

## ▼ Translation Using Word Level Seq2Seq

```
%tensorflow_version 1.14
import tensorflow.compat.v1 as tf
tf.disable_v2_behavior()
from tensorflow import keras
from IPython import display
from matplotlib import cm
from matplotlib import gridspec
from matplotlib import pyplot as plt
import numpy as np
import pandas as pd
from tensorflow.python.data import Dataset
from sklearn import preprocessing
from sklearn.preprocessing import StandardScaler
print(tf.__version__)
import string
from string import digits
%matplotlib inline
import re
from sklearn.utils import shuffle
from sklearn.model_selection import train_test_split
from keras.layers import Input, LSTM, Embedding, Dense
from keras.models import Model
```

☞ `%tensorflow\_version` only switches the major version: 1.x or 2.x.  
You set: `1.14`. This will be interpreted as: `1.x`.

```
TensorFlow 1.x selected.
WARNING:tensorflow:From /tensorflow-1.15.2/python3.6/tensorflow_core/python/compat:
Instructions for updating:
non-resource variables are not supported in the long term
1.15.2
Using TensorFlow backend.
```

```
lines= pd.read_table('hin.txt', names=['eng','hin','otherdata'])
```

```
lines = lines[0:50000]
```

```
lines.shape
```

☞ (2778, 3)

```
lines.sample(10)
```



	eng	hin	otherdata
1005	He was sentenced to death.	उसे मौत की सज़ा दे दी गई।	CC-BY 2.0 (France) Attribution: tatoeba.org #2...
2195	Workers must have their hair cut short.	कर्मचारियों को अपने बाल छोटे कटाने होते हैं।	CC-BY 2.0 (France) Attribution: tatoeba.org #2...
150	He has a beard.	उसके पास दाढ़ी है।	CC-BY 2.0 (France) Attribution: tatoeba.org #2...
1417	He took advantage of my youth.	उसने मेरे जवान होने का फ़ायदा उठाया।	CC-BY 2.0 (France) Attribution: tatoeba.org #2...
1290	Tom isn't able to drive yet.	टॉम अभी गाड़ी नहीं चला सकता।	CC-BY 2.0 (France) Attribution: tatoeba.org #1...
798	He couldn't get the job.	उसको नौकरी नहीं मिल पायी।	CC-BY 2.0 (France) Attribution: tatoeba.org #4...
1572	Why were you late this morning?	तुम आज सुबह देर से क्यों आया?	CC-BY 2.0 (France) Attribution: tatoeba.org #2...

```
lines.eng=lines.eng.apply(lambda x: x.lower())
lines.hin=lines.hin.apply(lambda x: x.lower())
```

```
# Take the length as 50
```

```
lines.eng=lines.eng.apply(lambda x: re.sub("'", '', x)).apply(lambda x: re.sub(",", ' ', x))
lines.hin=lines.hin.apply(lambda x: re.sub("'", '', x)).apply(lambda x: re.sub(",", ' ', x))
```

```
exclude = set(string.punctuation)
lines.eng=lines.eng.apply(lambda x: ''.join(ch for ch in x if ch not in exclude))
lines.hin=lines.hin.apply(lambda x: ''.join(ch for ch in x if ch not in exclude))
```

```
remove_digits = str.maketrans('', '', digits)
lines.eng=lines.eng.apply(lambda x: x.translate(remove_digits))
lines.hin=lines.hin.apply(lambda x: x.translate(remove_digits))
```

```
lines.head()
```



	eng	hin	otherdata
0	wow	वाह	CC-BY 2.0 (France) Attribution: tatoeba.org #5...
1	help	बचाओ	CC-BY 2.0 (France) Attribution: tatoeba.org #4...
2	jump	उछलो	CC-BY 2.0 (France) Attribution: tatoeba.org #6...
3	jump	कूदो	CC-BY 2.0 (France) Attribution: tatoeba.org #6...
4	jump	छलांग	CC-BY 2.0 (France) Attribution: tatoeba.org #6...

```
lines.hin = lines.hin.apply(lambda x : 'START ' + x + ' END')
```

```
lines.hin.head()
```

```

0      START_ वह _END
1      START_ बचाओ _END
2      START_ उछलो _END
3      START_ कूदो _END
4      START_ छलांग _END
Name: hin, dtype: object

```

```

all_eng_words=set()
for eng in lines.eng:
    for word in eng.split():
        if word not in all_eng_words:
            all_eng_words.add(word)

```

```

all_hindi_words=set()
for hin in lines.hin:
    for word in hin.split():
        if word not in all_hindi_words:
            all_hindi_words.add(word)

```

```
len(all_eng_words), len(all_hindi_words)
```

```
(2345, 2991)
```

```

lenght_list=[]
for l in lines.hin:
    lenght_list.append(len(l.split(' ')))
np.max(lenght_list)

```

```
29
```

```

lenght_list=[]
for l in lines.eng:
    lenght_list.append(len(l.split(' ')))
np.max(lenght_list)

```

```
23
```

```

input_words = sorted(list(all_eng_words))
target_words = sorted(list(all_hindi_words))
num_encoder_tokens = len(all_eng_words)
num_decoder_tokens = len(all_hindi_words)

```

```

input_token_index = dict(
    [(word, i) for i, word in enumerate(input_words)])
target_token_index = dict(

```

```

[(word, i) for i, word in enumerate(target_words)])

encoder_input_data = np.zeros(
    (len(lines.eng), 23),
    dtype='float32')
decoder_input_data = np.zeros(
    (len(lines.hin), 29),
    dtype='float32')
decoder_target_data = np.zeros(
    (len(lines.hin), 29, num_decoder_tokens),
    dtype='float32')

for i, (input_text, target_text) in enumerate(zip(lines.eng, lines.hin)):
    for t, word in enumerate(input_text.split()):
        encoder_input_data[i, t] = input_token_index[word]
    for t, word in enumerate(target_text.split()):
        # decoder_target_data is ahead of decoder_input_data by one timestep
        decoder_input_data[i, t] = target_token_index[word]
        if t > 0:
            # decoder_target_data will be ahead by one timestep
            # and will not include the start character.
            decoder_target_data[i, t - 1, target_token_index[word]] = 1.

```

## ▼ Build keras encoder-decoder model

```

embedding_size = 100

from keras.layers import Input, LSTM, Embedding, Dense
from keras.models import Model
from keras.utils import plot_model

#Encoder model
encoder_inputs = Input(shape=(None,))
en_x= Embedding(num_encoder_tokens, embedding_size)(encoder_inputs)
encoder = LSTM(50, return_state=True)
encoder_outputs, state_h, state_c = encoder(en_x)
# We discard `encoder_outputs` and only keep the states.
encoder_states = [state_h, state_c]

[⚠] WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tens
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tens
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tens

```

```

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

dex= Embedding(num_decoder_tokens, embedding_size)

final_dex= dex(decoder_inputs)

decoder_lstm = LSTM(50, return_sequences=True, return_state=True)

decoder_outputs, _, _ = decoder_lstm(final_dex,
                                     initial_state=encoder_states)

decoder_dense = Dense(num_decoder_tokens, activation='softmax')

decoder_outputs = decoder_dense(decoder_outputs)

model = Model([encoder_inputs, decoder_inputs], decoder_outputs)

model.compile(optimizer='rmsprop', loss='categorical_crossentropy', metrics=['acc'])

[> WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/optimizers.py
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tens

model.summary()

[>

