english-to-tamil-translation

April 1, 2024

[2]:
```
import numpy as np
import pandas as pd
from keras.models import Model
from keras.layers import LSTM,Dense,Input
```

[3]:
```
batch_size=64
samples=10000
latent_dim=256
epochs=100
```

[4]:
```
data_path=r"C:\Users\TRISHAA\Downloads\tam.txt"
```

Vectorize the data

[7]:
```
input_texts = []
target_texts = []
input_characters = set()
target_characters = set()
with open(data_path, 'r', encoding='utf-8') as f:
    lines = f.read().split('\n')
for line in lines[: min(samples, len(lines) - 1)]:
    input_text, target_text, _ = line.split('\t')
    # We use "tab" as the "start sequence" character
    # for the targets, and "\n" as "end sequence" character.
    target_text = '\t' + target_text + '\n'
    input_texts.append(input_text)
    target_texts.append(target_text)
    for char in input_text:
        if char not in input_characters:
            input_characters.add(char)
    for char in target_text:
        if char not in target_characters:
            target_characters.add(char)
```

[8]:
```
input_characters = sorted(list(input_characters))  #Sorting all characters of␣
 ↪English
target_characters = sorted(list(target_characters)) #Sorting all characters of␣
 ↪Tamil
```

```
num_encoder_tokens = len(input_characters)          #No of charac's in English
num_decoder_tokens = len(target_characters)         #No of charac's in Tamil
max_encoder_seq_length = max([len(txt) for txt in input_texts])   #Sentence␣
 ↪with max words in English
max_decoder_seq_length = max([len(txt) for txt in target_texts])  #Sentence␣
 ↪with max words in Tamil
```

[9]:
```
print('Number of samples:', len(input_texts))
print('Number of unique input tokens:', num_encoder_tokens)
print('Number of unique output tokens:', num_decoder_tokens)
print('Max sequence length for inputs:', max_encoder_seq_length)
print('Max sequence length for outputs:', max_decoder_seq_length)
```

```
Number of samples: 201
Number of unique input tokens: 53
Number of unique output tokens: 54
Max sequence length for inputs: 94
Max sequence length for outputs: 111
```

[10]:
```
print(input_characters)
```

```
[' ', '!', "'", ',', '.', '0', '2', '?', 'A', 'B', 'C', 'D', 'F', 'G', 'H', 'I',
'J', 'K', 'L', 'M', 'N', 'P', 'R', 'S', 'T', 'W', 'Y', 'a', 'b', 'c', 'd', 'e',
'f', 'g', 'h', 'i', 'j', 'k', 'l', 'm', 'n', 'o', 'p', 'q', 'r', 's', 't', 'u',
'v', 'w', 'x', 'y', 'z']
```

[11]:
```
print(target_characters)
```

```
['\t', '\n', ' ', '!', '(', ')', ',', '.', '0', '2', '?', 'C', 'D', ' ', ' ',
' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ',
' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', '', ' ',
' ', ' ', ' ', ' ', ' ', '']
```

[12]:
```
print(input_texts)
```

```
['I slept.', 'Calm down.', "I'll walk.", 'Who is he?', 'Who knows?', 'She
smiled.', 'Talk to me!', 'Who is she?', 'Go to sleep.', 'It may rain.', 'She bit
him.', 'She hit him.', 'She is kind.', 'She is eight.', 'Where are we?', 'Keep
in touch!', 'See you again.', 'Give it to her.', 'I ate too much.', "I'll see to
it.", "It's up to you.", 'Leave it to me.', 'Listen to this!', "That's the
way.", 'Come and see me.', "Don't lie to me.", 'He began to run.', 'He just
arrived.', 'He likes to run.', 'How is your dad?', 'I want to sleep.', "I'm able
to run.", 'Raise your hand.', 'What did he say?', 'When can we eat?', 'Come and
help us.', 'He is still here.', 'I have to go now.', 'I know that much.', 'I
made a mistake.', 'I walk to school.', "That's our house.", 'Those are my CDs.',
'Walk ahead of me.', "We'll follow you.", 'Beware of the dog!', 'He came back
soon.', 'He has three sons.', 'I know how to ski.', 'I know what to do.', "I'm
kind of happy.", 'Keep to the right.', 'She began to sing.', 'She decided to
```

go.', 'Do I have to study?', 'He is sure to come.', 'I had to walk home.', 'I have to dress up.', 'I told him to come.', "I'm short of money.", 'May I speak to you?', 'She gave it to him.', 'She is kind to him.', 'She sat next to me.', 'Shut up and listen!', 'Tell me what to do.', 'Tom runs very fast.', 'We ran out of food.', 'We started to walk.', 'When does it begin?', 'Are you ready to go?', 'Do you have any gum?', 'Does she play piano?', "Don't listen to her.", 'Go and wake Mary up.', 'He seems to know us.', 'I am engaged to her.', 'I have to leave now.', 'I want to go abroad.', "I'm glad to see you.", "I'm proud of my son.", "I'm taller than you.", "I'm trying to sleep.", "It's free of charge.", "It's time to get up.", 'Nobody speaks to me.', 'Roll the ball to me.', 'She boiled the eggs.', 'She danced with him.', 'She gave him a book.', 'She has 2,000 books.', 'This apple is sweet.', 'We swam in the lake.', 'Come home before six.', 'Go and see who it is.', 'I am afraid of bears.', 'I expect him to come.', "It's a piece of cake.", 'The boy began to cry.', 'You keep out of this.', 'All of us were silent.', 'Be kind to old people.', 'Beware of pickpockets.', "Don't drink and drive.", 'He can read and write.', 'He got a lot of money.', 'He has a lot of money.', 'He is afraid of death.', 'He let go of the rope.', 'I am tired of my work.', 'I got out of the taxi.', 'None of your business.', 'They made fun of Mary.', 'Tom and I are friends.', 'When is your birthday?', 'All of them went there.', 'Can you ride a bicycle?', 'Do you want to be rich?', 'He is afraid of snakes.', 'He is fond of swimming.', 'He went in place of me.', "He's afraid of the sea.", "I'll leave that to you.", 'It seems she hates you.', 'She got engaged to him.', 'She got married to him.', 'She stood close to him.', "They're about to leave.", 'This CD belongs to her.', 'We ran after the thief.', 'What do you plan to do?', 'A square has four sides.', 'Charge it to my account.', 'Did they write a letter?', 'He asked us to help him.', 'He is known to everyone.', 'He objected to our plan.', 'I just want you to come.', 'I want something to eat.', 'Is he a friend of yours?', 'The news quickly spread.', "I can't find it anywhere.", "I thought you'd be angry.", 'Please sit here and wait.', 'She went out of the room.', 'Speak slowly and clearly.', 'The sky is full of stars.', 'Come and see me right now.', 'Do you have a lot of pens?', 'Go and sit by your father.', 'He bought a pair of shoes.', 'I live on the bottom floor.', 'I sat between Tom and John.', 'She wore a beautiful dress.', 'When did you come to Japan?', "Most people think I'm crazy.", 'I suppose Tom is still alive.', 'She asked him for some money.', 'Tom told me about it himself.', 'Do you know when he will come?', 'He painted a picture of a dog.', 'I arrived ahead of the others.', 'I know every inch of the town.', "I'm not sharing this with Tom.", 'She is not afraid of anything.', 'The price of eggs is going up.', 'What is the price of this cap?', 'Which of them is your brother?', 'He arrived after the bell rang.', 'He was not aware of the danger.', 'My throat hurts when I swallow.', 'The school looks like a prison.', "I'm not sure how to answer this.", "There's no easy way out of here.", 'Three vicious dogs attacked Tom.', 'Tom was in Australia a year ago.', 'When did the wedding take place?', 'Where do you keep your passport?', "Because he's sick, he can't come.", 'Friendship requires mutual trust.', "He put the ring on Mary's finger.", 'She glanced through the magazine.', 'Tom has been crying all afternoon.', 'Tom has been in contact with Mary.', 'I want to be a pilot in the future.', 'If Tom ran away, where could he go?', 'I had my pocket picked on the

