rouge2 (0.0, 0.0, 0.0)
rouge {'rouge_1/f_score': 0.3724505936269943, 'rouge_1/r_score':
0.3158804822590853, 'rouge_1/p_score': 0.5, 'rouge_2/f_score': 0.0,
'rouge_2/r_score': 0.0, 'rouge_2/p_score': 0.0, 'rouge_l/f_score':
0.1547598230525738, 'rouge_l/r_score': 0.1461033278377259, 'rouge_l/p_score':
0.5}
total time required for completing whole process 7712.268606901169

Loss Curves and Accuracy Curves for text summarization
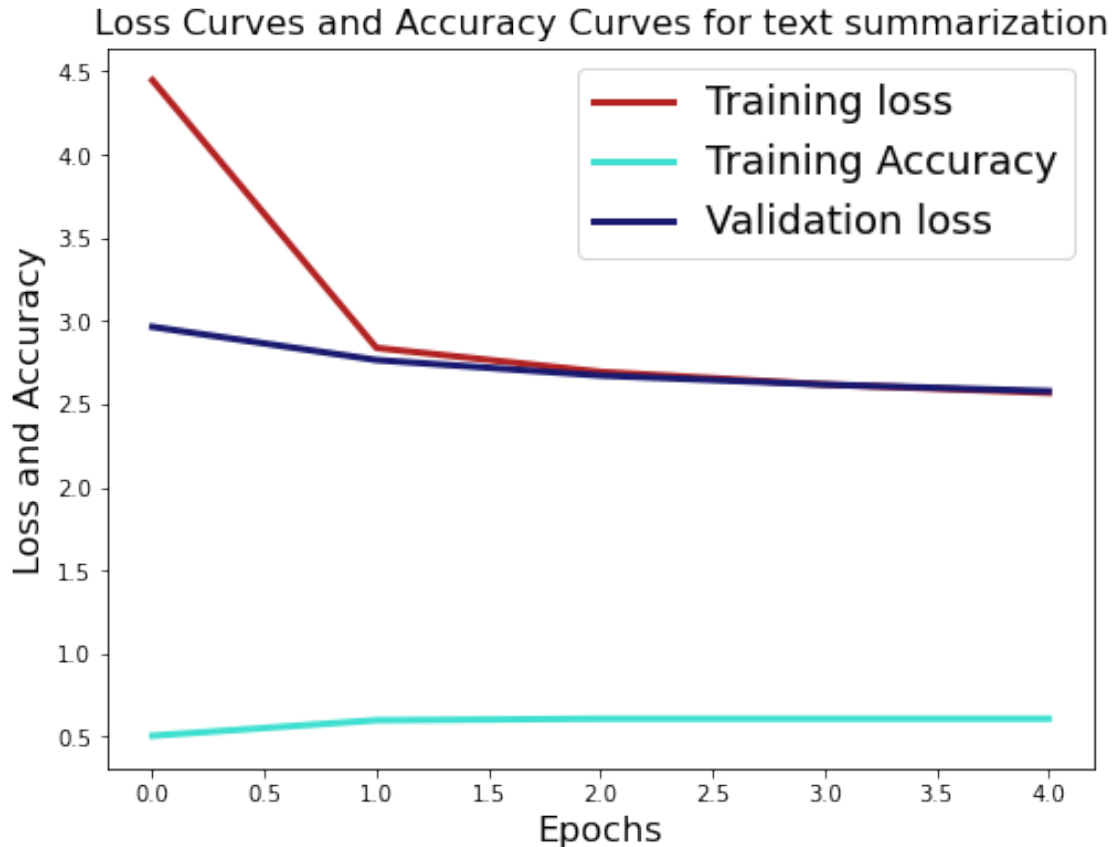
```
[ ]: #summary using T5small pretrained model
```

```
[ ]: #step26
     #function is used to return the loss
     def step(inputs_ids, attention_mask, y, pad_token_id, model):
       y_ids = y[:, :-1].contiguous()
       lm_labels = y[:, 1:].clone()
       lm_labels[y[:, 1:] == pad_token_id] = -100
       output = model(inputs_ids, attention_mask=attention_mask,␣
     ↪decoder_input_ids=y_ids, lm_labels=lm_labels)
       # loss
       return output[0]
```

```
[ ]: #step25
     #this function is used to train the pretrained t5small model
     def t5train(train_loader,val_loader,pad_token_id,model,EPOCHS,log_interval):
       #initialize empty list for train_loss and val_loss
       train_loss = []
       val_loss = []
       #optimizer
```

```python
    optimizer = torch.optim.Adam(model.parameters(),lr=1e-4, weight_decay=1e-4/25)
    #iterate for number of epochs
    for epoch in range(EPOCHS):
      model.train()
      #start time
      start_time = time.time()
      #for data in train_loader train the model
      for i, (inputs_ids, attention_mask, y) in enumerate(train_loader):
        inputs_ids = inputs_ids.to(device)
        attention_mask = attention_mask.to(device)
        y = y.to(device)

        optimizer.zero_grad()
        loss = step(inputs_ids, attention_mask, y, pad_token_id, model)
        train_loss.append(loss.item())
        loss.backward()
        torch.nn.utils.clip_grad_norm_(model.parameters(), 0.5)
        optimizer.step()

        if (i + 1) % log_interval == 0:
          with torch.no_grad():
            x, x_mask, y = next(iter(val_loader))
            x = x.to(device)
            x_mask = x_mask.to(device)
            y = y.to(device)

            v_loss = step(x, x_mask, y, pad_token_id, model)
            v_loss = v_loss.item()

            elapsed = time.time() - start_time
            print('| epoch {:3d} | [{:5d}/{:5d}] | '
                    'ms/batch {:5.2f} | '
                    'loss {:5.2f} | val loss {:5.2f}'.format(
                      epoch, i, len(train_loader),
                      elapsed * 1000 / log_interval,
                      loss.item(), v_loss))
            start_time = time.time()
            val_loss.append(v_loss)

    return model
```

```python
#step26
#function to test the model it writes original and predicted summary in txt file
def testT5(model,tokenizer,test_loader):
  #intialize the empty lists
  predictions = []
  real_og=[]
```

```python
    pred_op=[]
    #for data in test loader
    for i, (input_ids, attention_mask, y) in enumerate(test_loader):
      input_ids = input_ids.to(device)
      attention_mask = attention_mask.to(device)
      y = y.to(device)
      #generate summaries
      #store real and predicted summary in a list and write in txt file
      summaries = model.generate(input_ids=input_ids,␣
 ↪attention_mask=attention_mask,max_length=10)
      pred = [tokenizer.decode(g, skip_special_tokens=True,␣
 ↪clean_up_tokenization_spaces=False) for g in summaries]
      real = [tokenizer.decode(g, skip_special_tokens=True,␣
 ↪clean_up_tokenization_spaces=False) for g in y]
      for pred_sent, real_sent in zip(pred, real):
        print("Original: {}".format(real_sent))
        print("Predicted: {}".format(pred_sent))
        print("\n")
        real_og.append(real_sent)
        pred_op.append(pred_sent)
        predictions.append(str("pred sentence: " + pred_sent + "\t\t real␣
 ↪sentence: " + real_sent+"\n"))

    file1 = open("/content/drive/MyDrive/TFIVE.txt","w")
    file1.writelines(predictions)
    file1.close()
    #calculate scores
    bleu=compute_bleu(real_og,pred_op, max_order=4,smooth=False)
    rougen=rouge_n(pred_op, real_og, n=2)
    ro=rouge(pred_op, real_og)

    print("bleu, precisions, bp, ratio, translation_length,␣
 ↪reference_length",bleu)
    print("rouge2",rougen)
    print("rouge",ro)
```

```python
[ ]: #step27
     #fucntion to get the data and call all the functions in a squence
     def tf5token():
       class MyDataset(torch.utils.data.Dataset):
         def __init__(self, articles, highlights):
           self.x = articles
           self.y = highlights

         def __getitem__(self,index):
           x = tokenizer.encode_plus(model.config.prefix + str(self.x[index]),␣
 ↪max_length=200, return_tensors="pt", pad_to_max_length=True)
```

```python
        y = tokenizer.encode(str(self.y[index]), max_length=10,␣
→return_tensors="pt", pad_to_max_length=True)
        return x['input_ids'].view(-1), x['attention_mask'].view(-1), y.view(-1)

    def __len__(self):
        return len(self.x)

#get the data
x_tr,y_tr,x_tt,y_tt,x_val,y_val=combining_all_steps_t5()
BATCH_SIZE = 128
SHUFFEL_SIZE = 1024
EPOCHS = 10
log_interval = 200
#get the pretrained model t5-small
tokenizer = T5Tokenizer.from_pretrained('t5-small')
model = T5ForConditionalGeneration.from_pretrained('t5-small').to(device)

task_specific_params = model.config.task_specific_params
if task_specific_params is not None:
    model.config.update(task_specific_params.get("summarization", {}))

#create train,test and validation datasets
train_ds = MyDataset(x_tr["reviewText"],y_tr["summary"])
val_ds = MyDataset(x_val["reviewText"],y_val["summary"])
test_ds = MyDataset(x_tt["reviewText"],y_tt["summary"])

train_loader = torch.utils.data.DataLoader(train_ds, batch_size=BATCH_SIZE)
val_loader = torch.utils.data.DataLoader(val_ds, batch_size=BATCH_SIZE)
test_loader = torch.utils.data.DataLoader(test_ds, batch_size=BATCH_SIZE)

x, x_mask, y = next(iter(val_loader))
print(x.shape, x_mask.shape, y.shape)
pad_token_id = tokenizer.pad_token_id

#call the train function
model=t5train(train_loader,val_loader,pad_token_id,model,EPOCHS,log_interval)
#call the test function
testT5(model,tokenizer,test_loader)
```

```
[ ]: tf5token()
```

Streaming output truncated to the last 5000 lines.