```

```
#Fit the model
model.fit([encoder_input_data, decoder_input_data], decoder_target_data,
          batch_size=128,
          epochs=500,
          validation_split=0.05)
```



```

WARNING:tensorflow:From /tensorflow-1.15.2/python3.6/tensorflow_core/python/ops/r
Instructions for updating:
Use tf.where in 2.0, which has the same broadcast rule as np.where
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tens

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tens

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tens

Train on 2639 samples, validate on 139 samples
Epoch 1/500
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tens

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tens

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tens

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tens

2639/2639 [=====] - 11s 4ms/step - loss: 1.9295 - acc: (
Epoch 2/500
2639/2639 [=====] - 2s 694us/step - loss: 1.6307 - acc:
Epoch 3/500
2639/2639 [=====] - 2s 693us/step - loss: 1.5500 - acc:
Epoch 4/500
2639/2639 [=====] - 2s 681us/step - loss: 1.5211 - acc:
Epoch 5/500
2639/2639 [=====] - 2s 677us/step - loss: 1.4997 - acc:
Epoch 6/500
2639/2639 [=====] - 2s 674us/step - loss: 1.4794 - acc:
Epoch 7/500
2639/2639 [=====] - 2s 678us/step - loss: 1.4616 - acc:
Epoch 8/500
2639/2639 [=====] - 2s 680us/step - loss: 1.4456 - acc:
Epoch 9/500
2639/2639 [=====] - 2s 684us/step - loss: 1.4317 - acc:
Epoch 10/500
2639/2639 [=====] - 2s 679us/step - loss: 1.4172 - acc:
Epoch 11/500
2639/2639 [=====] - 2s 680us/step - loss: 1.4038 - acc:
Epoch 12/500
2639/2639 [=====] - 2s 677us/step - loss: 1.3904 - acc:
Epoch 13/500
2639/2639 [=====] - 2s 680us/step - loss: 1.3776 - acc:
Epoch 14/500
2639/2639 [=====] - 2s 678us/step - loss: 1.3659 - acc:
Epoch 15/500
2639/2639 [=====] - 2s 680us/step - loss: 1.3541 - acc:
Epoch 16/500
2639/2639 [=====] - 2s 679us/step - loss: 1.3427 - acc:
Epoch 17/500
2639/2639 [=====] - 2s 683us/step - loss: 1.3315 - acc:
Epoch 18/500
2639/2639 [=====] - 2s 673us/step - loss: 1.3208 - acc:
Epoch 19/500

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2639/2639 [=====] - 2s 685us/step - loss: 1.3102 - acc:
Epoch 20/500
2639/2639 [=====] - 2s 679us/step - loss: 1.3009 - acc:
Epoch 21/500
2639/2639 [=====] - 2s 688us/step - loss: 1.2908 - acc:
Epoch 22/500
2639/2639 [=====] - 2s 685us/step - loss: 1.2821 - acc:
Epoch 23/500
2639/2639 [=====] - 2s 683us/step - loss: 1.2732 - acc:
Epoch 24/500
2639/2639 [=====] - 2s 689us/step - loss: 1.2639 - acc:
Epoch 25/500
2639/2639 [=====] - 2s 688us/step - loss: 1.2552 - acc:
Epoch 26/500
2639/2639 [=====] - 2s 681us/step - loss: 1.2478 - acc:
Epoch 27/500
2639/2639 [=====] - 2s 688us/step - loss: 1.2385 - acc:
Epoch 28/500
2639/2639 [=====] - 2s 678us/step - loss: 1.2299 - acc:
Epoch 29/500
2639/2639 [=====] - 2s 680us/step - loss: 1.2221 - acc:
Epoch 30/500
2639/2639 [=====] - 2s 678us/step - loss: 1.2134 - acc:
Epoch 31/500
2639/2639 [=====] - 2s 680us/step - loss: 1.2058 - acc:
Epoch 32/500
2639/2639 [=====] - 2s 674us/step - loss: 1.1980 - acc:
Epoch 33/500
2639/2639 [=====] - 2s 675us/step - loss: 1.1903 - acc:
Epoch 34/500
2639/2639 [=====] - 2s 680us/step - loss: 1.1816 - acc:
Epoch 35/500
2639/2639 [=====] - 2s 673us/step - loss: 1.1757 - acc:
Epoch 36/500
2639/2639 [=====] - 2s 677us/step - loss: 1.1664 - acc:
Epoch 37/500
2639/2639 [=====] - 2s 671us/step - loss: 1.1600 - acc:
Epoch 38/500
2639/2639 [=====] - 2s 678us/step - loss: 1.1520 - acc:
Epoch 39/500
2639/2639 [=====] - 2s 673us/step - loss: 1.1449 - acc:
Epoch 40/500
2639/2639 [=====] - 2s 673us/step - loss: 1.1370 - acc:
Epoch 41/500
2639/2639 [=====] - 2s 676us/step - loss: 1.1303 - acc:
Epoch 42/500
2639/2639 [=====] - 2s 677us/step - loss: 1.1230 - acc:
Epoch 43/500
2639/2639 [=====] - 2s 679us/step - loss: 1.1164 - acc:
Epoch 44/500
2639/2639 [=====] - 2s 673us/step - loss: 1.1091 - acc:
Epoch 45/500
2639/2639 [=====] - 2s 684us/step - loss: 1.1016 - acc:
Epoch 46/500
2639/2639 [=====] - 2s 690us/step - loss: 1.0951 - acc:
Epoch 47/500
2639/2639 [=====] - 2s 679us/step - loss: 1.0884 - acc:
Epoch 48/500
```