train.', 'He told her something and she smiled.', "I don't like to go out when it's dark.", 'When he spoke, everyone became silent.', 'Tom drank with us until after midnight.', 'She has never been in a car driven by him.', 'Tom goes to church with Mary every Sunday.', "I don't think people use that word anymore.", 'My younger sister got married in her teens.', 'I wonder why Tom suggested we do that together.', "Tom says he doesn't think he can do that by himself.", "People who live in glass houses shouldn't throw stones.", "It's been a long time since I've heard anyone use that word.", 'If you want your workers to be happy, you need to pay them a decent wage.', "It's my fault that the cake was burned. I was talking on the phone and didn't notice the time."]

[13]:
```
print(target_texts)
```

```
['\t       .\n', '\t         \n', '\t      .\n', '\t
  ?\n', '\t         ?\n', '\t       \n', '\t
   \n', '\t    ?\n', '\t     \n', '\t      \n', '\t
        \n', '\t          \n', '\t      \n',
'\t          \n', '\t          ?\n', '\t      \n',
'\t          \n', '\t      \n', '\t          \n',
'\t          \n', '\t             \n', '\t
     \n', '\t     \n', '\t         \n', '\t
  \n', '\t          \n', '\t          \n', '\t
          \n', '\t              \n', '\t
               ?\n', '\t             \n', '\t
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            \n', '\t             \n', '\t
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'\t               \n', '\t                  \n',
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          ?\n', '\t           \n', '\t
   \n', '\t                    \n', '\t
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     \n', '\t                  \n', '\t
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'\t         \n', '\t                   \n', '\t
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          \n', '\t                  \n', '\t
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           \n', '\t                \n', '\t
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         \n', '\t             ?\n', '\t
                \n', '\t
     .\n', '\t             \n', '\t
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           \n', '\t                \n', '\t
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'\t                        \n', '\t
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   \n', '\t                \n', '\t
```

```
                \n', '\t
     \n', '\t                              .\n',
'\t                        .\n', '\t
   \n', '\t                                \n',
'\t                \n', '\t
       ?\n', '\t                                  \n',
'\t                \n', '\t
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                .\n', '\t
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        \n', '\t                      .\n', '\t
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                       \n', '\t
          \n', '\t
        \n', '\t
                 \n', '\t
      .
  \n']
```

[14]:
```
input_token_index = dict([(char, i) for i, char in enumerate(input_characters)])

target_token_index = dict([(char, i) for i, char in␣
 ↪enumerate(target_characters)])
```

[15]:
```
print(input_token_index)
```

```
{' ': 0, '!': 1, '"': 2, ',': 3, '.': 4, '0': 5, '2': 6, '?': 7, 'A': 8, 'B': 9,
'C': 10, 'D': 11, 'F': 12, 'G': 13, 'H': 14, 'I': 15, 'J': 16, 'K': 17, 'L': 18,
'M': 19, 'N': 20, 'P': 21, 'R': 22, 'S': 23, 'T': 24, 'W': 25, 'Y': 26, 'a': 27,
'b': 28, 'c': 29, 'd': 30, 'e': 31, 'f': 32, 'g': 33, 'h': 34, 'i': 35, 'j': 36,
'k': 37, 'l': 38, 'm': 39, 'n': 40, 'o': 41, 'p': 42, 'q': 43, 'r': 44, 's': 45,
't': 46, 'u': 47, 'v': 48, 'w': 49, 'x': 50, 'y': 51, 'z': 52}
```

[16]:
```
print(target_token_index)
```

```
{'\t': 0, '\n': 1, ' ': 2, '!': 3, '(': 4, ')': 5, ',': 6, '.': 7, '0': 8, '2':
9, '?': 10, 'C': 11, 'D': 12, ' ': 13, ' ': 14, ' ': 15, ' ': 16, ' ': 17, ' ':
18, ' ': 19, ' ': 20, ' ': 21, ' ': 22, ' ': 23, ' ': 24, ' ': 25, ' ': 26, ' ':
27, ' ': 28, ' ': 29, ' ': 30, ' ': 31, ' ': 32, ' ': 33, ' ': 34, ' ': 35, ' ':
36, ' ': 37, ' ': 38, ' ': 39, ' ': 40, ' ': 41, ' ': 42, ' ': 43, ' ': 44, '':
```

```
45, ' ': 46, ' ': 47, ' ': 48, ' ': 49, ' ': 50, ' ': 51, ' ': 52, '': 53}
```

Creating the 3 dimensional array

(No of input text,Max sequence's length,No of lan's character)