Original: my favorite pants
Predicted: i love these

28

Original: great everyday gym bag
Predicted: good bag for gym

Original: too small
Predicted: i thought it

Original: good skivvies
Predicted: tucks

Original: purple cactu basketball shoes
Predicted: i love these

Original: boooooo not like they used to be
Predicted: t shirts

Original: pleasantly surprised
Predicted: katarin

Original: gift purchase
Predicted: my sister loved these

Original: awesome summer suns
Predicted: ray ban

Original: score one for the boyfriend
Predicted: i love these

Original: good buy
Predicted: for a good

Original: built like a tank wont break the bank
Predicted: it has it is

Original: slight changes in manufacture and still and excellent product
Predicted: slight change in texture

```
Original: love these shoes
Predicted: i love these


Original: this is my favorite purse
Predicted: a great purse


Original: best crew socks
Predicted: i love these


Original: back pack
Predicted: sexy


Original: thick soft good quality
Predicted: socks are a


Original: good value
Predicted: iwth


Original: hard to find shoes
Predicted: great price for the


Original: wears out quickly
Predicted: i do not


Original: i love them
Predicted: i like them


Original: great idea
Predicted: i love these


Original: good quality tee but the material
Predicted: tee


Original: cute and comfy
Predicted: shoes look nicer
```

```
Original: functional but not ornate
Predicted: a mask for


Original: fits skinny not tight
Predicted: leotard


Original: bogs are the best
Predicted: i love these


Original: will buy again
Predicted: hubby s


Original: bad buckle
Predicted: flip backwards


Original: not that great
Predicted: i like it


Original: expensive but good
Predicted: makes a great


Original: decent
Predicted: a little expensive


Original: really nice shoes comfortable great fit
Predicted: i quit buying


Original: great toy
Predicted: great toy for


Original: nice clog
Predicted: clogs


Original: nice but not as nice as the prior generation
Predicted: i like it
```

```
Original: wigwam men s at wort
Predicted: good socks for work


Original: cute design does not pinch chubby
Predicted: iplays


Original: comfy tight
Predicted: airy feet are


Original: great watch for kids or even adults beautiful feminine watch
Predicted: a great watch


Original: fine product
Predicted: dowdy


Original: beautiful necklace
Predicted: i love it


Original: love them
Predicted: asics


Original: little narrow
Predicted: a little narrow


Original: carhartt is just good stuff
Predicted: carhartt coat


Original: normal
Predicted: a little bulk


Original: good product
Predicted: i liked it


Original: cotton polo standard issues
Predicted: a pol
```

Original: i love it
Predicted: the right fit and

Original: good buy
Predicted: sexy

Original: love these sandals
Predicted: fettish fit

Original: great fit
Predicted: a gift for

Original: handy little lock
Predicted: heavy cable threads

Original: great except for the leather strap
Predicted: watch for the price

Original: comfy keen
Predicted: keen sa

Original: the hood cant be removed or put in
Predicted: the hood is

Original: work well easy to use
Predicted: crouching

Original: booty shorts
Predicted: sexy

Original: birkenstocks last
Predicted: birks

Original: probably of good quality but too small for daily use
Predicted: i liked it

```
Original: good value spring jacket
Predicted: nice jacket for the


Original: perfect for blocking sun and keeping dirt off
Predicted: i like it


Original: love
Predicted: i love these


Original: they look good
Predicted: the best belt


Original: great pair of working pant
Predicted: dickies


Original: beautiful and match everything
Predicted: i love these


Original: pretty cool shorts
Predicted: sucks


Original: awesome
Predicted: scotl


Original: love
Predicted: love these house slip


Original: beautiful but size up
Predicted: i love this


Original: great price for a really classy shoe
Predicted: i love these


Original: a bit big
Predicted: a bit big
```

```
Original: can also be used as swimming trunks
Predicted: a bit tight


Original: playtime
Predicted: wigs are


Original: see it from both ways
Predicted: i love it


Original: what a comfortable and attractive shoe
Predicted: easy to get compliment


Original: great gift to self
Predicted: sexy


Original: warm pants nice and warm
Predicted: stepdads are


Original: great for display and fun
Predicted: i love this


Original: definitely a convert
Predicted: i am not


Original: recommend it
Predicted: i like the


Original: disapointed
Predicted: a great watch


Original: bermuda
Predicted: great travells


Original: nice belt for the money
Predicted: good quality belt for
```

```
Original: these are my favorites
Predicted: v panties


Original: very comfortable with good support
Predicted: i like it


Original: style for my little guy
Predicted: sexy


Original: well worth it
Predicted: i love these


Original: love
Predicted: i love it


Original: perfect
Predicted: comfortable and light weight


Original: iacute tem purchased as expected
Predicted: i love it


Original: wow
Predicted: i love it


Original: absolutly beautiful i love it
Predicted: ring for the


Original: the arch support the arch support the arch support
Predicted: crocs


Original: why pay full price
Predicted: kohl is the


Original: beautiful watch
Predicted: i love it
```

```
Original: lovely
Predicted: i love this


Original: great costume
Predicted: a great costume


Original: ellegant
Predicted: buy this item for


Original: too small
Predicted: great bagga


Original: my baby
Predicted: i love this


Original: love it
Predicted: good quality and quality


Original: comfortable
Predicted: sneaker is great


Original: excellent bought two
Predicted: i do not


Original: not enough arch support
Predicted: the arches are


Original: real cool
Predicted: it has it is


Original: fits great
Predicted: 2 suits are great


Original: like em but not very comfy
Predicted: i love these
```

Original: love it
Predicted: i love this

Original: good walking shoe
Predicted: nb

Original: so adorable
Predicted: my granddaughter loves these

Original: good undershirts
Predicted: i love these

Original: impressive unique watch
Predicted: nut watch for

Original: disapointed
Predicted: i like them

Original: best i have tried
Predicted: i love these

Original: batgirl
Predicted: costume for my daughter

Original: pretty yellow jacket
Predicted: i like it

Original: cute
Predicted: cute hat but

Original: nice boots
Predicted: i love this

Original: love the sandal
Predicted: sizing is

```
Original: looks good too but easy to scratch
Predicted: watch for the price


Original: muy buenos
Predicted: muy bue


Original: true to its size
Predicted: size is a


Original: christmas gift
Predicted: gift for cowork


Original: best sports watch i have had
Predicted: watch for a


Original: brightness by the sun
Predicted: man s watch


Original: typical gold toe quality
Predicted: socks


Original: night night
Predicted: lite silky


Original: he said i needed it
Predicted: rich steve


Original: size runs large for an asian guy
Predicted: i ordered small


Original: run large
Predicted: shoes ran a


Original: converse converse chuck tay
Predicted: his son is happy
```

```
Original: ok
Predicted: comodas


Original: nike slides for my granddaughter
Predicted: fpor


Original: crocs but different
Predicted: crocs


Original: excellent
Predicted: flip flops


Original: hat not like photo
Predicted: good looking hat


Original: toe socks he squealed
Predicted: squea


Original: cozy
Predicted: i love these


Original: cleverly done
Predicted: neice


Original: polyu watch
Predicted: plastic watch crystals


Original: nice boot good price
Predicted: good for the price


Original: too gawdy
Predicted: the picture is


Original: great
Predicted: i love it
```

```
Original: runs large
Predicted: flats run small


Original: surprisingly comfortable and beautiful color
Predicted: i am not


Original: rjm
Predicted: compression is too small


Original: perfect pants
Predicted: i love these


Original: correct size means good fit
Predicted: i love this


Original: nice
Predicted: shopper


Original: sketchers are dependable
Predicted: sketchers shoes are


Original: i love it
Predicted: love the size and


Original: three stars
Predicted: the pins break


Original: runs small
Predicted: bust runs small


Original: way too tight
Predicted: a little


Original: breakfast at tiffanny s
Predicted: tiffanny
```