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2639/2639 [=====] - 2s 686us/step - loss: 1.0812 - acc:
Epoch 49/500
2639/2639 [=====] - 2s 671us/step - loss: 1.0737 - acc:
Epoch 50/500
2639/2639 [=====] - 2s 694us/step - loss: 1.0681 - acc:
Epoch 51/500
2639/2639 [=====] - 2s 704us/step - loss: 1.0605 - acc:
Epoch 52/500
2639/2639 [=====] - 2s 686us/step - loss: 1.0536 - acc:
Epoch 53/500
2639/2639 [=====] - 2s 697us/step - loss: 1.0473 - acc:
Epoch 54/500
2639/2639 [=====] - 2s 695us/step - loss: 1.0414 - acc:
Epoch 55/500
2639/2639 [=====] - 2s 689us/step - loss: 1.0337 - acc:
Epoch 56/500
2639/2639 [=====] - 2s 690us/step - loss: 1.0282 - acc:
Epoch 57/500
2639/2639 [=====] - 2s 675us/step - loss: 1.0211 - acc:
Epoch 58/500
2639/2639 [=====] - 2s 676us/step - loss: 1.0152 - acc:
Epoch 59/500
2639/2639 [=====] - 2s 675us/step - loss: 1.0094 - acc:
Epoch 60/500
2639/2639 [=====] - 2s 680us/step - loss: 1.0018 - acc:
Epoch 61/500
2639/2639 [=====] - 2s 676us/step - loss: 0.9956 - acc:
Epoch 62/500
2639/2639 [=====] - 2s 682us/step - loss: 0.9899 - acc:
Epoch 63/500
2639/2639 [=====] - 2s 690us/step - loss: 0.9838 - acc:
Epoch 64/500
2639/2639 [=====] - 2s 672us/step - loss: 0.9780 - acc:
Epoch 65/500
2639/2639 [=====] - 2s 679us/step - loss: 0.9722 - acc:
Epoch 66/500
2639/2639 [=====] - 2s 687us/step - loss: 0.9668 - acc:
Epoch 67/500
2639/2639 [=====] - 2s 684us/step - loss: 0.9598 - acc:
Epoch 68/500
2639/2639 [=====] - 2s 694us/step - loss: 0.9542 - acc:
Epoch 69/500
2639/2639 [=====] - 2s 675us/step - loss: 0.9483 - acc:
Epoch 70/500
2639/2639 [=====] - 2s 683us/step - loss: 0.9431 - acc:
Epoch 71/500
2639/2639 [=====] - 2s 682us/step - loss: 0.9370 - acc:
Epoch 72/500
2639/2639 [=====] - 2s 678us/step - loss: 0.9309 - acc:
Epoch 73/500
2639/2639 [=====] - 2s 683us/step - loss: 0.9259 - acc:
Epoch 74/500
2639/2639 [=====] - 2s 680us/step - loss: 0.9197 - acc:
Epoch 75/500
2639/2639 [=====] - 2s 675us/step - loss: 0.9146 - acc:
Epoch 76/500
2639/2639 [=====] - 2s 677us/step - loss: 0.9092 - acc:
Epoch 77/500
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Epoch 77/500
2639/2639 [=====] - 2s 681us/step - loss: 0.9041 - acc:
Epoch 78/500
2639/2639 [=====] - 2s 678us/step - loss: 0.8969 - acc:
Epoch 79/500
2639/2639 [=====] - 2s 681us/step - loss: 0.8928 - acc:
Epoch 80/500
2639/2639 [=====] - 2s 679us/step - loss: 0.8868 - acc:
Epoch 81/500
2639/2639 [=====] - 2s 682us/step - loss: 0.8824 - acc:
Epoch 82/500
2639/2639 [=====] - 2s 674us/step - loss: 0.8762 - acc:
Epoch 83/500
2639/2639 [=====] - 2s 675us/step - loss: 0.8712 - acc:
Epoch 84/500
2639/2639 [=====] - 2s 675us/step - loss: 0.8658 - acc:
Epoch 85/500
2639/2639 [=====] - 2s 683us/step - loss: 0.8607 - acc:
Epoch 86/500
2639/2639 [=====] - 2s 678us/step - loss: 0.8548 - acc:
Epoch 87/500
2639/2639 [=====] - 2s 680us/step - loss: 0.8505 - acc:
Epoch 88/500
2639/2639 [=====] - 2s 677us/step - loss: 0.8434 - acc:
Epoch 89/500
2639/2639 [=====] - 2s 688us/step - loss: 0.8401 - acc:
Epoch 90/500
2639/2639 [=====] - 2s 680us/step - loss: 0.8335 - acc:
Epoch 91/500
2639/2639 [=====] - 2s 687us/step - loss: 0.8286 - acc:
Epoch 92/500
2639/2639 [=====] - 2s 680us/step - loss: 0.8235 - acc:
Epoch 93/500
2639/2639 [=====] - 2s 685us/step - loss: 0.8191 - acc:
Epoch 94/500
2639/2639 [=====] - 2s 681us/step - loss: 0.8135 - acc:
Epoch 95/500
2639/2639 [=====] - 2s 686us/step - loss: 0.8093 - acc:
Epoch 96/500
2639/2639 [=====] - 2s 680us/step - loss: 0.8028 - acc:
Epoch 97/500
2639/2639 [=====] - 2s 690us/step - loss: 0.7984 - acc:
Epoch 98/500
2639/2639 [=====] - 2s 680us/step - loss: 0.7932 - acc:
Epoch 99/500
2639/2639 [=====] - 2s 677us/step - loss: 0.7875 - acc:
Epoch 100/500
2639/2639 [=====] - 2s 676us/step - loss: 0.7837 - acc:
Epoch 101/500
2639/2639 [=====] - 2s 684us/step - loss: 0.7783 - acc:
Epoch 102/500
2639/2639 [=====] - 2s 685us/step - loss: 0.7737 - acc:
Epoch 103/500
2639/2639 [=====] - 2s 678us/step - loss: 0.7684 - acc:
Epoch 104/500
2639/2639 [=====] - 2s 680us/step - loss: 0.7632 - acc:
Epoch 105/500
2639/2639 [=====] - 2s 680us/step - loss: 0.7595 - acc:
Epoch 106/500
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Epoch 106/500
2639/2639 [=====] - 2s 681us/step - loss: 0.7536 - acc:
Epoch 107/500
2639/2639 [=====] - 2s 684us/step - loss: 0.7486 - acc:
Epoch 108/500
2639/2639 [=====] - 2s 684us/step - loss: 0.7439 - acc:
Epoch 109/500
2639/2639 [=====] - 2s 682us/step - loss: 0.7391 - acc:
Epoch 110/500
2639/2639 [=====] - 2s 679us/step - loss: 0.7346 - acc:
Epoch 111/500
2639/2639 [=====] - 2s 679us/step - loss: 0.7300 - acc:
Epoch 112/500
2639/2639 [=====] - 2s 689us/step - loss: 0.7250 - acc:
Epoch 113/500
2639/2639 [=====] - 2s 692us/step - loss: 0.7204 - acc:
Epoch 114/500
2639/2639 [=====] - 2s 690us/step - loss: 0.7150 - acc:
Epoch 115/500
2639/2639 [=====] - 2s 687us/step - loss: 0.7120 - acc:
Epoch 116/500
2639/2639 [=====] - 2s 691us/step - loss: 0.7064 - acc:
Epoch 117/500
2639/2639 [=====] - 2s 683us/step - loss: 0.7010 - acc:
Epoch 118/500
2639/2639 [=====] - 2s 685us/step - loss: 0.6974 - acc:
Epoch 119/500
2639/2639 [=====] - 2s 686us/step - loss: 0.6930 - acc:
Epoch 120/500
2639/2639 [=====] - 2s 678us/step - loss: 0.6884 - acc:
Epoch 121/500
2639/2639 [=====] - 2s 690us/step - loss: 0.6846 - acc:
Epoch 122/500
2639/2639 [=====] - 2s 684us/step - loss: 0.6794 - acc:
Epoch 123/500
2639/2639 [=====] - 2s 691us/step - loss: 0.6750 - acc:
Epoch 124/500
2639/2639 [=====] - 2s 684us/step - loss: 0.6711 - acc:
Epoch 125/500
2639/2639 [=====] - 2s 682us/step - loss: 0.6665 - acc:
Epoch 126/500
2639/2639 [=====] - 2s 679us/step - loss: 0.6613 - acc:
Epoch 127/500
2639/2639 [=====] - 2s 677us/step - loss: 0.6575 - acc:
Epoch 128/500
2639/2639 [=====] - 2s 677us/step - loss: 0.6533 - acc:
Epoch 129/500
2639/2639 [=====] - 2s 678us/step - loss: 0.6502 - acc:
Epoch 130/500
2639/2639 [=====] - 2s 679us/step - loss: 0.6446 - acc:
Epoch 131/500
2639/2639 [=====] - 2s 675us/step - loss: 0.6411 - acc:
Epoch 132/500
2639/2639 [=====] - 2s 680us/step - loss: 0.6355 - acc:
Epoch 133/500
2639/2639 [=====] - 2s 704us/step - loss: 0.6335 - acc:
Epoch 134/500
2639/2639 [=====] - 2s 687us/step - loss: 0.6288 - acc:
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```
Epoch 135/500
2639/2639 [=====] - 2s 684us/step - loss: 0.6242 - acc:
Epoch 136/500
2639/2639 [=====] - 2s 683us/step - loss: 0.6201 - acc:
Epoch 137/500
2639/2639 [=====] - 2s 679us/step - loss: 0.6159 - acc:
Epoch 138/500
2639/2639 [=====] - 2s 685us/step - loss: 0.6116 - acc:
Epoch 139/500
2639/2639 [=====] - 2s 682us/step - loss: 0.6076 - acc:
Epoch 140/500
2639/2639 [=====] - 2s 677us/step - loss: 0.6043 - acc:
Epoch 141/500
2639/2639 [=====] - 2s 682us/step - loss: 0.5999 - acc:
Epoch 142/500
2639/2639 [=====] - 2s 691us/step - loss: 0.5969 - acc:
Epoch 143/500
2639/2639 [=====] - 2s 676us/step - loss: 0.5930 - acc:
Epoch 144/500
2639/2639 [=====] - 2s 686us/step - loss: 0.5882 - acc:
Epoch 145/500
2639/2639 [=====] - 2s 672us/step - loss: 0.5847 - acc:
Epoch 146/500
2639/2639 [=====] - 2s 672us/step - loss: 0.5809 - acc:
Epoch 147/500
2639/2639 [=====] - 2s 682us/step - loss: 0.5763 - acc:
Epoch 148/500
2639/2639 [=====] - 2s 676us/step - loss: 0.5732 - acc:
Epoch 149/500
2639/2639 [=====] - 2s 676us/step - loss: 0.5696 - acc:
Epoch 150/500
2639/2639 [=====] - 2s 680us/step - loss: 0.5652 - acc:
Epoch 151/500
2639/2639 [=====] - 2s 677us/step - loss: 0.5622 - acc:
Epoch 152/500
2639/2639 [=====] - 2s 687us/step - loss: 0.5584 - acc:
Epoch 153/500
2639/2639 [=====] - 2s 677us/step - loss: 0.5542 - acc:
Epoch 154/500
2639/2639 [=====] - 2s 681us/step - loss: 0.5504 - acc:
Epoch 155/500
2639/2639 [=====] - 2s 677us/step - loss: 0.5471 - acc:
Epoch 156/500
2639/2639 [=====] - 2s 688us/step - loss: 0.5436 - acc:
Epoch 157/500
2639/2639 [=====] - 2s 681us/step - loss: 0.5408 - acc:
Epoch 158/500
2639/2639 [=====] - 2s 682us/step - loss: 0.5360 - acc:
Epoch 159/500
2639/2639 [=====] - 2s 687us/step - loss: 0.5331 - acc:
Epoch 160/500
2639/2639 [=====] - 2s 692us/step - loss: 0.5289 - acc:
Epoch 161/500
2639/2639 [=====] - 2s 686us/step - loss: 0.5265 - acc:
Epoch 162/500
2639/2639 [=====] - 2s 677us/step - loss: 0.5221 - acc:
Epoch 163/500
2639/2639 [=====] - 2s 683us/step - loss: 0.5185 - acc:
```

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Epoch 164/500
2639/2639 [=====] - 2s 678us/step - loss: 0.5163 - acc:
Epoch 165/500
2639/2639 [=====] - 2s 690us/step - loss: 0.5113 - acc:
Epoch 166/500
2639/2639 [=====] - 2s 673us/step - loss: 0.5095 - acc:
Epoch 167/500
2639/2639 [=====] - 2s 678us/step - loss: 0.5059 - acc:
Epoch 168/500
2639/2639 [=====] - 2s 684us/step - loss: 0.5022 - acc:
Epoch 169/500
2639/2639 [=====] - 2s 678us/step - loss: 0.4984 - acc:
Epoch 170/500
2639/2639 [=====] - 2s 685us/step - loss: 0.4955 - acc:
Epoch 171/500
2639/2639 [=====] - 2s 694us/step - loss: 0.4921 - acc:
Epoch 172/500
2639/2639 [=====] - 2s 693us/step - loss: 0.4892 - acc:
Epoch 173/500
2639/2639 [=====] - 2s 699us/step - loss: 0.4858 - acc:
Epoch 174/500
2639/2639 [=====] - 2s 679us/step - loss: 0.4816 - acc:
Epoch 175/500
2639/2639 [=====] - 2s 676us/step - loss: 0.4802 - acc:
Epoch 176/500
2639/2639 [=====] - 2s 686us/step - loss: 0.4757 - acc:
Epoch 177/500
2639/2639 [=====] - 2s 689us/step - loss: 0.4727 - acc:
Epoch 178/500
2639/2639 [=====] - 2s 691us/step - loss: 0.4697 - acc:
Epoch 179/500
2639/2639 [=====] - 2s 678us/step - loss: 0.4667 - acc:
Epoch 180/500
2639/2639 [=====] - 2s 683us/step - loss: 0.4633 - acc:
Epoch 181/500
2639/2639 [=====] - 2s 677us/step - loss: 0.4618 - acc:
Epoch 182/500
2639/2639 [=====] - 2s 686us/step - loss: 0.4567 - acc:
Epoch 183/500
2639/2639 [=====] - 2s 686us/step - loss: 0.4554 - acc:
Epoch 184/500
2639/2639 [=====] - 2s 681us/step - loss: 0.4519 - acc:
Epoch 185/500
2639/2639 [=====] - 2s 691us/step - loss: 0.4479 - acc:
Epoch 186/500
2639/2639 [=====] - 2s 674us/step - loss: 0.4453 - acc:
Epoch 187/500
2639/2639 [=====] - 2s 688us/step - loss: 0.4432 - acc:
Epoch 188/500
2639/2639 [=====] - 2s 684us/step - loss: 0.4405 - acc:
Epoch 189/500
2639/2639 [=====] - 2s 678us/step - loss: 0.4374 - acc:
Epoch 190/500
2639/2639 [=====] - 2s 675us/step - loss: 0.4340 - acc:
Epoch 191/500
2639/2639 [=====] - 2s 680us/step - loss: 0.4316 - acc:
Epoch 192/500
2639/2639 [=====] - 2s 685us/step - loss: 0.4287 - acc:
```