[17]:
```
encoder_input_data = np.zeros((len(input_texts), max_encoder_seq_length,␣
↪num_encoder_tokens),dtype='float32')

decoder_input_data = np.zeros((len(input_texts), max_decoder_seq_length,␣
↪num_decoder_tokens),dtype='float32')

decoder_target_data = np.zeros((len(input_texts), max_decoder_seq_length,␣
↪num_decoder_tokens),dtype='float32')
```

[18]:
```
for i, (input_text, target_text) in enumerate(zip(input_texts, target_texts)):
    for t, char in enumerate(input_text):
        encoder_input_data[i, t, input_token_index[char]] = 1.
    encoder_input_data[i, t + 1:, input_token_index[' ']] = 1.
    for t, char in enumerate(target_text):

        decoder_input_data[i, t, target_token_index[char]] = 1.
        if t > 0:

            decoder_target_data[i, t - 1, target_token_index[char]] = 1.
    decoder_input_data[i, t + 1:, target_token_index[' ']] = 1.
    decoder_target_data[i, t:, target_token_index[' ']] = 1.

encoder_inputs = Input(shape=(None, num_encoder_tokens))
encoder = LSTM(latent_dim, return_state=True)
encoder_outputs, state_h, state_c = encoder(encoder_inputs)

encoder_states = [state_h, state_c]
```

[19]:
```
decoder_inputs = Input(shape=(None, num_decoder_tokens))

decoder_lstm = LSTM(latent_dim, return_sequences=True, return_state=True)
decoder_outputs, _, _ = decoder_lstm(decoder_inputs,
                                     initial_state=encoder_states)
decoder_dense = Dense(num_decoder_tokens, activation='softmax')
decoder_outputs = decoder_dense(decoder_outputs)
```

[20]:
```
model = Model([encoder_inputs, decoder_inputs], decoder_outputs)
```

[21]:
```
model.compile(optimizer='rmsprop',␣
↪loss='categorical_crossentropy',metrics=['accuracy'])
```