Original: belt
Predicted: cwc

Original: have been using it for a long time
Predicted: i did not

Original: just what i wanted
Predicted: roaring 20

Original: elegant crystal ring dish
Predicted: ring holders are

Original: exactly as shown
Predicted: the ring looks

Original: my wife s is incredible for the price
Predicted: i bought this

Original: great fit
Predicted: a bit tight

Original: watch did not last a long time
Predicted: lasted a

Original: red gloves for christmas
Predicted: a gift for

Original: great clasps
Predicted: earrings

Original: playtex front close bra
Predicted: 84 year old

Original: comfy and firm
Predicted: i love it

```
Original: fantastic lasted years
Predicted: one size fits all


Original: my secret
Predicted: easy to find and


Original: cute
Predicted: i guess it


Original: a keeper i would buy more
Predicted: good bra for the


Original: vry narrow and flimsy
Predicted: flims


Original: nice sunglasses but a bit small
Predicted: ray bans


Original: just great
Predicted: i like these


Original: too close fitting
Predicted: work camisole


Original: great shoes
Predicted: sizing down


Original: if i had gotten a packing
Predicted: packing slips are


Original: love it
Predicted: i bought this


Original: excellent for travel
Predicted: perfect for a
```

```
Original: nice watch
Predicted: i love this


Original: very nice and comfortable
Predicted: sling shoes


Original: great quality
Predicted: i love it


Original: good shoe
Predicted: husband loves these shoes


Original: the sizes are terribly inaccurate
Predicted: sock is


Original: very good
Predicted: sun glasses for kid


Original: comfy flip flops
Predicted: havaiana


Original: fine product not for passport
Predicted: i like the


Original: very pretty
Predicted: sexy


Original: comfortable fabulous
Predicted: for 40dd


Original: very nice first jewelry box
Predicted: a gift for


Original: only jockey for me from here on
Predicted: hanes underwear
```

```
Original: nice shirt
Predicted: junior polo


Original: lighter than it looks
Predicted: a little big


Original: solid product
Predicted: pricey crystal crystal


Original: great extended size socks
Predicted: i love these


Original: fits and looks nice
Predicted: a little small


Original: size on the box reflects true size of socks
Predicted: great socks great material


Original: beautiful
Predicted: ring is big


Original: this bra is amazing
Predicted: ordered a size


Original: a nice sturdy pair of britches
Predicted: pair of bri


Original: nice and worm
Predicted: pair of socks for


Original: reebok easytone
Predicted: easytones are


Original: love them
Predicted: tao
```

```
Original: i love it
Predicted: ggifts


Original: shawl
Predicted: sexy


Original: i will buy again
Predicted: large runs small but


Original: seems big and straps are far too wide
Predicted: a little big


Original: way too small
Predicted: crotch


Original: definitely worth it
Predicted: i wear these


Original: size up
Predicted: the strap is screw


Original: expensive but worth it
Predicted: soooo expensive


Original: leopard gloves
Predicted: bkack


Original: gorgeous earrings
Predicted: omg


Original: comfort comfort comfort
Predicted: i am not


Original: good shoe
Predicted: the leather gets dirty
```

```
Original: adorable shoes
Predicted: sexy


Original: ugh beautiful
Predicted: winter boot i


Original: too hard and too large
Predicted: sizing is


Original: winner
Predicted: kohls


Original: nice
Predicted: old style robe


Original: cant go wrong with ariat
Predicted: ariat rope


Original: daughter loves them as always you pay for
Predicted: my daughter loves them


Original: great shoe
Predicted: i love them


Original: great fit
Predicted: hunch


Original: comfortable
Predicted: i like it


Original: good stuff
Predicted: the 3rd


Original: not well fitted on top
Predicted: i like the
```

```
Original: i love this scrub top
Predicted: the best scrubs


Original: might be switching my brand
Predicted: levi s


Original: fantastic
Predicted: i lost my


Original: what has what is up with the tag thing on
Predicted: i was surprised


Original: great fit sock
Predicted: enjop


Original: anklets for every day
Predicted: nike


Original: good value
Predicted: armitron watch


Original: just what i needed
Predicted: i love this


Original: this does exactly what it says i use this
Predicted: i am


Original: they are great
Predicted: i was


Original: get what you pay for
Predicted: i like the


Original: granddaughter gives two thumbs up
Predicted: sexy
```

Original: sold my soul to the devil
Predicted: i love it

Original: love it
Predicted: the best timex

Original: just cool
Predicted: a great watch

Original: shrunk too short
Predicted: russell x

Original: timex kids lizard watch
Predicted: a great watch

Original: dainty circles
Predicted: smallish earrings da

Original: review was wrong
Predicted: i do not

Original: i shall i will beat this one up
Predicted: great watch for the

Original: the ultimate in cool
Predicted: ray ban

Original: keep your expectations high girls
Predicted: a plus size

Original: love them
Predicted: i love these

Original: timex watch
Predicted: a great watch

```
Original: works boot cut jeans
Predicted: long lasting levi


Original: great purchase
Predicted: w 6 4


Original: very cute wedge
Predicted: striking wedge sandals


Original: cute
Predicted: i love these


Original: perfect gift
Predicted: great gift for my


Original: great gift idea
Predicted: a great gift


Original: i love love love love it
Predicted: boobs


Original: quality matches the cheap price
Predicted: cheap for the price


Original: good
Predicted: i like the


Original: inexpensive but really great
Predicted: it works great for


Original: comfortable attractive reasonably supportive for smaller sizes
Predicted: i love it


Original: durable but not skid proof
Predicted: shoe i liked
```

```
Original: oh thank goodness
Predicted: love these slippers


Original: nice wallet soft leather
Predicted: the wallet is


Original: the basic cube indispensable
Predicted: eagle


Original: love them
Predicted: i love these


Original: not soft
Predicted: a little disappointed


Original: comfortable cool sandal
Predicted: i love these


Original: no support not very cushiony
Predicted: slippers are great


Original: love them
Predicted: i wear these


Original: needed for swollen feet
Predicted: sizing is


Original: so so
Predicted: i love these


Original: uniboob
Predicted: boob support


Original: excellent watch only missing one thing
Predicted: i love this
```

```
Original: nice little travel bag
Predicted: leather travel bag great


Original: pretty good
Predicted: a little loose


Original: rain poncho
Predicted: great for travel but


Original: butterfly necklace
Predicted: my granddaughter loves it


Original: good bra
Predicted: good for larger chest


Original: love them
Predicted: pair i have


Original: great socks
Predicted: good fit good price


Original: great costume
Predicted: i love it


Original: love em
Predicted: t shirts


Original: cuter in person
Predicted: i love them


Original: better but not great
Predicted: men s under


Original: good quality
Predicted: a good shoe
```

```
Original: cool
Predicted: crooked


Original: love the quality of levis jeans and its very
Predicted: i love le


Original: disappointed
Predicted: i love these


Original: 14 long just barely
Predicted: 5 10 34 long


Original: thick comfy
Predicted: i love these


Original: still working
Predicted: ben winder


Original: best jeans i have ever come acrossed
Predicted: wrangler


Original: perfect
Predicted: sizing is


Original: love love
Predicted: i love these


Original: george gge
Predicted: the wife loves them


Original: great belt buckle at a great price
Predicted: i love it


Original: butterfly necklace
Predicted: i love this
```

```
Original: great pants
Predicted: good quality pants for


Original: perfect
Predicted: i love these


Original: great quality runs a little small
Predicted: i love this


Original: really thin material
Predicted: a must have


Original: happy feet
Predicted: i love these


Original: after 1 use it has paid for itself
Predicted: i like it


Original: platinum for sure
Predicted: a nice watch


Original: good
Predicted: i got it


Original: great fit
Predicted: sexy


Original: pretty but not structured well
Predicted: i love this


Original: jockey always makes the men happy
Predicted: men s joc


Original: great pouch
Predicted: loose 22lr
```

```
Original: nice
Predicted: a great watch


Original: the waistband rolls down
Predicted: my waistband runs


Original: pretty and perfect
Predicted: bridesmaid


Original: perfect
Predicted: clingy


Original: perfect size hoop
Predicted: oversized oversized


Original: high quality loose fit and i love the pocket
Predicted: new favorite brand of


Original: crunchy dress
Predicted: i did not


Original: great bang for the buck
Predicted: 8926a


Original: feel good
Predicted: recieve


Original: sizing is just bad these boots are just
Predicted: merrell bate


Original: good fit nice material
Predicted: i love it


Original: horrible stitching in the neck band
Predicted: overly picky
```

```
Original: sorel men s caribou buff
Predicted: i love them


Original: belt
Predicted: good quality leather weave


Original: great value
Predicted: i ordered


Original: best bra for now
Predicted: i love play


Original: nice
Predicted: a nice addition


Original: backpackers watch
Predicted: a great watch


Original: wonderful strap nice dial and number stand out
Predicted: i love this


Original: as expected
Predicted: a bit tight


Original: great
Predicted: i love this


Original: very small
Predicted: dantee


Original: love these
Predicted: i wear it


Original: two small
Predicted: i like it
```

```
Original: soft comfy very lightweight
Predicted: easy spirit s


Original: pointy
Predicted: large breasted


Original: 5 stars for great socks to work out in
Predicted: i love these


Original: good fabric
Predicted: nice shirt but not


Original: exactly as i had hoped
Predicted: i wish


Original: good so times two
Predicted: i love these


Original: wow is it durable
Predicted: a good watch


Original: great robe
Predicted: 6ft 3


Original: atlanta georgia 17 y
Predicted: i love this


Original: huge
Predicted: skinny husband s


Original: wonderful shirts
Predicted: i love it


Original: big and light but broke pretty quickly
Predicted: i love my
```

```
Original: comfy warm and dry
Predicted: i love it


Original: limousine s for your feet
Predicted: i love this


Original: very nice necklace
Predicted: i love it


Original: ok
Predicted: ok but not


Original: these tights nicely complete my granddaughter s costumes
Predicted: navy tights are


Original: love love love this underwear
Predicted: feel like body breathing


Original: its ok but i dont think these are
Predicted: hanes shirts


Original: just fine
Predicted: nice fit good quality


Original: i am a kid again
Predicted: geezer jeans


Original: nice
Predicted: the color fades


Original: 10k yellow gold and diamond three stone heart pendant
Predicted: i like the


Original: move over uggs
Predicted: ugg slipper
```

```
Original: fleur de lis earrings
Predicted: cleversilver


Original: minnetonka sandal
Predicted: a little wide


Original: good work jeans
Predicted: wrangler


Original: nylons
Predicted: i love it


Original: great quality
Predicted: canadian girl


Original: fitflops are the best
Predicted: i love fit


Original: a gown husbands will love
Predicted: love love it but


Original: it has it is carhartt
Predicted: the carhartt


Original: love these pants
Predicted: great pants for the


Original: returned reefs bought these
Predicted: fav


Original: try to optimize on the packaging
Predicted: stuffed weighty


Original: good for a few uses
Predicted: a good pair
```

```
Original: not for me
Predicted: nursing nursing bras


Original: great
Predicted: i loved these


Original: shapewear
Predicted: i love this


Original: i love the shape ups
Predicted: arthritis


Original: big tall
Predicted: t shirts


Original: great socks
Predicted: ua is


Original: cute fashion look
Predicted: i wear these


Original: waste
Predicted: a lot stiff


Original: good solid belt
Predicted: feels like a


Original: stays put
Predicted: true to size but


Original: great
Predicted: i wish


Original: fit
Predicted: fit flops
```

```
Original: very cushy
Predicted: i like it


Original: not bad for the money but not my first choice
Predicted: not as bright as


Original: love these things
Predicted: makes packing easy to


Original: fits well
Predicted: i love it


Original: beautiful ties at the right price
Predicted: fiance loves these


Original: could not be better
Predicted: a little small


Original: fits exactly
Predicted: i like it


Original: beautiful necklace
Predicted: beautiful earrings for the


Original: comfortable good lookin too
Predicted: i love these


Original: perfect
Predicted: i loved it


Original: classy versitile comfortable
Predicted: toffee sandal


Original: classy and beautiful
Predicted: i love this
```

```
Original: perfect
Predicted: easy clean and sturdy


Original: tight around calves
Predicted: a little tight


Original: love these
Predicted: i love them


Original: comfy but small
Predicted: a little small


Original: great bra
Predicted: i love this


Original: so far so good
Predicted: laces are great


Original: not the size i wanted but this product is
Predicted: the shapers


Original: gorgeous
Predicted: the chain looks pretty


Original: great watch but
Predicted: a great watch


Original: great product
Predicted: i love it


Original: son loves it
Predicted: great product for college


Original: nope
Predicted: i love them
```

```
Original: five stars
Predicted: great lab coat fabric


Original: silver twisted hoop earrings
Predicted: the earring


Original: great sandal
Predicted: electra elect


Original: very good
Predicted: a casi


Original: casio wow
Predicted: g shock men


Original: comfortable and infinitely usable
Predicted: a great hiking


Original: great watch
Predicted: wal mart


Original: durable and good looking
Predicted: carhartt


Original: disappointed with this product
Predicted: sprayed shoes


Original: my gf love it
Predicted: kinda chunky


Original: good product
Predicted: great for hiking hiking


Original: beautiful dress
Predicted: i love this
```

```
Original: really nice
Predicted: dries quickly


Original: i love the lord
Predicted: lord


Original: good quality great fit and comfortable
Predicted: sandels


Original: good undergarment
Predicted: i needed


Original: lost immediately
Predicted: the lever backs


Original: carhartt washed duck dungare
Predicted: a canvas pan


Original: very cute
Predicted: i love it


Original: stand in
Predicted: ring i


Original: too small for purpose
Predicted: i ordered it


Original: perfect
Predicted: i love this


Original: fruit of the loom brand
Predicted: ok but not


Original: great for summer
Predicted: women s swim
```

```
Original: good
Predicted: hwo


Original: pretty great
Predicted: a little small


Original: experience with nb socks
Predicted: nb socks


Original: ugh
Predicted: thigh high


Original: heavy duty belt
Predicted: heavy heavy and massive


Original: very comfortable
Predicted: maternity bra for


Original: halloween costume
Predicted: flims


Original: sagging in the butt again
Predicted: levi s


Original: great belt heavy and durable
Predicted: scuff


Original: murano
Predicted: i love these


Original: one star
Predicted: tight to the face


Original: wonderful sun cover
Predicted: i like it
```