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2039/2039 [-----] - 2s 663us/step - loss: 0.4207 - acc:  
Epoch 193/500  
2639/2639 [=====] - 2s 686us/step - loss: 0.4257 - acc:  
Epoch 194/500  
2639/2639 [=====] - 2s 683us/step - loss: 0.4237 - acc:  
Epoch 195/500  
2639/2639 [=====] - 2s 680us/step - loss: 0.4203 - acc:  
Epoch 196/500  
2639/2639 [=====] - 2s 681us/step - loss: 0.4160 - acc:  
Epoch 197/500  
2639/2639 [=====] - 2s 676us/step - loss: 0.4146 - acc:  
Epoch 198/500  
2639/2639 [=====] - 2s 691us/step - loss: 0.4120 - acc:  
Epoch 199/500  
2639/2639 [=====] - 2s 697us/step - loss: 0.4095 - acc:  
Epoch 200/500  
2639/2639 [=====] - 2s 689us/step - loss: 0.4070 - acc:  
Epoch 201/500  
2639/2639 [=====] - 2s 680us/step - loss: 0.4038 - acc:  
Epoch 202/500  
2639/2639 [=====] - 2s 685us/step - loss: 0.4016 - acc:  
Epoch 203/500  
2639/2639 [=====] - 2s 684us/step - loss: 0.3978 - acc:  
Epoch 204/500  
2639/2639 [=====] - 2s 686us/step - loss: 0.3975 - acc:  
Epoch 205/500  
2639/2639 [=====] - 2s 693us/step - loss: 0.3928 - acc:  
Epoch 206/500  
2639/2639 [=====] - 2s 681us/step - loss: 0.3910 - acc:  
Epoch 207/500  
2639/2639 [=====] - 2s 686us/step - loss: 0.3871 - acc:  
Epoch 208/500  
2639/2639 [=====] - 2s 681us/step - loss: 0.3873 - acc:  
Epoch 209/500  
2639/2639 [=====] - 2s 695us/step - loss: 0.3823 - acc:  
Epoch 210/500  
2639/2639 [=====] - 2s 687us/step - loss: 0.3817 - acc:  
Epoch 211/500  
2639/2639 [=====] - 2s 685us/step - loss: 0.3784 - acc:  
Epoch 212/500  
2639/2639 [=====] - 2s 678us/step - loss: 0.3758 - acc:  
Epoch 213/500  
2639/2639 [=====] - 2s 673us/step - loss: 0.3722 - acc:  
Epoch 214/500  
2639/2639 [=====] - 2s 676us/step - loss: 0.3718 - acc:  
Epoch 215/500  
2639/2639 [=====] - 2s 689us/step - loss: 0.3682 - acc:  
Epoch 216/500  
2639/2639 [=====] - 2s 681us/step - loss: 0.3673 - acc:  
Epoch 217/500  
2639/2639 [=====] - 2s 685us/step - loss: 0.3634 - acc:  
Epoch 218/500  
2639/2639 [=====] - 2s 675us/step - loss: 0.3623 - acc:  
Epoch 219/500  
2639/2639 [=====] - 2s 675us/step - loss: 0.3587 - acc:  
Epoch 220/500  
2639/2639 [=====] - 2s 678us/step - loss: 0.3575 - acc:  
Epoch 221/500
```

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2639/2639 [=====] - 2s 697us/step - loss: 0.3544 - acc:
Epoch 222/500
2639/2639 [=====] - 2s 694us/step - loss: 0.3528 - acc:
Epoch 223/500
2639/2639 [=====] - 2s 719us/step - loss: 0.3495 - acc:
Epoch 224/500
2639/2639 [=====] - 2s 696us/step - loss: 0.3483 - acc:
Epoch 225/500
2639/2639 [=====] - 2s 684us/step - loss: 0.3455 - acc:
Epoch 226/500
2639/2639 [=====] - 2s 695us/step - loss: 0.3424 - acc:
Epoch 227/500
2639/2639 [=====] - 2s 697us/step - loss: 0.3419 - acc:
Epoch 228/500
2639/2639 [=====] - 2s 697us/step - loss: 0.3392 - acc:
Epoch 229/500
2639/2639 [=====] - 2s 680us/step - loss: 0.3366 - acc:
Epoch 230/500
2639/2639 [=====] - 2s 681us/step - loss: 0.3349 - acc:
Epoch 231/500
2639/2639 [=====] - 2s 681us/step - loss: 0.3325 - acc:
Epoch 232/500
2639/2639 [=====] - 2s 678us/step - loss: 0.3303 - acc:
Epoch 233/500
2639/2639 [=====] - 2s 680us/step - loss: 0.3281 - acc:
Epoch 234/500
2639/2639 [=====] - 2s 677us/step - loss: 0.3249 - acc:
Epoch 235/500
2639/2639 [=====] - 2s 683us/step - loss: 0.3254 - acc:
Epoch 236/500
2639/2639 [=====] - 2s 677us/step - loss: 0.3215 - acc:
Epoch 237/500
2639/2639 [=====] - 2s 679us/step - loss: 0.3201 - acc:
Epoch 238/500
2639/2639 [=====] - 2s 675us/step - loss: 0.3184 - acc:
Epoch 239/500
2639/2639 [=====] - 2s 683us/step - loss: 0.3155 - acc:
Epoch 240/500
2639/2639 [=====] - 2s 683us/step - loss: 0.3148 - acc:
Epoch 241/500
2639/2639 [=====] - 2s 679us/step - loss: 0.3106 - acc:
Epoch 242/500
2639/2639 [=====] - 2s 677us/step - loss: 0.3108 - acc:
Epoch 243/500
2639/2639 [=====] - 2s 677us/step - loss: 0.3077 - acc:
Epoch 244/500
2639/2639 [=====] - 2s 676us/step - loss: 0.3060 - acc:
Epoch 245/500
2639/2639 [=====] - 2s 682us/step - loss: 0.3034 - acc:
Epoch 246/500
2639/2639 [=====] - 2s 682us/step - loss: 0.3024 - acc:
Epoch 247/500
2639/2639 [=====] - 2s 678us/step - loss: 0.3008 - acc:
Epoch 248/500
2639/2639 [=====] - 2s 687us/step - loss: 0.2971 - acc:
Epoch 249/500
2639/2639 [=====] - 2s 685us/step - loss: 0.2972 - acc:
Epoch 250/500
```

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2639/2639 [=====] - 2s 679us/step - loss: 0.2943 - acc:
Epoch 251/500
2639/2639 [=====] - 2s 679us/step - loss: 0.2924 - acc:
Epoch 252/500
2639/2639 [=====] - 2s 677us/step - loss: 0.2904 - acc:
Epoch 253/500
2639/2639 [=====] - 2s 684us/step - loss: 0.2895 - acc:
Epoch 254/500
2639/2639 [=====] - 2s 672us/step - loss: 0.2870 - acc:
Epoch 255/500
2639/2639 [=====] - 2s 678us/step - loss: 0.2849 - acc:
Epoch 256/500
2639/2639 [=====] - 2s 675us/step - loss: 0.2838 - acc:
Epoch 257/500
2639/2639 [=====] - 2s 683us/step - loss: 0.2818 - acc:
Epoch 258/500
2639/2639 [=====] - 2s 678us/step - loss: 0.2801 - acc:
Epoch 259/500
2639/2639 [=====] - 2s 689us/step - loss: 0.2771 - acc:
Epoch 260/500
2639/2639 [=====] - 2s 680us/step - loss: 0.2767 - acc:
Epoch 261/500
2639/2639 [=====] - 2s 676us/step - loss: 0.2745 - acc:
Epoch 262/500
2639/2639 [=====] - 2s 680us/step - loss: 0.2718 - acc:
Epoch 263/500
2639/2639 [=====] - 2s 676us/step - loss: 0.2715 - acc:
Epoch 264/500
2639/2639 [=====] - 2s 680us/step - loss: 0.2692 - acc:
Epoch 265/500
2639/2639 [=====] - 2s 674us/step - loss: 0.2674 - acc:
Epoch 266/500
2639/2639 [=====] - 2s 684us/step - loss: 0.2655 - acc:
Epoch 267/500
2639/2639 [=====] - 2s 682us/step - loss: 0.2646 - acc:
Epoch 268/500
2639/2639 [=====] - 2s 680us/step - loss: 0.2615 - acc:
Epoch 269/500
2639/2639 [=====] - 2s 674us/step - loss: 0.2606 - acc:
Epoch 270/500
2639/2639 [=====] - 2s 686us/step - loss: 0.2593 - acc:
Epoch 271/500
2639/2639 [=====] - 2s 682us/step - loss: 0.2576 - acc:
Epoch 272/500
2639/2639 [=====] - 2s 677us/step - loss: 0.2553 - acc:
Epoch 273/500
2639/2639 [=====] - 2s 674us/step - loss: 0.2541 - acc:
Epoch 274/500
2639/2639 [=====] - 2s 685us/step - loss: 0.2520 - acc:
Epoch 275/500
2639/2639 [=====] - 2s 688us/step - loss: 0.2508 - acc:
Epoch 276/500
2639/2639 [=====] - 2s 687us/step - loss: 0.2493 - acc:
Epoch 277/500
2639/2639 [=====] - 2s 672us/step - loss: 0.2470 - acc:
Epoch 278/500
2639/2639 [=====] - 2s 673us/step - loss: 0.2461 - acc:
Epoch 279/500
```



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Epoch 279/500
2639/2639 [=====] - 2s 684us/step - loss: 0.2448 - acc:
Epoch 280/500
2639/2639 [=====] - 2s 690us/step - loss: 0.2418 - acc:
Epoch 281/500
2639/2639 [=====] - 2s 687us/step - loss: 0.2409 - acc:
Epoch 282/500
2639/2639 [=====] - 2s 685us/step - loss: 0.2398 - acc:
Epoch 283/500
2639/2639 [=====] - 2s 679us/step - loss: 0.2382 - acc:
Epoch 284/500
2639/2639 [=====] - 2s 697us/step - loss: 0.2361 - acc:
Epoch 285/500
2639/2639 [=====] - 2s 688us/step - loss: 0.2348 - acc:
Epoch 286/500
2639/2639 [=====] - 2s 682us/step - loss: 0.2336 - acc:
Epoch 287/500
2639/2639 [=====] - 2s 691us/step - loss: 0.2315 - acc:
Epoch 288/500
2639/2639 [=====] - 2s 679us/step - loss: 0.2309 - acc:
Epoch 289/500
2639/2639 [=====] - 2s 681us/step - loss: 0.2280 - acc:
Epoch 290/500
2639/2639 [=====] - 2s 686us/step - loss: 0.2270 - acc:
Epoch 291/500
2639/2639 [=====] - 2s 677us/step - loss: 0.2263 - acc:
Epoch 292/500
2639/2639 [=====] - 2s 709us/step - loss: 0.2234 - acc:
Epoch 293/500
2639/2639 [=====] - 2s 682us/step - loss: 0.2243 - acc:
Epoch 294/500
2639/2639 [=====] - 2s 689us/step - loss: 0.2216 - acc:
Epoch 295/500
2639/2639 [=====] - 2s 685us/step - loss: 0.2202 - acc:
Epoch 296/500
2639/2639 [=====] - 2s 683us/step - loss: 0.2192 - acc:
Epoch 297/500
2639/2639 [=====] - 2s 678us/step - loss: 0.2166 - acc:
Epoch 298/500
2639/2639 [=====] - 2s 675us/step - loss: 0.2165 - acc:
Epoch 299/500
2639/2639 [=====] - 2s 674us/step - loss: 0.2144 - acc:
Epoch 300/500
2639/2639 [=====] - 2s 682us/step - loss: 0.2143 - acc:
Epoch 301/500
2639/2639 [=====] - 2s 686us/step - loss: 0.2119 - acc:
Epoch 302/500
2639/2639 [=====] - 2s 682us/step - loss: 0.2100 - acc:
Epoch 303/500
2639/2639 [=====] - 2s 681us/step - loss: 0.2093 - acc:
Epoch 304/500
2639/2639 [=====] - 2s 678us/step - loss: 0.2078 - acc:
Epoch 305/500
2639/2639 [=====] - 2s 681us/step - loss: 0.2068 - acc:
Epoch 306/500
2639/2639 [=====] - 2s 674us/step - loss: 0.2047 - acc:
Epoch 307/500
2639/2639 [=====] - 2s 673us/step - loss: 0.2034 - acc:
Epoch 308/500
```