[22]:
```
model.fit([encoder_input_data, decoder_input_data], decoder_target_data,
          batch_size=batch_size,
          epochs=epochs,
          validation_split=0.2)
```

```
Epoch 1/100
3/3 [==============================] - 9s 1s/step - loss: 3.3387 - accuracy:
0.4550 - val_loss: 3.5604 - val_accuracy: 0.5871
Epoch 2/100
3/3 [==============================] - 2s 630ms/step - loss: 1.6074 - accuracy:
0.7609 - val_loss: 2.0681 - val_accuracy: 0.5928
Epoch 3/100
3/3 [==============================] - 2s 618ms/step - loss: 1.4439 - accuracy:
0.7102 - val_loss: 2.0205 - val_accuracy: 0.5948
Epoch 4/100
3/3 [==============================] - 2s 591ms/step - loss: 1.2831 - accuracy:
0.7614 - val_loss: 1.9983 - val_accuracy: 0.5946
Epoch 5/100
3/3 [==============================] - 2s 589ms/step - loss: 1.1382 - accuracy:
0.7642 - val_loss: 2.1675 - val_accuracy: 0.5948
Epoch 6/100
3/3 [==============================] - 2s 590ms/step - loss: 1.0318 - accuracy:
0.7630 - val_loss: 1.7479 - val_accuracy: 0.5992
Epoch 7/100
3/3 [==============================] - 2s 608ms/step - loss: 1.1387 - accuracy:
0.7560 - val_loss: 2.0837 - val_accuracy: 0.5957
Epoch 8/100
3/3 [==============================] - 2s 622ms/step - loss: 0.9957 - accuracy:
0.7638 - val_loss: 1.9264 - val_accuracy: 0.5961
Epoch 9/100
3/3 [==============================] - 2s 587ms/step - loss: 0.9619 - accuracy:
0.7663 - val_loss: 2.0483 - val_accuracy: 0.5939
Epoch 10/100
3/3 [==============================] - 2s 658ms/step - loss: 0.9913 - accuracy:
0.7630 - val_loss: 1.7728 - val_accuracy: 0.5964
Epoch 11/100
3/3 [==============================] - 2s 642ms/step - loss: 0.9384 - accuracy:
0.7667 - val_loss: 1.9070 - val_accuracy: 0.5972
Epoch 12/100
3/3 [==============================] - 2s 657ms/step - loss: 0.9204 - accuracy:
0.7702 - val_loss: 1.9566 - val_accuracy: 0.5953
Epoch 13/100
3/3 [==============================] - 2s 618ms/step - loss: 0.9568 - accuracy:
0.7670 - val_loss: 1.6549 - val_accuracy: 0.6023
Epoch 14/100
3/3 [==============================] - 2s 510ms/step - loss: 0.9604 - accuracy:
0.7673 - val_loss: 1.9743 - val_accuracy: 0.5990
```

```
Epoch 15/100
3/3 [==============================] - 1s 423ms/step - loss: 0.9175 - accuracy:
0.7710 - val_loss: 1.6339 - val_accuracy: 0.5979
Epoch 16/100
3/3 [==============================] - 2s 654ms/step - loss: 0.9336 - accuracy:
0.7703 - val_loss: 1.9953 - val_accuracy: 0.6003
Epoch 17/100
3/3 [==============================] - 2s 617ms/step - loss: 0.9028 - accuracy:
0.7715 - val_loss: 1.8921 - val_accuracy: 0.5891
Epoch 18/100
3/3 [==============================] - 2s 519ms/step - loss: 0.9280 - accuracy:
0.7681 - val_loss: 2.0710 - val_accuracy: 0.5970
Epoch 19/100
3/3 [==============================] - 1s 406ms/step - loss: 0.9497 - accuracy:
0.7715 - val_loss: 1.6462 - val_accuracy: 0.6049
Epoch 20/100
3/3 [==============================] - 2s 531ms/step - loss: 1.0060 - accuracy:
0.7668 - val_loss: 1.8281 - val_accuracy: 0.5983
Epoch 21/100
3/3 [==============================] - 2s 504ms/step - loss: 0.8852 - accuracy:
0.7729 - val_loss: 1.9393 - val_accuracy: 0.6001
Epoch 22/100
3/3 [==============================] - 2s 625ms/step - loss: 0.8774 - accuracy:
0.7716 - val_loss: 1.9522 - val_accuracy: 0.5988
Epoch 23/100
3/3 [==============================] - 2s 622ms/step - loss: 0.8976 - accuracy:
0.7728 - val_loss: 1.6043 - val_accuracy: 0.6067
Epoch 24/100
3/3 [==============================] - 2s 640ms/step - loss: 0.8933 - accuracy:
0.7730 - val_loss: 1.8610 - val_accuracy: 0.6003
Epoch 25/100
3/3 [==============================] - 2s 651ms/step - loss: 0.8609 - accuracy:
0.7740 - val_loss: 1.7371 - val_accuracy: 0.6012
Epoch 26/100
3/3 [==============================] - 2s 666ms/step - loss: 0.8569 - accuracy:
0.7726 - val_loss: 1.5950 - val_accuracy: 0.6036
Epoch 27/100
3/3 [==============================] - 2s 621ms/step - loss: 0.8677 - accuracy:
0.7780 - val_loss: 2.0953 - val_accuracy: 0.6001
Epoch 28/100
3/3 [==============================] - 2s 509ms/step - loss: 0.8479 - accuracy:
0.7770 - val_loss: 1.6935 - val_accuracy: 0.6025
Epoch 29/100
3/3 [==============================] - 2s 513ms/step - loss: 0.8566 - accuracy:
0.7757 - val_loss: 2.3758 - val_accuracy: 0.6062
Epoch 30/100
3/3 [==============================] - 2s 588ms/step - loss: 0.8998 - accuracy:
0.7805 - val_loss: 1.5878 - val_accuracy: 0.6045
```

```
Epoch 31/100
3/3 [==============================] - 2s 626ms/step - loss: 0.8510 - accuracy:
0.7796 - val_loss: 1.7504 - val_accuracy: 0.6076
Epoch 32/100
3/3 [==============================] - 2s 605ms/step - loss: 0.8266 - accuracy:
0.7822 - val_loss: 1.7288 - val_accuracy: 0.6043
Epoch 33/100
3/3 [==============================] - 2s 580ms/step - loss: 0.8180 - accuracy:
0.7845 - val_loss: 1.8087 - val_accuracy: 0.6005
Epoch 34/100
3/3 [==============================] - 2s 562ms/step - loss: 0.8388 - accuracy:
0.7754 - val_loss: 1.6023 - val_accuracy: 0.6120
Epoch 35/100
3/3 [==============================] - 2s 648ms/step - loss: 0.8092 - accuracy:
0.7833 - val_loss: 1.6039 - val_accuracy: 0.6027
Epoch 36/100
3/3 [==============================] - 2s 625ms/step - loss: 0.8050 - accuracy:
0.7778 - val_loss: 1.5398 - val_accuracy: 0.6076
Epoch 37/100
3/3 [==============================] - 2s 606ms/step - loss: 0.8189 - accuracy:
0.7790 - val_loss: 2.2589 - val_accuracy: 0.6117
Epoch 38/100
3/3 [==============================] - 2s 602ms/step - loss: 0.9093 - accuracy:
0.7835 - val_loss: 1.5096 - val_accuracy: 0.6067
Epoch 39/100
3/3 [==============================] - 2s 635ms/step - loss: 0.8359 - accuracy:
0.7795 - val_loss: 1.7085 - val_accuracy: 0.6111
Epoch 40/100
3/3 [==============================] - 2s 631ms/step - loss: 0.7931 - accuracy:
0.7884 - val_loss: 1.6963 - val_accuracy: 0.6157
Epoch 41/100
3/3 [==============================] - 2s 657ms/step - loss: 0.7860 - accuracy:
0.7908 - val_loss: 1.6238 - val_accuracy: 0.6166
Epoch 42/100
3/3 [==============================] - 2s 590ms/step - loss: 0.7792 - accuracy:
0.7923 - val_loss: 1.5897 - val_accuracy: 0.6234
Epoch 43/100
3/3 [==============================] - 2s 621ms/step - loss: 0.7738 - accuracy:
0.7952 - val_loss: 1.6146 - val_accuracy: 0.6236
Epoch 44/100
3/3 [==============================] - 2s 597ms/step - loss: 0.7683 - accuracy:
0.7971 - val_loss: 1.6302 - val_accuracy: 0.6214
Epoch 45/100
3/3 [==============================] - 2s 636ms/step - loss: 0.7910 - accuracy:
0.7916 - val_loss: 1.4595 - val_accuracy: 0.6238
Epoch 46/100
3/3 [==============================] - 2s 596ms/step - loss: 0.8308 - accuracy:
0.7916 - val_loss: 1.4858 - val_accuracy: 0.6148
```

```
Epoch 47/100
3/3 [==============================] - 2s 629ms/step - loss: 0.7633 - accuracy:
0.7943 - val_loss: 1.4528 - val_accuracy: 0.6234
Epoch 48/100
3/3 [==============================] - 2s 659ms/step - loss: 0.7550 - accuracy:
0.7970 - val_loss: 1.4773 - val_accuracy: 0.6238
Epoch 49/100
3/3 [==============================] - 2s 626ms/step - loss: 0.7517 - accuracy:
0.7946 - val_loss: 1.4132 - val_accuracy: 0.6282
Epoch 50/100
3/3 [==============================] - 2s 609ms/step - loss: 0.7532 - accuracy:
0.7971 - val_loss: 1.4773 - val_accuracy: 0.6190
Epoch 51/100
3/3 [==============================] - 2s 603ms/step - loss: 0.7388 - accuracy:
0.8014 - val_loss: 1.4081 - val_accuracy: 0.6339
Epoch 52/100
3/3 [==============================] - 2s 582ms/step - loss: 0.7330 - accuracy:
0.8021 - val_loss: 1.6101 - val_accuracy: 0.6102
Epoch 53/100
3/3 [==============================] - 2s 626ms/step - loss: 0.7650 - accuracy:
0.7927 - val_loss: 1.3825 - val_accuracy: 0.6346
Epoch 54/100
3/3 [==============================] - 2s 659ms/step - loss: 0.7330 - accuracy:
0.8051 - val_loss: 1.3907 - val_accuracy: 0.6368
Epoch 55/100
3/3 [==============================] - 2s 606ms/step - loss: 0.7155 - accuracy:
0.8088 - val_loss: 1.3749 - val_accuracy: 0.6421
Epoch 56/100
3/3 [==============================] - 2s 642ms/step - loss: 0.7115 - accuracy:
0.8087 - val_loss: 1.3844 - val_accuracy: 0.6429
Epoch 57/100
3/3 [==============================] - 2s 637ms/step - loss: 0.7231 - accuracy:
0.8072 - val_loss: 1.3660 - val_accuracy: 0.6317
Epoch 58/100
3/3 [==============================] - 2s 604ms/step - loss: 0.8427 - accuracy:
0.7998 - val_loss: 1.3987 - val_accuracy: 0.6335
Epoch 59/100
3/3 [==============================] - 2s 625ms/step - loss: 0.7272 - accuracy:
0.8062 - val_loss: 1.3451 - val_accuracy: 0.6460
Epoch 60/100
3/3 [==============================] - 2s 647ms/step - loss: 0.7020 - accuracy:
0.8082 - val_loss: 1.3275 - val_accuracy: 0.6504
Epoch 61/100
3/3 [==============================] - 2s 649ms/step - loss: 0.6913 - accuracy:
0.8136 - val_loss: 1.3177 - val_accuracy: 0.6491
Epoch 62/100
3/3 [==============================] - 2s 622ms/step - loss: 0.6833 - accuracy:
0.8129 - val_loss: 1.3075 - val_accuracy: 0.6555
```

```
Epoch 63/100
3/3 [==============================] - 2s 613ms/step - loss: 0.6786 - accuracy:
0.8186 - val_loss: 1.3138 - val_accuracy: 0.6506
Epoch 64/100
3/3 [==============================] - 2s 606ms/step - loss: 0.6759 - accuracy:
0.8162 - val_loss: 1.3502 - val_accuracy: 0.6449
Epoch 65/100
3/3 [==============================] - 2s 636ms/step - loss: 0.6784 - accuracy:
0.8150 - val_loss: 1.3090 - val_accuracy: 0.6495
Epoch 66/100
3/3 [==============================] - 2s 643ms/step - loss: 0.6626 - accuracy:
0.8209 - val_loss: 1.2945 - val_accuracy: 0.6482
Epoch 67/100
3/3 [==============================] - 2s 612ms/step - loss: 0.6584 - accuracy:
0.8193 - val_loss: 1.3064 - val_accuracy: 0.6550
Epoch 68/100
3/3 [==============================] - 2s 634ms/step - loss: 0.6565 - accuracy:
0.8214 - val_loss: 1.2882 - val_accuracy: 0.6568
Epoch 69/100
3/3 [==============================] - 2s 624ms/step - loss: 0.6488 - accuracy:
0.8238 - val_loss: 1.2480 - val_accuracy: 0.6645
Epoch 70/100
3/3 [==============================] - 2s 615ms/step - loss: 0.6481 - accuracy:
0.8246 - val_loss: 1.2736 - val_accuracy: 0.6653
Epoch 71/100
3/3 [==============================] - 2s 629ms/step - loss: 0.6395 - accuracy:
0.8261 - val_loss: 1.2397 - val_accuracy: 0.6724
Epoch 72/100
3/3 [==============================] - 2s 659ms/step - loss: 0.6375 - accuracy:
0.8296 - val_loss: 1.2854 - val_accuracy: 0.6574
Epoch 73/100
3/3 [==============================] - 2s 628ms/step - loss: 0.6344 - accuracy:
0.8242 - val_loss: 1.2605 - val_accuracy: 0.6535
Epoch 74/100
3/3 [==============================] - 2s 643ms/step - loss: 0.6302 - accuracy:
0.8272 - val_loss: 1.2493 - val_accuracy: 0.6638
Epoch 75/100
3/3 [==============================] - 2s 624ms/step - loss: 0.6173 - accuracy:
0.8305 - val_loss: 1.2328 - val_accuracy: 0.6704
Epoch 76/100
3/3 [==============================] - 2s 610ms/step - loss: 0.6147 - accuracy:
0.8312 - val_loss: 1.2245 - val_accuracy: 0.6660
Epoch 77/100
3/3 [==============================] - 2s 620ms/step - loss: 0.6109 - accuracy:
0.8303 - val_loss: 1.1987 - val_accuracy: 0.6803
Epoch 78/100
3/3 [==============================] - 2s 660ms/step - loss: 0.6103 - accuracy:
0.8359 - val_loss: 1.2085 - val_accuracy: 0.6799
```

```
Epoch 79/100
3/3 [==============================] - 2s 630ms/step - loss: 0.5992 - accuracy:
0.8359 - val_loss: 1.2866 - val_accuracy: 0.6594
Epoch 80/100
3/3 [==============================] - 2s 548ms/step - loss: 0.5998 - accuracy:
0.8319 - val_loss: 1.1785 - val_accuracy: 0.6825
Epoch 81/100
3/3 [==============================] - 2s 592ms/step - loss: 0.5925 - accuracy:
0.8362 - val_loss: 1.1978 - val_accuracy: 0.6719
Epoch 82/100
3/3 [==============================] - 2s 611ms/step - loss: 0.5934 - accuracy:
0.8353 - val_loss: 1.1667 - val_accuracy: 0.6834
Epoch 83/100
3/3 [==============================] - 2s 632ms/step - loss: 0.5804 - accuracy:
0.8405 - val_loss: 1.1701 - val_accuracy: 0.6794
Epoch 84/100
3/3 [==============================] - 2s 634ms/step - loss: 0.5764 - accuracy:
0.8394 - val_loss: 1.2039 - val_accuracy: 0.6757
Epoch 85/100
3/3 [==============================] - 2s 668ms/step - loss: 0.5705 - accuracy:
0.8426 - val_loss: 1.1770 - val_accuracy: 0.6772
Epoch 86/100
3/3 [==============================] - 2s 636ms/step - loss: 0.5757 - accuracy:
0.8369 - val_loss: 1.1577 - val_accuracy: 0.6906
Epoch 87/100
3/3 [==============================] - 2s 633ms/step - loss: 0.5666 - accuracy:
0.8407 - val_loss: 1.1674 - val_accuracy: 0.6849
Epoch 88/100
3/3 [==============================] - 2s 621ms/step - loss: 0.5569 - accuracy:
0.8447 - val_loss: 1.1494 - val_accuracy: 0.6886
Epoch 89/100
3/3 [==============================] - 2s 610ms/step - loss: 0.5507 - accuracy:
0.8475 - val_loss: 1.3691 - val_accuracy: 0.6704
Epoch 90/100
3/3 [==============================] - 2s 528ms/step - loss: 0.5625 - accuracy:
0.8412 - val_loss: 1.1333 - val_accuracy: 0.6884
Epoch 91/100
3/3 [==============================] - 2s 521ms/step - loss: 0.5489 - accuracy:
0.8453 - val_loss: 1.1557 - val_accuracy: 0.6882
Epoch 92/100
3/3 [==============================] - 2s 535ms/step - loss: 0.5392 - accuracy:
0.8492 - val_loss: 1.1195 - val_accuracy: 0.6970
Epoch 93/100
3/3 [==============================] - 2s 635ms/step - loss: 0.5334 - accuracy:
0.8520 - val_loss: 1.1308 - val_accuracy: 0.6908
Epoch 94/100
3/3 [==============================] - 2s 591ms/step - loss: 0.5372 - accuracy:
0.8467 - val_loss: 1.1914 - val_accuracy: 0.6812
```

```
Epoch 95/100
3/3 [==============================] - 2s 616ms/step - loss: 0.5364 - accuracy:
0.8471 - val_loss: 1.1012 - val_accuracy: 0.6935
Epoch 96/100
3/3 [==============================] - 2s 659ms/step - loss: 0.5249 - accuracy:
0.8530 - val_loss: 1.1196 - val_accuracy: 0.7007
Epoch 97/100
3/3 [==============================] - 2s 584ms/step - loss: 0.5209 - accuracy:
0.8542 - val_loss: 1.1015 - val_accuracy: 0.6972
Epoch 98/100
3/3 [==============================] - 2s 586ms/step - loss: 0.5196 - accuracy:
0.8512 - val_loss: 1.1509 - val_accuracy: 0.6976
Epoch 99/100
3/3 [==============================] - 2s 634ms/step - loss: 0.5143 - accuracy:
0.8554 - val_loss: 1.0960 - val_accuracy: 0.6966
Epoch 100/100
3/3 [==============================] - 2s 607ms/step - loss: 0.5248 - accuracy:
0.8539 - val_loss: 1.1037 - val_accuracy: 0.6937
```