Original: runs small and long
Predicted: a little small

Original: good for a short time wear
Predicted: wig cap cap

Original: these do not leak and adjusts to altitude
Predicted: gotubes travel

Original: what a pleasant surprise
Predicted: beautiful mala beads

Original: great price
Predicted: i love these

Original: nice belt
Predicted: a great belt

Original: good push up
Predicted: the bra fits true

Original: looks good
Predicted: slack

Original: comfortable everyday shoes
Predicted: the toes

Original: very nice pants
Predicted: d3

Original: a good choice for the travel savvy at
Predicted: i originally purchased

Original: great
Predicted: good quality and good

Original: great luggage
Predicted: sams

Original: love these earrings
Predicted: a gift for

Original: exceptionally well made and comfortable
Predicted: good for a

Original: ran large
Predicted: sizing is

Original: am i really writing a review for box
Predicted: i love these

Original: would be cute if they fit
Predicted: sizing is

Original: great shorts with minor caveats
Predicted: like these shorts

Original: finally found the one
Predicted: sizing is

Original: i like them but
Predicted: black sock

Original: lover of jambu shoes is somewhat disappointed
Predicted: i wear these

Original: awesome backpack but does not fit a 15 6
Predicted: i love this

Original: nice flip flop
Predicted: flip flops

Original: do not get the white color
Predicted: it has it is

Original: no support
Predicted: i needed

Original: you get what you payed for it
Predicted: good watch for the

Original: good product
Predicted: a little small

Original: classic comfortable reefs
Predicted: i love these

Original: best birthday gift
Predicted: a gift for

Original: chef hat
Predicted: a gift for

Original: how do they work
Predicted: laces are

Original: lovely earrings
Predicted: beautiful earrings for my

Original: very nice sweater
Predicted: i wear it

Original: nice necklace
Predicted: el salva

Original: thrilled
Predicted: dora backpack

Original: very good work shoe
Predicted: i need to

Original: great watch tiny strap
Predicted: f91w

Original: comfortable well made shirt
Predicted: sizing is

Original: love these jeans
Predicted: i love these

Original: they fulfill their purpose
Predicted: hanes underwear

Original: glamorise bra
Predicted: i love it

Original: awesome jewelry case
Predicted: sceptical

Original: it has it is a beanie
Predicted: a little small

Original: i do adore this spectacular cheap jeans
Predicted: dlls

Original: scer178 earrings
Predicted: i love these

Original: great but no arch support
Predicted: i do not

Original: bali skimp skamp for men too
Predicted: i love these

```
Original: not worth of 30
Predicted: i love these


Original: has been a huge help for my heels
Predicted: i love these


Original: decent socks
Predicted: a little tight


Original: comfortable and quality
Predicted: jeans i love


Original: winter staple
Predicted: kids s


Original: perfect ballet
Predicted: lightweight and comfy but


Original: perfect
Predicted: wait for a


Original: awesome boxers
Predicted: pair of boxers


Original: very comfortable and supportive
Predicted: bra for larger gal


Original: so comfortable
Predicted: keds are


Original: they are ok
Predicted: i love it


Original: cute fun for a range of ages
Predicted: a kidd
```

```
Original: very comfortable nice material
Predicted: a great buy


Original: good
Predicted: a good slip


Original: disapointed
Predicted: shoe collapsed after


Original: stylish good color and fit
Predicted: if you are


Original: champion women s absolute workout knee tights
Predicted: small waisted


Original: interesting design
Predicted: i do not


Original: buy these
Predicted: tell friends tell them


Original: love it
Predicted: i love this


Original: really attractive
Predicted: i was surprised


Original: much better than outlets same price
Predicted: the quality of the


Original: slippery on wet tiles
Predicted: water shoe not for


Original: it has it is a winner
Predicted: a great watch
```

```
Original: just ordered my second pair
Predicted: i love these


Original: comfortable
Predicted: cold winter underwear


Original: very good
Predicted: if you live


Original: just right for what i needed
Predicted: a little small


Original: belt
Predicted: i love it


Original: awesome
Predicted: a great watch


Original: my baby thinks this is a s
Predicted: a little big


Original: very nice sleeveless shirts
Predicted: i ordered this


Original: amber beauty
Predicted: i like the


Original: just a great costume
Predicted: sexy


Original: seen it on tv
Predicted: tv


Original: not the right color
Predicted: i love these
```

```
Original: just right for me
Predicted: i love these


Original: comfortable and stylish
Predicted: i love it


Original: love this sexy dress
Predicted: 5 3 34


Original: skechers d lite
Predicted: i love them


Original: runs small
Predicted: jr is


Original: the ultimate in flip flops
Predicted: havaiana


Original: nice wallet
Predicted: good buys 10


Original: becoming a classic shoe around here
Predicted: crocs


Original: these are light and comfortable
Predicted: stretchy cami


Original: great
Predicted: sexy


Original: material is very thin
Predicted: i need


Original: very nice
Predicted: awsome
```

```
Original: stylish
Predicted: great pair of le


Original: five stars
Predicted: i love it


Original: lysse leggings
Predicted: tummy control


Original: i am very impressed serious engineering apparently went into
Predicted: i am impressed


Original: nice look
Predicted: a bit darker


Original: a must have for the messy traveller
Predicted: i love this


Original: love the material
Predicted: material looks like traditional


Original: more like sports bra
Predicted: like a sports


Original: durable materials
Predicted: packable bag for


Original: quick delivery
Predicted: i am allergic


Original: i mean haha
Predicted: i love it


Original: great boot i bought a second pair
Predicted: let me start saying
```

```
Original: perfect
Predicted: bella vita


Original: camo shirt
Predicted: great price great buy


Original: not great for a well endowed woman
Predicted: sexy


Original: it is not bad just not for me
Predicted: didnt like it


Original: just what expected
Predicted: i bought these


Original: run long
Predicted: long inse


Original: my favorite shirt
Predicted: t shirts


Original: great product via elite hero
Predicted: great propper for


Original: fits smaller than canuck maybe less clun
Predicted: a winter boot


Original: good propper quality as per usual
Predicted: i like the


Original: transformers arent always cool and cud
Predicted: i was


Original: poor quality
Predicted: loosely woven
```

```
Original: very durable
Predicted: i love this


Original: bad neighbor
Predicted: i mean


Original: does not keep the right day date face got
Predicted: a great watch


Original: fantastic jacket
Predicted: thecolumbi


Original: simple and elegant
Predicted: i love these


Original: 18k gold overlay sterling silver multi gemstone ring
Predicted: mult gemstone ring


Original: not super heavy duty carries bulky light stuff
Predicted: plastic clamps are


Original: most comfortable flip flops i have warn
Predicted: i love these


Original: great for big girls
Predicted: sexy


Original: gold toe quarter socks
Predicted: i have not


Original: beautiful shoe fits well and is very fashionable
Predicted: good quality shoe for


Original: colorful
Predicted: i love it
```

```
Original: love that their longer and fit loose
Predicted: new style shorts


Original: nautica watch n14538g
Predicted: nautica watch


Original: well made apron
Predicted: good quality a


Original: simply love them
Predicted: i love fit


Original: poor quality
Predicted: poor quality belt was


Original: on the small size
Predicted: a little bit


Original: adorable and durable
Predicted: i love these


Original: cheap price but great product
Predicted: i like the


Original: cute and colorfull
Predicted: i love it


Original: cute
Predicted: a cape


Original: lives up to description
Predicted: sizing is


Original: great sandal for all water activities
Predicted: i love these
```

```
Original: too small
Predicted: ring size is


Original: nice jeans
Predicted: i ordered these


Original: lumpy seams
Predicted: a little tight


Original: a little tight but absolutely stunning
Predicted: a bit tight


Original: d best
Predicted: i like it


Original: great bra
Predicted: i love this


Original: hanes waistband woven boxers
Predicted: hanes is my


Original: buy a bit bigger
Predicted: a little small


Original: great fit comfortable
Predicted: wrangler


Original: very comfortable
Predicted: i love these


Original: well made and should last for a good while
Predicted: levi s


Original: average
Predicted: i love it
```

```
Original: meets my expectations
Predicted: i love it


Original: like it
Predicted: i like it


Original: nothing like frye quality
Predicted: pair of boots that


Original: great for hiking boots
Predicted: i love these


Original: very comfortable
Predicted: t shirt


Original: very cute
Predicted: sexy


Original: worth it
Predicted: i love these


Original: simple but useful
Predicted: nike


Original: stylish
Predicted: narrow and small but


Original: great shirts
Predicted: i like the


Original: pretty thin
Predicted: like a pan


Original: great but i like the patra better
Predicted: crocs
```

Original: perfect
Predicted: a great tie

Original: perfect fit
Predicted: slender

Original: eh not impressed
Predicted: i ordered it

Original: nice case
Predicted: i like it

Original: great gift for my
Predicted: a great gift

Original: okay
Predicted: dockers crew socks

Original: a great scarf with a lot of uses
Predicted: shemaghs

Original: not ughs
Predicted: better value for the

Original: not pretty but functional
Predicted: happy with this bra

Original: very nice earrings
Predicted: i love these

Original: they changed it
Predicted: i love this

Original: bazinga
Predicted: i bought this

```
Original: love em have bought 5
Predicted: best undergarments


Original: no itch
Predicted: long john


Original: execellent watch at a exe
Predicted: watch for the price


Original: watch band
Predicted: i like this


Original: comfortable and stylish
Predicted: i love these


Original: it has it is ok
Predicted: flims


Original: lervi s for me
Predicted: i love it


Original: well balanced
Predicted: asics


Original: love it comfortable and light
Predicted: the base layer was


Original: great boots for winter weather
Predicted: a must have


Original: great detail
Predicted: bead fits


Original: nb mens mr1906
Predicted: nb10
```

```
Original: nan
Predicted: flims


Original: cannot go wrong
Predicted: i love these


Original: reasonably good quality but not what i was looking
Predicted: a little narrow


Original: so great got another
Predicted: the best sports bra


Original: great boots full size too big though
Predicted: sizing is


Original: economical
Predicted: a great buy


Original: schechers women s biker mar
Predicted: shoses


Original: surprised it did not cost more
Predicted: macho is


Original: omg my new fave
Predicted: i love these


Original: great quality
Predicted: gripes are


Original: ok but i would look for another bra
Predicted: good quality nursing bra


Original: very comfy
Predicted: i love these
```

```
Original: comfortable hat
Predicted: low profile hat


Original: good looking good fitting jacket
Predicted: a must have


Original: very comfortable flip flops
Predicted: flip flops


Original: longer than usual
Predicted: sizing is


Original: love at first wear followed with 4 yr
Predicted: teva


Original: hat
Predicted: i love it


Original: great color
Predicted: i love it


Original: if it has it is merrell it has
Predicted: merrell moa


Original: not as cute as expected
Predicted: shoe runs big color


Original: glasses have a slightly tight fit compared to
Predicted: jimart


Original: love these but too small
Predicted: ordered 3 based


Original: nice shirt
Predicted: t shirt for
```

```
Original: great luggage addition
Predicted: easy to use and


Original: came on time and fits fine
Predicted: i washe


Original: heavy duty
Predicted: i love these


Original: this was a gift
Predicted: a gift for


Original: drawstring comfort
Predicted: i liked it


Original: love the boots but they fit me big
Predicted: i am going


Original: great investment
Predicted: love the buxton


Original: sketchers from amazon
Predicted: i have worn


Original: great coveralls
Predicted: great coveralls


Original: best flip flops ever made
Predicted: flip flops


Original: comfortable enough to wear all day
Predicted: i love these


Original: i love these workout pants
Predicted: a little too
```

```
Original: very comfortable only slightly small for me
Predicted: sizing is


Original: not what i needed
Predicted: i love it


Original: love this nursing bra my favorite
Predicted: a nursing bra


Original: levi s are not like they used to
Predicted: pair of levi


Original: warning five loops not seven
Predicted: jeans with a


Original: love it love it
Predicted: i love it


Original: great for the money
Predicted: trainers work for


Original: scuffed
Predicted: ksw


Original: love it
Predicted: the ring ran


Original: prettier than pictured
Predicted: a little bit


Original: clear and rusty
Predicted: i love it


Original: simply the best
Predicted: the best bra ever
```

```
Original: colors are nice
Predicted: a little wide


Original: beautifully styled ring
Predicted: i love this


Original: awesome
Predicted: i love it


Original: great product
Predicted: the gate is not


Original: khaki s
Predicted: a little small


Original: pretty handkerchiefs
Predicted: handkerchiefs


Original: awsome
Predicted: i love it


Original: close but not quite
Predicted: clima


Original: excellent fit support and comfort
Predicted: i love these


Original: great work pants
Predicted: good quality and quality


Original: great
Predicted: carhart for the


Original: the only sports bra i wear
Predicted: the best sports bra
```

```
Original: terrific
Predicted: fiance loves these


Original: perfect gift for a young woman
Predicted: a gift for


Original: great gloves colors are vivid and quality is nice
Predicted: great for the price


Original: good but kinda roomy in the derrier
Predicted: i do not


Original: love my thigh highs
Predicted: thigh high


Original: beautiful rain boots
Predicted: i love them


Original: quality item at a reasonable price
Predicted: good value for the


Original: celtic design dangle earrings
Predicted: beautiful earrings i


Original: great liners 4 stars
Predicted: liners are great


Original: love it
Predicted: i love it


Original: ginger az
Predicted: i love it


Original: great indoor slipper
Predicted: i love this
```