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Epoch 308/500
2639/2639 [=====] - 2s 683us/step - loss: 0.2023 - acc:
Epoch 309/500
2639/2639 [=====] - 2s 676us/step - loss: 0.2022 - acc:
Epoch 310/500
2639/2639 [=====] - 2s 702us/step - loss: 0.1992 - acc:
Epoch 311/500
2639/2639 [=====] - 2s 682us/step - loss: 0.1992 - acc:
Epoch 312/500
2639/2639 [=====] - 2s 673us/step - loss: 0.1984 - acc:
Epoch 313/500
2639/2639 [=====] - 2s 679us/step - loss: 0.1951 - acc:
Epoch 314/500
2639/2639 [=====] - 2s 675us/step - loss: 0.1952 - acc:
Epoch 315/500
2639/2639 [=====] - 2s 698us/step - loss: 0.1937 - acc:
Epoch 316/500
2639/2639 [=====] - 2s 683us/step - loss: 0.1920 - acc:
Epoch 317/500
2639/2639 [=====] - 2s 683us/step - loss: 0.1912 - acc:
Epoch 318/500
2639/2639 [=====] - 2s 677us/step - loss: 0.1895 - acc:
Epoch 319/500
2639/2639 [=====] - 2s 684us/step - loss: 0.1883 - acc:
Epoch 320/500
2639/2639 [=====] - 2s 686us/step - loss: 0.1876 - acc:
Epoch 321/500
2639/2639 [=====] - 2s 693us/step - loss: 0.1861 - acc:
Epoch 322/500
2639/2639 [=====] - 2s 681us/step - loss: 0.1848 - acc:
Epoch 323/500
2639/2639 [=====] - 2s 676us/step - loss: 0.1830 - acc:
Epoch 324/500
2639/2639 [=====] - 2s 680us/step - loss: 0.1824 - acc:
Epoch 325/500
2639/2639 [=====] - 2s 682us/step - loss: 0.1817 - acc:
Epoch 326/500
2639/2639 [=====] - 2s 676us/step - loss: 0.1806 - acc:
Epoch 327/500
2639/2639 [=====] - 2s 681us/step - loss: 0.1786 - acc:
Epoch 328/500
2639/2639 [=====] - 2s 677us/step - loss: 0.1777 - acc:
Epoch 329/500
2639/2639 [=====] - 2s 676us/step - loss: 0.1756 - acc:
Epoch 330/500
2639/2639 [=====] - 2s 683us/step - loss: 0.1755 - acc:
Epoch 331/500
2639/2639 [=====] - 2s 693us/step - loss: 0.1742 - acc:
Epoch 332/500
2639/2639 [=====] - 2s 671us/step - loss: 0.1730 - acc:
Epoch 333/500
2639/2639 [=====] - 2s 686us/step - loss: 0.1714 - acc:
Epoch 334/500
2639/2639 [=====] - 2s 692us/step - loss: 0.1706 - acc:
Epoch 335/500
2639/2639 [=====] - 2s 699us/step - loss: 0.1696 - acc:
Epoch 336/500
2639/2639 [=====] - 2s 680us/step - loss: 0.1688 - acc:
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Epoch 337/500
2639/2639 [=====] - 2s 688us/step - loss: 0.1670 - acc:
Epoch 338/500
2639/2639 [=====] - 2s 697us/step - loss: 0.1664 - acc:
Epoch 339/500
2639/2639 [=====] - 2s 689us/step - loss: 0.1651 - acc:
Epoch 340/500
2639/2639 [=====] - 2s 693us/step - loss: 0.1636 - acc:
Epoch 341/500
2639/2639 [=====] - 2s 690us/step - loss: 0.1627 - acc:
Epoch 342/500
2639/2639 [=====] - 2s 696us/step - loss: 0.1616 - acc:
Epoch 343/500
2639/2639 [=====] - 2s 687us/step - loss: 0.1608 - acc:
Epoch 344/500
2639/2639 [=====] - 2s 694us/step - loss: 0.1598 - acc:
Epoch 345/500
2639/2639 [=====] - 2s 681us/step - loss: 0.1593 - acc:
Epoch 346/500
2639/2639 [=====] - 2s 673us/step - loss: 0.1577 - acc:
Epoch 347/500
2639/2639 [=====] - 2s 685us/step - loss: 0.1557 - acc:
Epoch 348/500
2639/2639 [=====] - 2s 684us/step - loss: 0.1561 - acc:
Epoch 349/500
2639/2639 [=====] - 2s 681us/step - loss: 0.1542 - acc:
Epoch 350/500
2639/2639 [=====] - 2s 680us/step - loss: 0.1535 - acc:
Epoch 351/500
2639/2639 [=====] - 2s 679us/step - loss: 0.1520 - acc:
Epoch 352/500
2639/2639 [=====] - 2s 686us/step - loss: 0.1516 - acc:
Epoch 353/500
2639/2639 [=====] - 2s 705us/step - loss: 0.1506 - acc:
Epoch 354/500
2639/2639 [=====] - 2s 678us/step - loss: 0.1487 - acc:
Epoch 355/500
2639/2639 [=====] - 2s 696us/step - loss: 0.1494 - acc:
Epoch 356/500
2639/2639 [=====] - 2s 680us/step - loss: 0.1472 - acc:
Epoch 357/500
2639/2639 [=====] - 2s 697us/step - loss: 0.1467 - acc:
Epoch 358/500
2639/2639 [=====] - 2s 690us/step - loss: 0.1451 - acc:
Epoch 359/500
2639/2639 [=====] - 2s 677us/step - loss: 0.1443 - acc:
Epoch 360/500
2639/2639 [=====] - 2s 677us/step - loss: 0.1439 - acc:
Epoch 361/500
2639/2639 [=====] - 2s 685us/step - loss: 0.1415 - acc:
Epoch 362/500
2639/2639 [=====] - 2s 683us/step - loss: 0.1422 - acc:
Epoch 363/500
2639/2639 [=====] - 2s 668us/step - loss: 0.1406 - acc:
Epoch 364/500
2639/2639 [=====] - 2s 699us/step - loss: 0.1395 - acc:
Epoch 365/500
2639/2639 [=====] - 2s 686us/step - loss: 0.1399 - acc:
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Epoch 366/500
2639/2639 [=====] - 2s 680us/step - loss: 0.1375 - acc:
Epoch 367/500
2639/2639 [=====] - 2s 693us/step - loss: 0.1363 - acc:
Epoch 368/500
2639/2639 [=====] - 2s 682us/step - loss: 0.1355 - acc:
Epoch 369/500
2639/2639 [=====] - 2s 678us/step - loss: 0.1356 - acc:
Epoch 370/500
2639/2639 [=====] - 2s 678us/step - loss: 0.1338 - acc:
Epoch 371/500
2639/2639 [=====] - 2s 677us/step - loss: 0.1325 - acc:
Epoch 372/500
2639/2639 [=====] - 2s 671us/step - loss: 0.1330 - acc:
Epoch 373/500
2639/2639 [=====] - 2s 686us/step - loss: 0.1305 - acc:
Epoch 374/500
2639/2639 [=====] - 2s 678us/step - loss: 0.1306 - acc:
Epoch 375/500
2639/2639 [=====] - 2s 686us/step - loss: 0.1307 - acc:
Epoch 376/500
2639/2639 [=====] - 2s 687us/step - loss: 0.1286 - acc:
Epoch 377/500
2639/2639 [=====] - 2s 676us/step - loss: 0.1277 - acc:
Epoch 378/500
2639/2639 [=====] - 2s 694us/step - loss: 0.1267 - acc:
Epoch 379/500
2639/2639 [=====] - 2s 681us/step - loss: 0.1270 - acc:
Epoch 380/500
2639/2639 [=====] - 2s 686us/step - loss: 0.1251 - acc:
Epoch 381/500
2639/2639 [=====] - 2s 681us/step - loss: 0.1244 - acc:
Epoch 382/500
2639/2639 [=====] - 2s 691us/step - loss: 0.1239 - acc:
Epoch 383/500
2639/2639 [=====] - 2s 679us/step - loss: 0.1217 - acc:
Epoch 384/500
2639/2639 [=====] - 2s 686us/step - loss: 0.1218 - acc:
Epoch 385/500
2639/2639 [=====] - 2s 678us/step - loss: 0.1213 - acc:
Epoch 386/500
2639/2639 [=====] - 2s 694us/step - loss: 0.1198 - acc:
Epoch 387/500
2639/2639 [=====] - 2s 689us/step - loss: 0.1190 - acc:
Epoch 388/500
2639/2639 [=====] - 2s 682us/step - loss: 0.1186 - acc:
Epoch 389/500
2639/2639 [=====] - 2s 677us/step - loss: 0.1173 - acc:
Epoch 390/500
2639/2639 [=====] - 2s 690us/step - loss: 0.1167 - acc:
Epoch 391/500
2639/2639 [=====] - 2s 686us/step - loss: 0.1160 - acc:
Epoch 392/500
2639/2639 [=====] - 2s 679us/step - loss: 0.1148 - acc:
Epoch 393/500
2639/2639 [=====] - 2s 683us/step - loss: 0.1146 - acc:
Epoch 394/500
2639/2639 [=====] - 2s 681us/step - loss: 0.1145 - acc:
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```