[22]:
```
<keras.callbacks.History at 0x1653f18db80>
```

[23]:
```
model.save('tameng.h5')
```

Sampling models

[24]:
```
encoder_model = Model(encoder_inputs, encoder_states)

decoder_state_input_h = Input(shape=(latent_dim,))
decoder_state_input_c = Input(shape=(latent_dim,))
decoder_states_inputs = [decoder_state_input_h, decoder_state_input_c]
decoder_outputs, state_h, state_c = decoder_lstm(
    decoder_inputs, initial_state=decoder_states_inputs)
decoder_states = [state_h, state_c]
decoder_outputs = decoder_dense(decoder_outputs)
decoder_model = Model(
    [decoder_inputs] + decoder_states_inputs,
    [decoder_outputs] + decoder_states)
```

[25]:
```
reverse_input_char_index = dict(
    (i, char) for char, i in input_token_index.items())
reverse_target_char_index = dict(
    (i, char) for char, i in target_token_index.items())
```

[26]:
```
def decode_sequence(input_seq):

    states_value = encoder_model.predict(input_seq)

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

```
    target_seq[0, 0, target_token_index['\t']] = 1.

    stop_condition = False
    decoded_sentence = ''
    while not stop_condition:
        output_tokens, h, c = decoder_model.predict(
            [target_seq] + states_value)

        sampled_token_index = np.argmax(output_tokens[0, -1, :])
        sampled_char = reverse_target_char_index[sampled_token_index]
        decoded_sentence += sampled_char

        if (sampled_char == '\n' or
           len(decoded_sentence) > max_decoder_seq_length):
            stop_condition = True

        target_seq = np.zeros((1, 1, num_decoder_tokens))
        target_seq[0, 0, sampled_token_index] = 1.

        states_value = [h, c]

    return decoded_sentence
```

[27]:
```
for seq_index in range(100):