Original: sizing an issue
Predicted: sandals do not

Original: casio men s atomic solar
Predicted: jc 30

Original: i miss the old one s
Predicted: el salva

Original: clark s shoes
Predicted: i love the

Original: very comfortable but not shaped for a woman
Predicted: i hate wearing

Original: my feet are black
Predicted: i love these

Original: nice quality
Predicted: xl multi

Original: love this shoe
Predicted: love this shoe but

Original: love them
Predicted: a little

Original: great gift
Predicted: i love this

Original: was shocked to were this jacket was manufactured
Predicted: wrangler

Original: four stars
Predicted: slippers are great

```
Original: seiko men s automatic watch
Predicted: a great watch


Original: very nice
Predicted: sexy


Original: great little pirate outfit for the price
Predicted: i have been


Original: great jeans
Predicted: old lee jeans


Original: comfortable
Predicted: i love it


Original: my wedding band
Predicted: tungsten band


Original: great
Predicted: i love these


Original: eagle creek travel geat pack it
Predicted: eagle


Original: at least my feet are warm
Predicted: cold weather boot


Original: cramps toes
Predicted: i bought these


Original: awsome
Predicted: a great watch


Original: excellant
Predicted: the compartments are
```

```
Original: proper size for full length dress
Predicted: length is a


Original: typical no wire support bra
Predicted: wire support ok


Original: not bright green
Predicted: kelly green


Original: typical army duffle
Predicted: army duffles


Original: good price but
Predicted: disappointed with the handle


Original: make sure you have the right expectations
Predicted: sexy


Original: lovely
Predicted: i love this


Original: lovely ring
Predicted: perfict size


Original: poor design
Predicted: the belts are


Original: perfect
Predicted: i needed


Original: adorable
Predicted: soooo cute


Original: pleasant surprise
Predicted: miyot
```

Original: four stars
Predicted: like jean

Original: these killed my feet
Predicted: mephisto

Original: fit as expected
Predicted: levi 501

Original: almost too good to be true
Predicted: i love these

Original: very good durable product
Predicted: comfortable comfortable and flexible

Original: returned them
Predicted: a little tight

Original: the best denim jacket i have ever owned
Predicted: denim jackets

Original: love it
Predicted: i love it

Original: very good shoe
Predicted: water aerobics shoes

Original: sweet
Predicted: i am not

Original: not impressed
Predicted: i think

Original: dont be frozen
Predicted: great value for the

```
Original: love these
Predicted: i love these


Original: best surgeon shoes
Predicted: crocs


Original: excellent
Predicted: i love it


Original: good classic
Predicted: timex watch but


Original: my son love them
Predicted: shoes for my son


Original: great value
Predicted: watch for the price


Original: gift but
Predicted: a gift for


Original: thin legs
Predicted: jms


Original: jewelry cleaner
Predicted: ultrasonic cleaner


Original: luv my earrings
Predicted: earring for


Original: comfy and high quality
Predicted: i love these


Original: wonderful shoes for pregnancy
Predicted: crocs
```

```
Original: perfect
Predicted: the ring is


Original: for my dancer
Predicted: the best ballet shoes


Original: i love my crocs
Predicted: great clog


Original: beautiful
Predicted: the perfect ballerin


Original: hello kitty is cute but sizes run
Predicted: isnt comfortable


Original: good shoe but beware sizing
Predicted: i really like


Original: quality belt
Predicted: belt at a


Original: they shall they will do for work durable
Predicted: i like it


Original: perfect for my dad
Predicted: timex dad


Original: great products
Predicted: i do not


Original: super soft durable well made slipper
Predicted: i love them


Original: either a little snug or i am having
Predicted: great looking cheap looking
```

Original: front hook bra
Predicted: i do not

Original: a bear y good shirt
Predicted: alot of

Original: great ballet shoes
Predicted: i bought these

Original: fine watch a little hard to set for some
Predicted: watch for the price