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2039/2039 [=====] - 2s 691us/step - loss: 0.1145 - acc:
Epoch 395/500
2639/2639 [=====] - 2s 722us/step - loss: 0.1133 - acc:
Epoch 396/500
2639/2639 [=====] - 2s 693us/step - loss: 0.1121 - acc:
Epoch 397/500
2639/2639 [=====] - 2s 690us/step - loss: 0.1114 - acc:
Epoch 398/500
2639/2639 [=====] - 2s 706us/step - loss: 0.1111 - acc:
Epoch 399/500
2639/2639 [=====] - 2s 692us/step - loss: 0.1097 - acc:
Epoch 400/500
2639/2639 [=====] - 2s 698us/step - loss: 0.1091 - acc:
Epoch 401/500
2639/2639 [=====] - 2s 676us/step - loss: 0.1081 - acc:
Epoch 402/500
2639/2639 [=====] - 2s 680us/step - loss: 0.1082 - acc:
Epoch 403/500
2639/2639 [=====] - 2s 683us/step - loss: 0.1068 - acc:
Epoch 404/500
2639/2639 [=====] - 2s 683us/step - loss: 0.1070 - acc:
Epoch 405/500
2639/2639 [=====] - 2s 687us/step - loss: 0.1061 - acc:
Epoch 406/500
2639/2639 [=====] - 2s 684us/step - loss: 0.1042 - acc:
Epoch 407/500
2639/2639 [=====] - 2s 677us/step - loss: 0.1044 - acc:
Epoch 408/500
2639/2639 [=====] - 2s 682us/step - loss: 0.1035 - acc:
Epoch 409/500
2639/2639 [=====] - 2s 682us/step - loss: 0.1016 - acc:
Epoch 410/500
2639/2639 [=====] - 2s 677us/step - loss: 0.1025 - acc:
Epoch 411/500
2639/2639 [=====] - 2s 672us/step - loss: 0.1009 - acc:
Epoch 412/500
2639/2639 [=====] - 2s 684us/step - loss: 0.1003 - acc:
Epoch 413/500
2639/2639 [=====] - 2s 677us/step - loss: 0.0998 - acc:
Epoch 414/500
2639/2639 [=====] - 2s 683us/step - loss: 0.0991 - acc:
Epoch 415/500
2639/2639 [=====] - 2s 673us/step - loss: 0.0973 - acc:
Epoch 416/500
2639/2639 [=====] - 2s 678us/step - loss: 0.0982 - acc:
Epoch 417/500
2639/2639 [=====] - 2s 685us/step - loss: 0.0965 - acc:
Epoch 418/500
2639/2639 [=====] - 2s 679us/step - loss: 0.0965 - acc:
Epoch 419/500
2639/2639 [=====] - 2s 680us/step - loss: 0.0957 - acc:
Epoch 420/500
2639/2639 [=====] - 2s 681us/step - loss: 0.0954 - acc:
Epoch 421/500
2639/2639 [=====] - 2s 682us/step - loss: 0.0933 - acc:
Epoch 422/500
2639/2639 [=====] - 2s 676us/step - loss: 0.0936 - acc:
Epoch 423/500
```

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2639/2639 [=====] - 2s 682us/step - loss: 0.0933 - acc:
Epoch 424/500
2639/2639 [=====] - 2s 689us/step - loss: 0.0920 - acc:
Epoch 425/500
2639/2639 [=====] - 2s 687us/step - loss: 0.0916 - acc:
Epoch 426/500
2639/2639 [=====] - 2s 685us/step - loss: 0.0905 - acc:
Epoch 427/500
2639/2639 [=====] - 2s 679us/step - loss: 0.0916 - acc:
Epoch 428/500
2639/2639 [=====] - 2s 684us/step - loss: 0.0892 - acc:
Epoch 429/500
2639/2639 [=====] - 2s 681us/step - loss: 0.0890 - acc:
Epoch 430/500
2639/2639 [=====] - 2s 682us/step - loss: 0.0888 - acc:
Epoch 431/500
2639/2639 [=====] - 2s 691us/step - loss: 0.0876 - acc:
Epoch 432/500
2639/2639 [=====] - 2s 677us/step - loss: 0.0869 - acc:
Epoch 433/500
2639/2639 [=====] - 2s 673us/step - loss: 0.0871 - acc:
Epoch 434/500
2639/2639 [=====] - 2s 681us/step - loss: 0.0855 - acc:
Epoch 435/500
2639/2639 [=====] - 2s 676us/step - loss: 0.0856 - acc:
Epoch 436/500
2639/2639 [=====] - 2s 685us/step - loss: 0.0841 - acc:
Epoch 437/500
2639/2639 [=====] - 2s 670us/step - loss: 0.0845 - acc:
Epoch 438/500
2639/2639 [=====] - 2s 683us/step - loss: 0.0840 - acc:
Epoch 439/500
2639/2639 [=====] - 2s 686us/step - loss: 0.0834 - acc:
Epoch 440/500
2639/2639 [=====] - 2s 684us/step - loss: 0.0828 - acc:
Epoch 441/500
2639/2639 [=====] - 2s 679us/step - loss: 0.0809 - acc:
Epoch 442/500
2639/2639 [=====] - 2s 701us/step - loss: 0.0819 - acc:
Epoch 443/500
2639/2639 [=====] - 2s 671us/step - loss: 0.0805 - acc:
Epoch 444/500
2639/2639 [=====] - 2s 677us/step - loss: 0.0811 - acc:
Epoch 445/500
2639/2639 [=====] - 2s 680us/step - loss: 0.0791 - acc:
Epoch 446/500
2639/2639 [=====] - 2s 678us/step - loss: 0.0790 - acc:
Epoch 447/500
2639/2639 [=====] - 2s 685us/step - loss: 0.0790 - acc:
Epoch 448/500
2639/2639 [=====] - 2s 679us/step - loss: 0.0783 - acc:
Epoch 449/500
2639/2639 [=====] - 2s 687us/step - loss: 0.0769 - acc:
Epoch 450/500
2639/2639 [=====] - 2s 680us/step - loss: 0.0772 - acc:
Epoch 451/500
2639/2639 [=====] - 2s 692us/step - loss: 0.0751 - acc:
Epoch 452/500
```

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-
2639/2639 [=====] - 2s 681us/step - loss: 0.0768 - acc:
Epoch 453/500
2639/2639 [=====] - 2s 687us/step - loss: 0.0751 - acc:
Epoch 454/500
2639/2639 [=====] - 2s 672us/step - loss: 0.0748 - acc:
Epoch 455/500
2639/2639 [=====] - 2s 689us/step - loss: 0.0747 - acc:
Epoch 456/500
2639/2639 [=====] - 2s 685us/step - loss: 0.0730 - acc:
Epoch 457/500
2639/2639 [=====] - 2s 687us/step - loss: 0.0744 - acc:
Epoch 458/500
2639/2639 [=====] - 2s 682us/step - loss: 0.0720 - acc:
Epoch 459/500
2639/2639 [=====] - 2s 683us/step - loss: 0.0728 - acc:
Epoch 460/500
2639/2639 [=====] - 2s 681us/step - loss: 0.0721 - acc:
Epoch 461/500
2639/2639 [=====] - 2s 689us/step - loss: 0.0704 - acc:
Epoch 462/500
2639/2639 [=====] - 2s 684us/step - loss: 0.0708 - acc:
Epoch 463/500
2639/2639 [=====] - 2s 683us/step - loss: 0.0710 - acc:
Epoch 464/500
2639/2639 [=====] - 2s 680us/step - loss: 0.0692 - acc:
Epoch 465/500
2639/2639 [=====] - 2s 689us/step - loss: 0.0692 - acc:
Epoch 466/500
2639/2639 [=====] - 2s 682us/step - loss: 0.0679 - acc:
Epoch 467/500
2639/2639 [=====] - 2s 686us/step - loss: 0.0686 - acc:
Epoch 468/500
2639/2639 [=====] - 2s 681us/step - loss: 0.0681 - acc:
Epoch 469/500
2639/2639 [=====] - 2s 689us/step - loss: 0.0680 - acc:
Epoch 470/500
2639/2639 [=====] - 2s 694us/step - loss: 0.0671 - acc:
Epoch 471/500
2639/2639 [=====] - 2s 688us/step - loss: 0.0668 - acc:
Epoch 472/500
2639/2639 [=====] - 2s 680us/step - loss: 0.0651 - acc:
Epoch 473/500
2639/2639 [=====] - 2s 677us/step - loss: 0.0645 - acc:
Epoch 474/500
2639/2639 [=====] - 2s 689us/step - loss: 0.0651 - acc:
Epoch 475/500
2639/2639 [=====] - 2s 683us/step - loss: 0.0644 - acc:
Epoch 476/500
2639/2639 [=====] - 2s 685us/step - loss: 0.0650 - acc:
Epoch 477/500
2639/2639 [=====] - 2s 675us/step - loss: 0.0630 - acc:
Epoch 478/500
2639/2639 [=====] - 2s 678us/step - loss: 0.0637 - acc:
Epoch 479/500
2639/2639 [=====] - 2s 676us/step - loss: 0.0622 - acc:
Epoch 480/500
2639/2639 [=====] - 2s 672us/step - loss: 0.0625 - acc:
Epoch 481/500
```

```

Epoch 481/500
2639/2639 [=====] - 2s 679us/step - loss: 0.0623 - acc:
Epoch 482/500
2639/2639 [=====] - 2s 684us/step - loss: 0.0615 - acc:
Epoch 483/500
2639/2639 [=====] - 2s 674us/step - loss: 0.0604 - acc:
Epoch 484/500
2639/2639 [=====] - 2s 682us/step - loss: 0.0606 - acc:
Epoch 485/500
2639/2639 [=====] - 2s 679us/step - loss: 0.0602 - acc:
Epoch 486/500
2639/2639 [=====] - 2s 682us/step - loss: 0.0596 - acc:
Epoch 487/500
2639/2639 [=====] - 2s 684us/step - loss: 0.0599 - acc:
Epoch 488/500
2639/2639 [=====] - 2s 687us/step - loss: 0.0588 - acc:
Epoch 489/500
2639/2639 [=====] - 2s 688us/step - loss: 0.0579 - acc:
Epoch 490/500
2639/2639 [=====] - 2s 689us/step - loss: 0.0582 - acc:
Epoch 491/500
2639/2639 [=====] - 2s 684us/step - loss: 0.0581 - acc:
Epoch 492/500
2639/2639 [=====] - 2s 673us/step - loss: 0.0574 - acc:
Epoch 493/500
2639/2639 [=====] - 2s 676us/step - loss: 0.0558 - acc:
Epoch 494/500
2639/2639 [=====] - 2s 688us/step - loss: 0.0570 - acc:
Epoch 495/500
2639/2639 [=====] - 2s 686us/step - loss: 0.0563 - acc:
Epoch 496/500
2639/2639 [=====] - 2s 679us/step - loss: 0.0558 - acc:
Epoch 497/500
2639/2639 [=====] - 2s 685us/step - loss: 0.0548 - acc:
Epoch 498/500
2639/2639 [=====] - 2s 682us/step - loss: 0.0548 - acc:
Epoch 499/500
2639/2639 [=====] - 2s 686us/step - loss: 0.0538 - acc:
Epoch 500/500
2639/2639 [=====] - 2s 682us/step - loss: 0.0537 - acc:
<keras.callbacks.History at 0x7f15a7b95940>

```

```

encoder_model = Model(encoder_inputs, encoder_states)
encoder_model.summary()

```

```
#Create sampling model
```

```

decoder_state_input_h = Input(shape=(50,))
decoder_state_input_c = Input(shape=(50,))
decoder_states_inputs = [decoder_state_input_h, decoder_state_input_c]

```

```
final_dex2= dex(decoder_inputs)
```

```

decoder_outputs2, state_h2, state_c2 = decoder_lstm(final_dex2, initial_state=decoder
decoder_states2 = [state_h2, state_c2]

```



```

decoder_states2 = [state_h2, state_c2]
decoder_outputs2 = decoder_dense(decoder_outputs2)
decoder_model = Model(
    [decoder_inputs] + decoder_states_inputs,
    [decoder_outputs2] + decoder_states2)

# Reverse-lookup token index to decode sequences back to
# something readable.
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())

#Function to generate sequences
def decode_sequence(input_seq):
    # Encode the input as state vectors.
    states_value = encoder_model.predict(input_seq)
    # Generate empty target sequence of length 1.
    target_seq = np.zeros((1,1))
    # Populate the first character of target sequence with the start character.
    target_seq[0, 0] = target_token_index['START_']

    # Sampling loop for a batch of sequences
    # (to simplify, here we assume a batch of size 1).
    stop_condition = False
    decoded_sentence = ''
    while not stop_condition:
        output_tokens, h, c = decoder_model.predict(
            [target_seq] + states_value)

        # Sample a token
        sampled_token_index = np.argmax(output_tokens[0, -1, :])
        sampled_char = reverse_target_char_index[sampled_token_index]
        decoded_sentence += ' ' + sampled_char

        # Exit condition: either hit max length
        # or find stop character.
        if (sampled_char == '_END' or
            len(decoded_sentence) > 52):
            stop_condition = True

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

        # Update states
        states_value = [h, c]

    return decoded_sentence

#Look at some translations

```

```
for seq_index in range(100):  
    # Take one sequence (part of the training set)  
    # for trying out decoding.  
    input_seq = encoder_input_data[seq_index: seq_index + 1]  
    decoded_sentence = decode_sequence(input_seq)  
    print('-')  
    print('Input sentence:', lines.eng[seq_index: seq_index + 1])  
    print('Decoded sentence:', decoded_sentence)
```



```

Input sentence: 0      wow
Name: eng, dtype: object
Decoded sentence:  वाह _END
-
Input sentence: 1      help
Name: eng, dtype: object
Decoded sentence:  कुरसियाँ काफ़ी हैं क्या _END
-
Input sentence: 2      jump
Name: eng, dtype: object
Decoded sentence:  कूदो _END
-
Input sentence: 3      jump
Name: eng, dtype: object
Decoded sentence:  कूदो _END
-
Input sentence: 4      jump
Name: eng, dtype: object
Decoded sentence:  कूदो _END
-
Input sentence: 5      hello
Name: eng, dtype: object
Decoded sentence:  नमस्कार! _END
-
Input sentence: 6      hello
Name: eng, dtype: object
Decoded sentence:  नमस्कार! _END
-
Input sentence: 7      cheers
Name: eng, dtype: object
Decoded sentence:  वाहवाह _END
-
Input sentence: 8      cheers
Name: eng, dtype: object
Decoded sentence:  वाहवाह _END
-
Input sentence: 9      got it
Name: eng, dtype: object
Decoded sentence:  समझे कि नहीं _END
-
Input sentence: 10     im ok
Name: eng, dtype: object
Decoded sentence:  मैं ठीक हूँ! _END
-
Input sentence: 11     awesome
Name: eng, dtype: object
Decoded sentence:  बहुत बढ़िया _END
-
Input sentence: 12     come in
Name: eng, dtype: object
Decoded sentence:  अंदर आ जाओ! _END
-
Input sentence: 13     get out
Name: eng, dtype: object
Decoded sentence:  बाहर निकल जाओ  END

```

```
Input sentence: 14      go away
Name: eng, dtype: object
Decoded sentence: मोटे मत हो जाना। _END
-
Input sentence: 15      goodbye
Name: eng, dtype: object
Decoded sentence: रेखांकित शब्दों को सुधारिए। _END
-
Input sentence: 16      perfect
Name: eng, dtype: object
Decoded sentence: सही _END
-
Input sentence: 17      perfect
Name: eng, dtype: object
Decoded sentence: सही _END
-
Input sentence: 18      welcome
Name: eng, dtype: object
Decoded sentence: आपका स्वागत है। _END
-
Input sentence: 19      welcome
Name: eng, dtype: object
Decoded sentence: आपका स्वागत है। _END
-
Input sentence: 20      have fun
Name: eng, dtype: object
Decoded sentence: मज़े करो। _END
-
Input sentence: 21      have fun
Name: eng, dtype: object
Decoded sentence: मज़े करो। _END
-
Input sentence: 22      have fun
Name: eng, dtype: object
Decoded sentence: मज़े करो। _END
-
Input sentence: 23      i forgot
Name: eng, dtype: object
Decoded sentence: मैं भूल गई। _END
-
Input sentence: 24      i forgot
Name: eng, dtype: object
Decoded sentence: मैं भूल गई। _END
-
Input sentence: 25      ill pay
Name: eng, dtype: object
Decoded sentence: मैं पैसे दूंगा। _END
-
Input sentence: 26      im fine
Name: eng, dtype: object
Decoded sentence: मैं ठीक हूँ। _END
-
Input sentence: 27      im full
Name: eng, dtype: object
Decoded sentence: मेरा पेट भर गया है। _END
-
Input sentence: 28      lets go
Name: eng, dtype: object
```

```
Decoded sentence: चलो चलें _END
-
Input sentence: 29      answer me
Name: eng, dtype: object
Decoded sentence: मुझे जवाब दो। _END
-
Input sentence: 30      birds fly
Name: eng, dtype: object
Decoded sentence: पंछी उड़ते हैं। _END
-
Input sentence: 31      excuse me
Name: eng, dtype: object
Decoded sentence: माफ़ कीजिए। _END
-
Input sentence: 32      fantastic
Name: eng, dtype: object
Decoded sentence: बहुत खूब _END
-
Input sentence: 33      i fainted
Name: eng, dtype: object
Decoded sentence: मैं बेहोश हो गया। _END
-
Input sentence: 34      i fear so
Name: eng, dtype: object
Decoded sentence: खेद की बात है COMMA लेकिन वैसा ही है। _END
-
Input sentence: 35      i laughed
Name: eng, dtype: object
Decoded sentence: मैं हँसा। _END
-
Input sentence: 36      im bored
Name: eng, dtype: object
Decoded sentence: मैं बोर हो रहा हूँ। _END
-
Input sentence: 37      im broke
Name: eng, dtype: object
Decoded sentence: मेरा दीवालिया हो चुका है। _END
-
Input sentence: 38      im tired
Name: eng, dtype: object
Decoded sentence: मैं थक गया हूँ। _END
-
Input sentence: 39      its cold
Name: eng, dtype: object
Decoded sentence: ठंड हो रही है। _END
-
Input sentence: 40      well done
Name: eng, dtype: object
Decoded sentence: शाबाश _END
-
Input sentence: 41      who knows
Name: eng, dtype: object
Decoded sentence: किसे पता है _END
-
Input sentence: 42      who knows
Name: eng, dtype: object
Decoded sentence: किसे पता है _END
-
```

```
Input sentence: 43      who knows
Name: eng, dtype: object
Decoded sentence:  किसे पता है _END
-
Input sentence: 44      who knows
Name: eng, dtype: object
Decoded sentence:  किसे पता है _END
-
Input sentence: 45      wonderful
Name: eng, dtype: object
Decoded sentence:  अद्भुत _END
-
Input sentence: 46      birds sing
Name: eng, dtype: object
Decoded sentence:  पंछी गाते हैं। _END
-
Input sentence: 47      come on in
Name: eng, dtype: object
Decoded sentence:  अंदर आ जाओ। _END
-
Input sentence: 48      definitely
Name: eng, dtype: object
Decoded sentence:  निश्चित ही _END
-
Input sentence: 49      dont move
Name: eng, dtype: object
Decoded sentence:  मजे करो। _END
-
Input sentence: 50      fire burns
Name: eng, dtype: object
Decoded sentence:  आग जलाती है। _END
-
Input sentence: 51      follow him
Name: eng, dtype: object
Decoded sentence:  उसका पीछा करो। _END
-
Input sentence: 52      i can swim
Name: eng, dtype: object
Decoded sentence:  मैं तैर सकता हूँ। _END
-
Input sentence: 53      i can swim
Name: eng, dtype: object
Decoded sentence:  मैं तैर सकता हूँ। _END
-
Input sentence: 54      i love you
Name: eng, dtype: object
Decoded sentence:  मैं तुमसे प्यार करती हूँ। _END
-
Input sentence: 55      i love you
Name: eng, dtype: object
Decoded sentence:  मैं तुमसे प्यार करती हूँ। _END
-
Input sentence: 56      i love you
Name: eng, dtype: object
Decoded sentence:  मैं तुमसे प्यार करती हूँ। _END
-
Input sentence: 57      i love you
Name: eng, dtype: object
```

```
Name: eng, dtype: object
Decoded sentence: मैं तुमसे प्यार करती हूँ। _END
-
Input sentence: 58      i love you
Name: eng, dtype: object
Decoded sentence: मैं तुमसे प्यार करती हूँ। _END
-
Input sentence: 59      i will try
Name: eng, dtype: object
Decoded sentence: मैं कोशिश करूँगा। _END
-
Input sentence: 60      im coming
Name: eng, dtype: object
Decoded sentence: मैं आ रहा हूँ। _END
-
Input sentence: 61      im hungry
Name: eng, dtype: object
Decoded sentence: मुझे कुत्ते अच्छे लगते हैं। _END
-
Input sentence: 62      im hungry
Name: eng, dtype: object
Decoded sentence: मुझे कुत्ते अच्छे लगते हैं। _END
-
Input sentence: 63      let him in
Name: eng, dtype: object
Decoded sentence: उसे अंगर आने दो। _END
-
Input sentence: 64      let him in
Name: eng, dtype: object
Decoded sentence: उसे अंगर आने दो। _END
-
Input sentence: 65      let me out
Name: eng, dtype: object
Decoded sentence: मुझे बाहर जाने नहीं था। _END
-
Input sentence: 66      once again
Name: eng, dtype: object
Decoded sentence: और एक बार। _END
-
Input sentence: 67      please sit
Name: eng, dtype: object
Decoded sentence: बैठिए। _END
-
Input sentence: 68      that a boy
Name: eng, dtype: object
Decoded sentence: शाबाश _END
-
Input sentence: 69      whats new
Name: eng, dtype: object
Decoded sentence: क्या नया है _END
-
Input sentence: 70      whats new
Name: eng, dtype: object
Decoded sentence: क्या नया है _END
-
Input sentence: 71      whos that
Name: eng, dtype: object
Decoded sentence: वह कौन है _END
```

```
-  
Input sentence: 72      dont shout  
Name: eng, dtype: object  
Decoded sentence:  चिल्लाईए मत। _END  
-  
Input sentence: 73      dont shout  
Name: eng, dtype: object  
Decoded sentence:  चिल्लाईए मत। _END  
-  
Input sentence: 74      he stood up  
Name: eng, dtype: object  
Decoded sentence:  वह खड़ा हो गया। _END  
-  
Input sentence: 75      hes strong  
Name: eng, dtype: object  
Decoded sentence:  वह ताकतवर है। _END  
-  
Input sentence: 76      how are you  
Name: eng, dtype: object  
Decoded sentence:  आप कैसे हो _END  
-  
Input sentence: 77      how are you  
Name: eng, dtype: object  
Decoded sentence:  आप कैसे हो _END  
-  
Input sentence: 78      how are you  
Name: eng, dtype: object  
Decoded sentence:  आप कैसे हो _END  
-  
Input sentence: 79      how are you  
Name: eng, dtype: object  
Decoded sentence:  आप कैसे हो _END  
-  
Input sentence: 80      how are you  
Name: eng, dtype: object  
Decoded sentence:  आप कैसे हो _END  
-  
Input sentence: 81      how are you  
Name: eng, dtype: object  
Decoded sentence:  आप कैसे हो _END  
-  
Input sentence: 82      how are you  
Name: eng, dtype: object  
Decoded sentence:  आप कैसे हो _END  
-  
Input sentence: 83      i like both  
Name: eng, dtype: object  
Decoded sentence:  मुझे दोनो पसंद हैं। _END  
-  
Input sentence: 84      i like cake  
Name: eng, dtype: object  
Decoded sentence:  मुझे केक अच्छा लगता है। _END  
-  
Input sentence: 85      i like dogs  
Name: eng, dtype: object  
Decoded sentence:  मुझे कुत्ते अच्छे लगते हैं। _END  
-  
Input sentence: 86      i like math
```



```
Name: eng, dtype: object
Decoded sentence: मुझे गणित पसंद है। _END
-
Input sentence: 87    ill attend
Name: eng, dtype: object
Decoded sentence: मैं आऊंगा। _END
-
Input sentence: 88    nobody came
Name: eng, dtype: object
Decoded sentence: कोई नहीं आया। _END
-
Input sentence: 89    was i wrong
Name: eng, dtype: object
Decoded sentence: क्या मैं गलत था _END
-
Input sentence: 90    whats this
Name: eng, dtype: object
Decoded sentence: यह क्या है _END
-
Input sentence: 91    are you sick
Name: eng, dtype: object
Decoded sentence: क्या तुम बीमार हो _END
-
Input sentence: 92    bring him in
Name: eng, dtype: object
Decoded sentence: उसको अंदर ले आओ। _END
-
Input sentence: 93    come with us
Name: eng, dtype: object
Decoded sentence: हमारे साथ आओ। _END
-
Input sentence: 94    happy easter
Name: eng, dtype: object
Decoded sentence: एस्टर मुबारक हो _END
-
Input sentence: 95    has tom left
Name: eng, dtype: object
Decoded sentence: टॉम चला गया क्या _END
-
Input sentence: 96    i am at home
Name: eng, dtype: object
Decoded sentence: मैं घर पर हूँ। _END
-
Input sentence: 97    i cant move
Name: eng, dtype: object
Decoded sentence: मैं हिल नहीं सकता। _END
-
Input sentence: 98    i dont know
Name: eng, dtype: object
Decoded sentence: मुझे नहीं मालूम। _END
-
Input sentence: 99    i dont know
Name: eng, dtype: object
Decoded sentence: मुझे नहीं मालूम। _END
```

## Summary:

From the above, we can say that most of the sentences are being translated correctly.