    input_seq = encoder_input_data[seq_index: seq_index + 1]
    decoded_sentence = decode_sequence(input_seq)
    print('-')
    print('Input sentence:', input_texts[seq_index])
    print('Decoded sentence:', decoded_sentence)
```

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1/1 [==============================] - 1s 616ms/step
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Input sentence: I slept.
Decoded sentence:
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Input sentence: Calm down.
Decoded sentence:
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1/1 [==============================] - 0s 31ms/step
-
Input sentence: I'll walk.
Decoded sentence:
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1/1 [==============================] - 0s 31ms/step
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1/1 [==============================] - 0s 32ms/step
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-
Input sentence: Who is he?
Decoded sentence:
1/1 [==============================] - 0s 55ms/step
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1/1 [==============================] - 0s 30ms/step
1/1 [==============================] - 0s 32ms/step
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-
Input sentence: Who knows?
Decoded sentence:
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1/1 [==============================] - 0s 47ms/step
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-
Input sentence: She smiled.
Decoded sentence:
1/1 [==============================] - 0s 38ms/step
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1/1 [==============================] - 0s 24ms/step
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-
Input sentence: Talk to me!
Decoded sentence:
1/1 [==============================] - 0s 29ms/step
1/1 [==============================] - 0s 18ms/step
1/1 [==============================] - 0s 23ms/step
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-
Input sentence: Who is she?
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Decoded sentence:
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-
Input sentence: Go to sleep.
Decoded sentence:
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-
Input sentence: It may rain.
Decoded sentence:
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-
Input sentence: She bit him.
Decoded sentence:
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1/1 [==============================] - 0s 17ms/step
1/1 [==============================] - 0s 20ms/step
1/1 [==============================] - 0s 67ms/step
1/1 [==============================] - 0s 15ms/step
1/1 [==============================] - 0s 32ms/step
1/1 [==============================] - 0s 22ms/step
1/1 [==============================] - 0s 16ms/step
1/1 [==============================] - 0s 16ms/step
1/1 [==============================] - 0s 30ms/step
1/1 [==============================] - 0s 16ms/step
1/1 [==============================] - 0s 48ms/step
1/1 [==============================] - 0s 28ms/step
1/1 [==============================] - 0s 20ms/step
1/1 [==============================] - 0s 18ms/step
-
Input sentence: She hit him.
Decoded sentence:
1/1 [==============================] - 0s 36ms/step
1/1 [==============================] - 0s 22ms/step
1/1 [==============================] - 0s 25ms/step
1/1 [==============================] - 0s 33ms/step
1/1 [==============================] - 0s 20ms/step
1/1 [==============================] - 0s 22ms/step
1/1 [==============================] - 0s 23ms/step
1/1 [==============================] - 0s 27ms/step
1/1 [==============================] - 0s 34ms/step
1/1 [==============================] - 0s 23ms/step
1/1 [==============================] - 0s 26ms/step
1/1 [==============================] - 0s 36ms/step
1/1 [==============================] - 0s 18ms/step
1/1 [==============================] - 0s 19ms/step
1/1 [==============================] - 0s 31ms/step
```

```
1/1 [==============================] - 0s 38ms/step
1/1 [==============================] - 0s 27ms/step
1/1 [==============================] - 0s 38ms/step
1/1 [==============================] - 0s 26ms/step
1/1 [==============================] - 0s 20ms/step
1/1 [==============================] - 0s 6ms/step
1/1 [==============================] - 0s 34ms/step
1/1 [==============================] - 0s 40ms/step
1/1 [==============================] - 0s 23ms/step
1/1 [==============================] - 0s 34ms/step
1/1 [==============================] - 0s 21ms/step
1/1 [==============================] - 0s 17ms/step
1/1 [==============================] - 0s 17ms/step
1/1 [==============================] - 0s 17ms/step
1/1 [==============================] - 0s 24ms/step
1/1 [==============================] - 0s 29ms/step
1/1 [==============================] - 0s 26ms/step
1/1 [==============================] - 0s 44ms/step
1/1 [==============================] - 0s 28ms/step
1/1 [==============================] - 0s 28ms/step
1/1 [==============================] - 0s 40ms/step
1/1 [==============================] - 0s 30ms/step
1/1 [==============================] - 0s 20ms/step
1/1 [==============================] - 0s 17ms/step
1/1 [==============================] - 0s 19ms/step
1/1 [==============================] - 0s 19ms/step
1/1 [==============================] - 0s 14ms/step
1/1 [==============================] - 0s 37ms/step
1/1 [==============================] - 0s 21ms/step
1/1 [==============================] - 0s 25ms/step
1/1 [==============================] - 0s 32ms/step
1/1 [==============================] - 0s 21ms/step
1/1 [==============================] - 0s 25ms/step
1/1 [==============================] - 0s 15ms/step
1/1 [==============================] - 0s 23ms/step
1/1 [==============================] - 0s 26ms/step
1/1 [==============================] - 0s 24ms/step
1/1 [==============================] - 0s 11ms/step
1/1 [==============================] - 0s 23ms/step
1/1 [==============================] - 0s 33ms/step
1/1 [==============================] - 0s 19ms/step
1/1 [==============================] - 0s 35ms/step
1/1 [==============================] - 0s 35ms/step
1/1 [==============================] - 0s 19ms/step
1/1 [==============================] - 0s 27ms/step
1/1 [==============================] - 0s 26ms/step
1/1 [==============================] - 0s 24ms/step
1/1 [==============================] - 0s 24ms/step
```

```
1/1 [==============================] - 0s 25ms/step
1/1 [==============================] - 0s 20ms/step
1/1 [==============================] - 0s 20ms/step
1/1 [==============================] - 0s 20ms/step
1/1 [==============================] - 0s 31ms/step
1/1 [==============================] - 0s 16ms/step
1/1 [==============================] - 0s 16ms/step
1/1 [==============================] - 0s 18ms/step
1/1 [==============================] - 0s 31ms/step
1/1 [==============================] - 0s 31ms/step
1/1 [==============================] - 0s 36ms/step
1/1 [==============================] - 0s 18ms/step
1/1 [==============================] - 0s 6ms/step
1/1 [==============================] - 0s 34ms/step
1/1 [==============================] - 0s 33ms/step
1/1 [==============================] - 0s 39ms/step
1/1 [==============================] - 0s 36ms/step
1/1 [==============================] - 0s 15ms/step
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1/1 [==============================] - 0s 27ms/step
1/1 [==============================] - 0s 20ms/step
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1/1 [==============================] - 0s 35ms/step
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1/1 [==============================] - 0s 35ms/step
1/1 [==============================] - 0s 26ms/step
1/1 [==============================] - 0s 32ms/step
1/1 [==============================] - 0s 34ms/step
1/1 [==============================] - 0s 49ms/step
1/1 [==============================] - 0s 25ms/step
1/1 [==============================] - 0s 33ms/step
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1/1 [==============================] - 0s 26ms/step
1/1 [==============================] - 0s 33ms/step
1/1 [==============================] - 0s 26ms/step
1/1 [==============================] - 0s 49ms/step
1/1 [==============================] - 0s 41ms/step
1/1 [==============================] - 0s 27ms/step
1/1 [==============================] - 0s 18ms/step
1/1 [==============================] - 0s 17ms/step
1/1 [==============================] - 0s 31ms/step
1/1 [==============================] - 0s 20ms/step
```

```
1/1 [==============================] - 0s 35ms/step
1/1 [==============================] - 0s 3ms/step
-
Input sentence: She is kind.
Decoded sentence:
1/1 [==============================] - 0s 16ms/step
1/1 [==============================] - 0s 20ms/step
1/1 [==============================] - 0s 45ms/step
1/1 [==============================] - 0s 16ms/step
1/1 [==============================] - 0s 13ms/step
1/1 [==============================] - 0s 16ms/step
1/1 [==============================] - 0s 32ms/step
1/1 [==============================] - 0s 25ms/step
1/1 [==============================] - 0s 25ms/step
1/1 [==============================] - 0s 16ms/step
1/1 [==============================] - 0s 16ms/step
1/1 [==============================] - 0s 15ms/step
1/1 [==============================] - 0s 26ms/step
1/1 [==============================] - 0s 16ms/step
1/1 [==============================] - 0s 23ms/step
1/1 [==============================] - 0s 23ms/step
1/1 [==============================] - 0s 26ms/step
1/1 [==============================] - 0s 30ms/step
1/1 [==============================] - 0s 28ms/step
1/1 [==============================] - 0s 25ms/step
1/1 [==============================] - 0s 19ms/step
1/1 [==============================] - 0s 33ms/step
1/1 [==============================] - 0s 20ms/step
1/1 [==============================] - 0s 28ms/step
1/1 [==============================] - 0s 19ms/step
1/1 [==============================] - 0s 18ms/step
1/1 [==============================] - 0s 16ms/step
1/1 [==============================] - 0s 17ms/step
1/1 [==============================] - 0s 24ms/step
1/1 [==============================] - 0s 25ms/step
1/1 [==============================] - 0s 19ms/step
1/1 [==============================] - 0s 32ms/step
1/1 [==============================] - 0s 18ms/step
1/1 [==============================] - 0s 16ms/step
1/1 [==============================] - 0s 34ms/step
```

```
---------------------------------------------------------------------------
KeyboardInterrupt                         Traceback (most recent call last)
Cell In[27], line 5
      1 for seq_index in range(100):
      2     # Take one sequence (part of the training set)
      3     # for trying out decoding.
```

```
      4     input_seq = encoder_input_data[seq_index: seq_index + 1]
----> 5     decoded_sentence = decode_sequence(input_seq)
      6     print('-')
      7     print('Input sentence:', input_texts[seq_index])

Cell In[26], line 15, in decode_sequence(input_seq)
     13 decoded_sentence = ''
     14 while not stop_condition:
---> 15     output_tokens, h, c = decoder_model.predict(
     16         [target_seq] + states_value)
     18     # Sample a token
     19     sampled_token_index = np.argmax(output_tokens[0, -1, :])

File ~\anaconda3\envs\tf\lib\site-packages\keras\utils\traceback_utils.py:64, i
 ↪filter_traceback.<locals>.error_handler(*args, **kwargs)
     62 filtered_tb = None
     63 try:
---> 64   return fn(*args, **kwargs)
     65 except Exception as e:  # pylint: disable=broad-except
     66   filtered_tb = _process_traceback_frames(e.__traceback__)

File ~\anaconda3\envs\tf\lib\site-packages\keras\engine\training.py:2029, in
 ↪Model.predict(self, x, batch_size, verbose, steps, callbacks, max_queue_size,
 ↪workers, use_multiprocessing)
   2027 callbacks.on_predict_begin()
   2028 batch_outputs = None
-> 2029 for _, iterator in data_handler.enumerate_epochs():  # Single epoch.
   2030   with data_handler.catch_stop_iteration():
   2031     for step in data_handler.steps():

File ~\anaconda3\envs\tf\lib\site-packages\keras\engine\data_adapter.py:1193, i
 ↪DataHandler.enumerate_epochs(self)
   1191 """Yields `(epoch, tf.data.Iterator)`."""
   1192 with self._truncate_execution_to_epoch():
-> 1193   data_iterator = iter(self._dataset)
   1194   for epoch in range(self._initial_epoch, self._epochs):
   1195     if self._insufficient_data:  # Set by `catch_stop_iteration`.

File
 ↪~\anaconda3\envs\tf\lib\site-packages\tensorflow\python\data\ops\dataset_ops.
 ↪py:494, in DatasetV2.__iter__(self)
    492 if context.executing_eagerly() or ops.inside_function():
    493   with ops.colocate_with(self._variant_tensor):
--> 494     return iterator_ops.OwnedIterator(self)
    495 else:
    496   raise RuntimeError("`tf.data.Dataset` only supports Python-style "
    497                      "iteration in eager mode or within tf.function.")
```

```
File␣
 ↪~\anaconda3\envs\tf\lib\site-packages\tensorflow\python\data\ops\iterator_ops
 ↪py:696, in OwnedIterator.__init__(self, dataset, components, element_spec)
    692   if (components is not None or element_spec is not None):
    693     raise ValueError(
    694         "When `dataset` is provided, `element_spec` and `components`␣
 ↪must "
    695         "not be specified.")
--> 696   self._create_iterator(dataset)
    698 self._get_next_call_count = 0

File␣
 ↪~\anaconda3\envs\tf\lib\site-packages\tensorflow\python\data\ops\iterator_ops
 ↪py:721, in OwnedIterator._create_iterator(self, dataset)
    716 with ops.colocate_with(ds_variant):
    717   self._iterator_resource = (
    718       gen_dataset_ops.anonymous_iterator_v3(
    719           output_types=self._flat_output_types,
    720           output_shapes=self._flat_output_shapes))
--> 721   gen_dataset_ops.make_iterator(ds_variant, self._iterator_resource)

File ~\anaconda3\envs\tf\lib\site-packages\tensorflow\python\ops\gen_dataset_op
 ↪py:3408, in make_iterator(dataset, iterator, name)
   3406 if tld.is_eager:
   3407   try:
-> 3408     _result = pywrap_tfe.TFE_Py_FastPathExecute(
   3409       _ctx, "MakeIterator", name, dataset, iterator)
   3410     return _result
   3411   except _core._NotOkStatusException as e:

KeyboardInterrupt:
```