Original: meh
Predicted: sexy

Original: ebags shoe bag
Predicted: i am not

Original: great
Predicted: perfect for winter winter

Original: great for baby soft soft
Predicted: i love these

Original: a perfect little purse
Predicted: attractive purse looks soft

Original: strap works
Predicted: i had to

Original: really nice watch
Predicted: a great watch

Original: i love this
Predicted: maternity belt for

```
Original: sport
Predicted: nice looking watch strap


Original: i tried to like it
Predicted: i love these


Original: jefferies brand crew length white socks grey
Predicted: socks for my son


Original: stunning necklace
Predicted: i love it


Original: love these
Predicted: it has it is


Original: run extremely small
Predicted: size 18 shirts


Original: it is a very beautiful wallet
Predicted: i love it


Original: great travel shirt
Predicted: tamiami


Original: perfect for travel
Predicted: it has it is


Original: great texture
Predicted: i love it


Original: perfect under shirt
Predicted: i love these


Original: no liquid
Predicted: plastic container plastic container
```

```
Original: 501 levi s
Predicted: a little too


Original: blackhawk desert ops boots
Predicted: best boots i


Original: satisfied with purchase
Predicted: a little big


Original: ok but squeaked
Predicted: sucks


Original: a little loose but still comfortable
Predicted: small breasted


Original: very disappointed
Predicted: i do not


Original: love them
Predicted: crocs


Original: lightweight comfortable
Predicted: camisole is


Original: great looking
Predicted: goffs


Original: this is ok but run small
Predicted: the right size is


Original: strap is not as pictured
Predicted: like the shorts


Original: decent purse real leather good value for the price
Predicted: a bit smaller
```

```
Original: typical fall off the heel shoe liner
Predicted: toe liners


Original: very good
Predicted: good watch for the


Original: do not do it
Predicted: crocs


Original: argh it constantly rides up
Predicted: argh


Original: cheap quality
Predicted: red purple scarve


Original: aerosoles are soooo comfortable and good
Predicted: i love these


Original: beautiful earrings
Predicted: the earrings came in


Original: disappointed in these shoes
Predicted: i did not


Original: great quality
Predicted: i love these


Original: love this color very nuetral
Predicted: crocs


Original: very comfortable
Predicted: pantiy


Original: great hat for 40 degree weather
Predicted: hat for the
```

```
Original: what happened to new balance
Predicted: i do not


Original: nice and long
Predicted: sizing info


Original: very good waist shapewear
Predicted: great for the price


Original: nice size but not military grade
Predicted: a great bag


Original: sturdy
Predicted: dress shoes are not


Original: runs big
Predicted: sizing is


Original: not like previous russell athletic slee
Predicted: the arm holes are


Original: super cute
Predicted: xox


Original: good job
Predicted: shaper is


Original: hmmm well it did kinda work
Predicted: sexy


Original: poorly designed
Predicted: belt sizing


Original: jazz feet
Predicted: saucony is
```

```
Original: good work socks
Predicted: i like these


Original: well made but a little big
Predicted: a little big


Original: better than uggs
Predicted: uggs are


Original: blisters
Predicted: i like the


Original: nursing outfits
Predicted: ms in


Original: excellent quality
Predicted: satisfied with these socks


Original: great wrap for a great price
Predicted: i love it


Original: ck prostretch
Predicted: i love these


Original: kind of ugly
Predicted: unattractive


Original: great product
Predicted: i like it


Original: nice bra
Predicted: sensitivity to late


Original: ugly but comfortable
Predicted: i love them
```

```
Original: sparkly
Predicted: a gift for


Original: thong nice
Predicted: like thong


Original: comfort that has that is hard to describe
Predicted: i love these


Original: speedos galore
Predicted: man s


Original: great jeans
Predicted: a little longer


Original: great tricorn hat
Predicted: costumer s


Original: love them
Predicted: shoes run a


Original: love it
Predicted: girly girly


Original: nice shoehorn
Predicted: the shoehorn is


Original: champion men
Predicted: good quality and good


Original: the other one sold on amazon is much better
Predicted: the snag


Original: nice hat
Predicted: the color is not
```

```
Original: durable but high waisted
Predicted: work pants for work


Original: good as price
Predicted: nice deatil


Original: very nice
Predicted: i love it


Original: i could wear these cream shoes even in winter
Predicted: i love them


Original: so comfortable
Predicted: i love these


Original: great
Predicted: a great under


Original: gildan 7 75 oz sweat
Predicted: i like the


Original: they are great
Predicted: it has it is


Original: this blouse is beautiful and i love the
Predicted: i love this


Original: love reefs
Predicted: i love reef


Original: couldnt read the display returned it
Predicted: the title says it


Original: made a great gift
Predicted: a gift for
```

```
Original: i love it
Predicted: sexy


Original: very nice warm socks
Predicted: good looking and warm


Original: simple and smooth
Predicted: a nice tie


Original: handy for quick trip
Predicted: ingrown toen


Original: sterling silver eternty crosspendant 18
Predicted: gift for a


Original: functional but not a fashion statement
Predicted: water proof watch water


Original: not worth it
Predicted: i ordered


Original: great quality and very comfortable
Predicted: comfrotable


Original: mustache fun
Predicted: pros mustaches fake


Original: columbia sportswear men s back
Predicted: good bathing suit


Original: pretty good
Predicted: g shock looks


Original: love this purple watch
Predicted: i love it
```

```
Original: amazing
Predicted: ring size up


Original: great black jeans
Predicted: i love this


Original: great watch perfect time looks great
Predicted: i love it


Original: organized and protected
Predicted: great earring


Original: a little snug but comfortable
Predicted: cute but a


Original: as good as advertised
Predicted: japanes


Original: good product
Predicted: good ad


Original: great belt wonderful detail perfect color
Predicted: i love this


Original: dickies quality
Predicted: irrati


Original: country made in depends on fit
Predicted: great fit great fit


Original: nice dinner watch with a sporty look more
Predicted: a great looking


Original: cute comfy
Predicted: uber cute and
```

```
Original: i like it she loves it
Predicted: great for the price


Original: pretty style but large calf
Predicted: pleasantly surprised by


Original: pretty little red dress
Predicted: a nice fall


Original: sweet long sleeve shirt
Predicted: seahawk t


Original: in love with this set
Predicted: a good fit


Original: beware these run small
Predicted: flip flops


Original: good little lock
Predicted: tsa


Original: for the
Predicted: i loved it


Original: perfect
Predicted: i needed


Original: perfect fit excellent price
Predicted: dress t shirt


Original: fun
Predicted: niti


Original: mens acu digital t shirt large
Predicted: acu
```

```
Original: timex watch
Predicted: look good for


Original: look good very comfortable
Predicted: levi s


Original: men s docker pants
Predicted: i wanted


Original: it works
Predicted: i wish


Original: shirt
Predicted: a nice shirt


Original: nine west satchel
Predicted: roomy and nice


Original: great garden shoe for bad feet
Predicted: i love these


Original: lightweight and comfortable
Predicted: crocs


Original: good for boxer briefs
Predicted: sized large and


Original: the best
Predicted: i love these


Original: she loves it
Predicted: wears a


Original: glad i got a whole size bigger
Predicted: i am glad
```

```
Original: super comfy
Predicted: love fitflops


Original: nice handkerchiefs
Predicted: handkerchiefs


Original: she went into a rehab facility and needed some
Predicted: socks for my mom


Original: great purchase
Predicted: i love these


Original: what a statement shoe
Predicted: i love this


Original: sharp shoes
Predicted: husband s favorite


Original: just the thing
Predicted: i love it


Original: too close together
Predicted: i am not


Original: works well but has shortcomings
Predicted: aaa


Original: gold toe quality
Predicted: good socks for the


Original: ginormous
Predicted: i love this


Original: gave it a 4 star for looks but had
Predicted: sizing is
```

```
Original: the originals
Predicted: wrangler


Original: perfect
Predicted: tool for watch set


Original: minnetonka men s straight plug mo
Predicted: moccasin


Original: not so comfortable
Predicted: i am disappointed


Original: work well
Predicted: a hat


Original: briefs
Predicted: i love these


Original: great watch
Predicted: a great watch


Original: converse chuck taylor all
Predicted: a sneaker


Original: beautiful
Predicted: i love them


Original: favorite slippers i have ever owned
Predicted: i love these


Original: three stars
Predicted: chain broke easily and


Original: its ok
Predicted: sexy
```

```
Original: wow quality matters
Predicted: the best shoe for


Original: five stars
Predicted: buy a size


Original: nice sandals but could be more comfortable
Predicted: nice but scratchy


Original: love
Predicted: my kid loves these


Original: dockers khaki pants
Predicted: comfortable and comfortable and


Original: great for sunny but crisp days
Predicted: vests roomy


Original: also perfect
Predicted: slack


Original: expect shrinkage
Predicted: sizing is


Original: rockport
Predicted: sizing is


Original: carhartt comfort
Predicted: i love it


Original: fast shipping ok product
Predicted: i love it


Original: love them
Predicted: sag
```

```
Original: great everyday or t shirt bra
Predicted: i love this


Original: not real impressed
Predicted: i love these


Original: great boots
Predicted: nicer than


Original: wonderful
Predicted: big bust size


Original: perfect
Predicted: i love it


Original: plus size no
Predicted: i love these


Original: like em
Predicted: i like it


Original: wonderful seller
Predicted: i thought it


Original: looks nice
Predicted: sexy


Original: very cute and great for the price
Predicted: a bit small


Original: loved these earrings
Predicted: shiny and strong earrings


Original: nice socks
Predicted: the quality of socks
```

```
Original: another hmmmmmm
Predicted: black khaki


Original: shoes
Predicted: rockport upto


Original: good quick shine
Predicted: good for quick shine


Original: nice shirt for the money
Predicted: a good value


Original: beautiful
Predicted: i washe


Original: great underwear
Predicted: i love this


Original: nice bra but not the best sports bra
Predicted: a good bra


Original: my hubby loves it
Predicted: i love it


Original: comfortable and warm but slip off your feet
Predicted: i love these


Original: durable and comfortable too
Predicted: socke


Original: a great pair of leggings
Predicted: leggings for


Original: finally found a sheer yet supportive bra
Predicted: i love this
```

```
Original: great cold weather gear
Predicted: i love these


Original: my daughter loves these
Predicted: i love these


Original: nothing special
Predicted: image impresive real


Original: unique and super cute
Predicted: i love them


Original: clog meets sandal
Predicted: inko


Original: kilt wear
Predicted: i love these


Original: great slipper
Predicted: sized too small


Original: my summer favorite
Predicted: arizona


Original: fantastic cream polish
Predicted: fav


Original: bullet proof
Predicted: a tractor trailer


Original: as expected
Predicted: i love this


Original: smooth and silky
Predicted: i love these
```

```
Original: happy with this product
Predicted: sizing is


Original: very comfortable wrinkle free nice solid grey color
Predicted: van heus


Original: it has it is really pretty
Predicted: i like it


Original: i wear two stacked best nursing rings ever
Predicted: i love this


Original: not exactly the same as bought at sports expo
Predicted: i love these


Original: it has it is great to be a guy
Predicted: sex appeal


Original: looks nice but feels cheap
Predicted: light belt unpack


Original: lighter weight strapping but good value
Predicted: dockers belts


Original: nice fruit of the loom briefs
Predicted: good quality but not


Original: kd leg warmers
Predicted: i love these


Original: great buy great tee
Predicted: t shirts


Original: these are not murano glass beads
Predicted: infuriating
```

```
Original: i would wear them everywhere if i
Predicted: i love these


Original: clarks un parody
Predicted: i love these


Original: vanity fair women coloratura short gown purity blue
Predicted: terrible material and material


Original: nice shaper brief
Predicted: the shaper fabric


Original: works great
Predicted: i love it


Original: love it
Predicted: i love this


Original: great shirt
Predicted: t shirt for


Original: sketchers
Predicted: i am not


Original: great product
Predicted: the best umbrella for


Original: great quality
Predicted: i love it


Original: quality relatively inexpensive
Predicted: good value for money


Original: returned it
Predicted: sexy
```

```
Original: watch tool kit
Predicted: the tools worked fine


Original: very high quality
Predicted: leotard


Original: a goody in maroon
Predicted: snags


Original: excellent
Predicted: i love these


Original: no muffin top but horrible squeezed upper thighs
Predicted: sexy


Original: very comfortable and sturdy
Predicted: slippers for tile


Original: light comfort
Predicted: shorts fit


Original: looks nice
Predicted: dickies


Original: cup size is not correct
Predicted: ok but not


Original: very comfortable
Predicted: a good fit


Original: not flattering
Predicted: ok for school


Original: extremely comfortable
Predicted: i like it
```

```
Original: my favorite socks
Predicted: 91 2 narrow


Original: excellent shoe
Predicted: sock is


Original: one size fits all
Predicted: i like it


Original: great jewelry organizer
Predicted: sturd


Original: breast cancer awareness bracelets
Predicted: pink cancer bracelets


Original: a good duffle bag despite the material
Predicted: x large bag


Original: not the same as shown on amazon advertisement page
Predicted: shinn


Original: terribly made very disappointed
Predicted: the zipper is not


Original: cheap
Predicted: flims


Original: very comfortable
Predicted: c cup is


Original: fun
Predicted: stretchy but fun


Original: nice compliment
Predicted: little boler
```

```
Original: love these great for jeans soft comfy relaxed but not
Predicted: i love this


Original: very nice
Predicted: i love it


Original: just a little less quality than
Predicted: a little better


Original: fantastic
Predicted: travel cubes


Original: good trousers
Predicted: i like these


Original: very cute and comfortable
Predicted: great set for small


Original: excellent value
Predicted: id credit


Original: satisified
Predicted: i love this


Original: perfect
Predicted: comfortable flip flop


Original: very nice and good quality
Predicted: nice hoop


Original: quality for a very good price
Predicted: great product for the


Original: very stylish great quality
Predicted: i love these
```

```
Original: tip toes are my favorite
Predicted: the best sandals


Original: timex is classic dependable
Predicted: indiglo watch


Original: good shirts
Predicted: texas


Original: dockers men s proposal moc run off
Predicted: dockers men


Original: good product and service but some what larger than it
Predicted: size is a


Original: awesome swimsuit
Predicted: i love this


Original: great
Predicted: great shades for blocking


Original: good pair of shoes
Predicted: i like them


Original: this is amazing
Predicted: i love it


Original: awesome thigh highs
Predicted: i love it


Original: low priced casio
Predicted: value for the money


Original: so buttery rich is this leather
Predicted: soft and roomy
```

```
Original: men s belt brown
Predicted: man s belt


Original: best bali style collection for everyday bras
Predicted: sizing is


Original: they fit and they flop
Predicted: good for physical


Original: the husband loves them
Predicted: mens s


Original: good value
Predicted: i like it


Original: good quality
Predicted: poncho


Original: comfortable
Predicted: flin


Original: awesome fit
Predicted: i thought


Original: cannot go wrong with carhartt
Predicted: carhartt women


Original: cute
Predicted: i love it


Original: my fault
Predicted: i ordered


Original: great socks
Predicted: a little stretch
```

```
Original: something blue
Predicted: i like them


Original: i love
Predicted: sexy


Original: bali bra back opening
Predicted: i love this


Original: great but
Predicted: em


Original: orange monster collectors watch
Predicted: scuba watch


Original: buxton
Predicted: i love it


Original: first time wearing this particular brand
Predicted: wrights


Original: not enough arch support
Predicted: love the way they


Original: love these earings
Predicted: beautiful and good quality


Original: levi s men s 505 straight
Predicted: levi s


Original: military standard
Predicted: i love it


Original: sporty snazzy shirts
Predicted: great polo
```

```
Original: socks
Predicted: i thought


Original: could live without
Predicted: sizing is


Original: ck rocks
Predicted: good quality good price


Original: attractive but functional
Predicted: merrill


Original: great costume
Predicted: i love spider


Original: se watch band link remover set 5 piece set
Predicted: watch band remover


Original: heaven on your feet
Predicted: tolito men


Original: very nice jeans
Predicted: sexy


Original: exactly what i needed
Predicted: i love this


Original: levi s women s petite 512
Predicted: a bit long


Original: good plain aviators
Predicted: aviators are


Original: i like the boot but it has it is
Predicted: missleading runs large
```

Original: cute and comfortable
Predicted: i love these

Original: carhartt traditional fit b18
Predicted: levi s

Original: a great looking jacket
Predicted: sizing is

Original: timex kids
Predicted: it smells bad

Original: not bad for the price
Predicted: flims

Original: well made holds multiple garments
Predicted: good quality for the

Original: my single favorite lounge sleeping pantsl
Predicted: pj pants

Original: nicer than expected
Predicted: pleasantly surprised at

Original: great pant for cooler temps
Predicted: good looking pants for

Original: the perfect gift for the man who has 34 everything
Predicted: a gift for

Original: nice looking and fits perfectly
Predicted: lee jeans are

Original: cushiony
Predicted: i will not

```
Original: they may run a bit large
Predicted: i love these


Original: comfortable ugly
Predicted: i love these


Original: glass colors vary
Predicted: valentine


Original: rubber bracelets
Predicted: em bracelet


Original: love these cute and comfortable
Predicted: crocs


Original: they are popular for a reason
Predicted: sock line


Original: comfort
Predicted: i love these


Original: good choice
Predicted: jeans for my husband


Original: husband loves these
Predicted: my husband loves them


Original: love it
Predicted: good clea


Original: excellent substitute for silver or gold
Predicted: ring looks good


Original: not comfortable for me
Predicted: it has it is
```

```
Original: good quality shoes
Predicted: sexy


Original: well designed and nice fabric
Predicted: a great fit


Original: warm and cute
Predicted: i love this


Original: if i was a woman i
Predicted: a gift for


Original: delightful
Predicted: i love these


Original: good quality jacket
Predicted: feb


Original: real leather plus
Predicted: i love this


Original: good quality but bigger and lighter than expected
Predicted: a little tight


Original: these seem great
Predicted: long sle


Original: i love these panties
Predicted: the guy loves these


Original: so comfortable
Predicted: great for work


Original: good sale
Predicted: i need black
```

```
Original: okay
Predicted: elastic feels a


Original: pretty rose button earrings
Predicted: pink rose earrings perfect


Original: scuba diver s
Predicted: watch for a


Original: great style and quality
Predicted: the best lame


Original: great sneakers
Predicted: i love these


Original: have always liked this one
Predicted: sock is


Original: if you are between sizes try a hair
Predicted: crocs


Original: great quality looks expensive
Predicted: i am glad


Original: good for the money
Predicted: the best er


Original: fancy replacement for hairband rubberband trick
Predicted: i am not


Original: excellent fit
Predicted: shorts are great


Original: cleavage
Predicted: cleavage
```

```
Original: very cool
Predicted: my daughter s


Original: nice pants
Predicted: shorts run


Original: very good
Predicted: i love it


Original: my son loves thse
Predicted: sexy


Original: my favorite new night pants
Predicted: i love them


Original: love these sportsbras
Predicted: i like it


Original: short inseam
Predicted: good quality fit in


Original: perfect for me
Predicted: my favorite expensive wallet


Original: nice shoe
Predicted: tad


Original: nice cotton panties
Predicted: a little too


Original: tinker toy watch band tool
Predicted: i am not


Original: looks nice fits nicely hurts
Predicted: good looking bra but
```

```
Original: love these shoes
Predicted: a must have


Original: mary janes are cute and just plain awesome
Predicted: i like it


Original: turned green
Predicted: smelt


Original: wearing it right now
Predicted: the best robe


Original: expecting more
Predicted: flims


Original: beautiful
Predicted: mother likes it


Original: very cute casual
Predicted: size 10 5 shoes


Original: you get what you pay for
Predicted: ok halloween costume


Original: belt
Predicted: i love it


Original: my grandson loves his boots
Predicted: grandson s


Original: new favorite jeans
Predicted: pair of denim


Original: for my needs its great
Predicted: great price good quality
```

Original: very dorky
Predicted: sizing is

Original: nice pants
Predicted: i love it

Original: looks like pic
Predicted: i love these

Original: sturdy
Predicted: mesh backpacks for

Original: super cute and versatile
Predicted: i love it

Original: nice t shirts
Predicted: wears for 2

Original: awesome
Predicted: good boots for the

Original: beautiful
Predicted: i love it

Original: five stars
Predicted: i count keen

Original: the ideal cleaner for all metals and nearly all
Predicted: rho

Original: good sunglasses but too big right now
Predicted: a little big

Original: handy packer
Predicted: use it all day

```
Original: my casio chronograph is a form
Predicted: man s watch


Original: does it job material could be different
Predicted: reflective id


Original: nice
Predicted: i love it


Original: super comfy
Predicted: i love them


Original: looks good but came un sewed
Predicted: sexy


Original: great value for dress or casual
Predicted: good looking excellent value


Original: comfort looks feel great shoes
Predicted: pair of loafers


Original: great traing pants
Predicted: great training pants for


Original: great deal
Predicted: a handbag


Original: good fit comfortable underwear
Predicted: migrated a


Original: great dinosaur shirt
Predicted: a gift for


Original: you can trust izod
Predicted: izod men
```

```
Original: better than expected
Predicted: great watch for the


Original: love
Predicted: love dansko


Original: nice finish
Predicted: nice polished polished and


Original: you get what you pay for
Predicted: the difference between 5


Original: not my favorites
Predicted: floppy leg


Original: best flip flop
Predicted: fashon


Original: i am a fan of sketchers so
Predicted: custom inserts for


Original: i love having little feet
Predicted: i like these


Original: very well made
Predicted: i love it


Original: light and lovely
Predicted: these earrings are great


Original: great backpack
Predicted: i love this


Original: my husband loved it
Predicted: my husband loves it
```

```
Original: love these
Predicted: great work hat


Original: just needed new ones and this was the most easy
Predicted: mcd


Original: warm socks or liners
Predicted: sock


Original: great
Predicted: i love it


Original: like alot
Predicted: i like the


Original: great
Predicted: sexy


Original: great boots
Predicted: i wear them


Original: classic
Predicted: size 11 s


Original: color shipped did not match the web site
Predicted: color is not as


Original: great hat
Predicted: hats for


Original: shoe and back saver
Predicted: shoe horn length


Original: the most perfect bag ever
Predicted: i love it
```

Original: a little flimsy but still
Predicted: flims

Original: i really like these shoes
Predicted: thongs

Original: good cheap amber glasses
Predicted: i do not

Original: great craft fun
Predicted: a gift for

Original: ss citrine celtic drop earrings
Predicted: a little small

Original: practical work pants
Predicted: i did not

Original: these crocs rock
Predicted: crocs

Original: cute and very stretchy
Predicted: a little

Original: these are mens tricky to adjust width
Predicted: i did not

Original: hot feet
Predicted: light weight brook

Original: cannot beat gold toe
Predicted: gold toe socks

Original: new englander rain jacket aqua reflective
Predicted: prius

```
Original: beautiful sandal
Predicted: a great sandal


Original: i bought these to replace a previous
Predicted: skechers


Original: great for packing small items
Predicted: hosiery


Original: toms are winners
Predicted: toms are


Original: extremely comfortable shoes
Predicted: burgundy


Original: nice
Predicted: vf pan


Original: i love it
Predicted: figure flattering cut


Original: carhartt double front
Predicted: great quality carhart


Original: exactly as described
Predicted: sock for


Original: yagh
Predicted: flims


Original: great fit over sunglasses
Predicted: i love these


Original: great sweater
Predicted: i guess it
```

```
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