[36]:
```
def translate_sentence(input_sentence):
    input_sequence = tamil_tokenizer.texts_to_sequences([input_sentence])
    input_sequence_padded = pad_sequences(input_sequence, maxlen=max_length,␣
 ↪padding='post')
    decoded_sentence = ''
    target_sequence = np.zeros((1, max_length))
    target_sequence[0, 0] = english_tokenizer.word_index['<start>']
    for i in range(max_length - 1):
        output_tokens = model.predict([input_sequence_padded, target_sequence])
        sampled_token_index = np.argmax(output_tokens[0, i, :])
        if sampled_token_index == 0:
            break
        sampled_word = english_tokenizer.index_word[sampled_token_index]
        if sampled_word == '<end>':
            break
```

```
        decoded_sentence += sampled_word + ' '
        target_sequence[0, i + 1] = sampled_token_index
    return decoded_sentence.strip()

tamil_sentence = input("Enter a Tamil sentence: ")

translated_sentence = translate_sentence(tamil_sentence)

print('Translated English: ', translated_sentence)
```

```
Enter a Tamil sentence:
I'm so happy
```

[37]:
```
tamil_sentence = input("Enter a Tamil sentence: ")

translated_sentence = translate_sentence(tamil_sentence)

print('Translated English: ', translated_sentence)
```

```
Enter a Tamil sentence:
It wasn't necessary
```

[38]:
```
tamil_sentence = input("Enter a Tamil sentence: ")

translated_sentence = translate_sentence(tamil_sentence)

print('Translated English: ', translated_sentence)
```

```
Enter a Tamil sentence:
please do that again
```

[39]:
```
tamil_sentence = input("Enter a Tamil sentence: ")

translated_sentence = translate_sentence(tamil_sentence)

print('Translated English: ', translated_sentence)
```

```
Enter a Tamil sentence:
That is a good idea
```

[40]:
```
tamil_sentence = input("Enter a Tamil sentence: ")
translated_sentence = translate_sentence(tamil_sentence)

print('Translated English: ', translated_sentence)
```

```
Enter a Tamil sentence:
They agree to work together
```

[ ]: