In [32]:
```
import numpy as np
import tensorflow as tf
from tensorflow.keras.preprocessing.text import Tokenizer
from tensorflow.keras.preprocessing.sequence import pad_sequences
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Embedding, LSTM, Dense

# Reading corpus the text file
with open("D:\project\IndiaUS.txt", 'r', encoding='utf-8') as myfile:
    mytext = myfile.read()
```

In [34]:
```
mytext
```

Out[34]: 'Following a lavish state visit by Indian Prime Minister Narendra Modi to Washingt
on, US President Joe Biden has called his country\'s partnership with India among
the "most consequential in the world". The BBC\'s Vikas Pandey and Soutik Biswas e
xplore the factors that contribute to the visit\'s potential in strengthening the
ties between the two nations.\n\nThe US\'s relationship with India - the world\'s
most populous country - is "stronger, closer and more dynamic than any time in his
tory", Mr Biden said at the completion of a pomp-filled state visit by Mr Modi to
the White House.\n\nThe remark may not be an exaggeration. "This summit suggests t
hat the relationship has been transformed. It underscores just how broad and deep
it has become in a relatively short time," says Michael Kugelman of The Wilson Cen
ter, an American think-tank.\n\nA key reason is that Washington is keen to draw In
dia closer so that it can act as a counterbalance to China\'s growing influence in
the Indo-Pacific. India-US ties had not lived up to their promise following a land
mark civilian nuclear deal in 2005 because a liability law passed by India three y
ears later hobbled purchase of reactors.\n\n"This followed a fading commitment to
the relationship during [former prime minister] Manmohan Singh\'s second term as t
he leader of a coalition government. With Mr Modi there has been a lot more enthus
iasm about embracing the US. Mr Biden has also given an overall broad directive to
make it work," says Seema Sirohi, author of Friends With Benefits: The India-US St
ory.\n\nMs Sirohi says the US put in a "lot of effort to make Mr Modi\'s visit sub
stantive and have a lot of deliverables". Defence-industrial cooperation and techn
ology topped the list. Consider this:\n\nGeneral Electric and India\'s state-owned
Hindustan Aeronautics Limited will make in India advanced fighter jet engines for
the country\'s indigenous light combat aircraft. This means a "greater transfer of
US jet engine technology than ever before" - a clear sign that Washington not only
wants to sell arms to India but is also comfortable with sharing military technolo
gy.\nIndia will proceed with a $3bn purchase of the battle-tested MQ-9B Predator d
rones from General Atomics, which will also set up a facility in India. The drones
will be assembled in India, which fits into Mr Modi\'s \'Make in India\' campaign.
The US supplies only 11% of India\'s arms - Russia is the biggest (45%) supplier -
but hopes to become the primary provider in the coming years. Mr Kugelman says Was
hington\'s immediate goal is to "strengthen India\'s military capacity to counter
China".\nMr Modi wants to make India a semiconductor base. US memory chip giant Mi
cron Technology will invest up to $825m to build a semiconductor assembly and test
facility in India, creating thousands of jobs.\nUS semiconductor equipment maker L
am Research will train 60,000 Indian engineers through a network of interconnected
labs and research centres to speed up India\'s semiconductor education and workfor
ce development. Also Applied Materials, the biggest maker of machines for producin
g semiconductors, will invest $400m to establish an engineering centre in Indi
a.\n"It is all about the future now. Both sides are talking about cutting-edge tec
hnologies and how to seed and shape the future," says Ms Sirohi.\n\n: U.S. Preside
nt Joe Biden and first lady Jill Biden welcome India Prime Minister Narendra Modi
to the White House on June 21, 2023 in Washington, DC\nMr Biden and Mrs Biden welc
ome Mr Modi to the White House\nThe India-US relationship has seen many ups and do
wns since the US seriously began courting India - first under President Bill Clint
on and then under the George Bush administration. The response from India was meas
ured, never overeager or too forthcoming.\n\nThe reason was the way India saw geop
olitics and its own place in the global order. The strategy of nonalignment, start
ed by India\'s first prime minister Jawaharlal Nehru, has always been deeply roote
d into India\'s foreign policy.\n\nIndia never wanted to be seen in one camp or th
e other, or to be seen as junior strategic partner to a global superpower. Mr Modi
has not left the ideals of what some describe as "strategic altruism" in Indian fo
reign policy.\n\nBut Mr Modi is leading a different kind of India, one which has c
onsiderably more economic and geopolitical heft. He has owned the India-US relatio
ns - he formed close bonds with former presidents Barack Obama and Donald Trump an
d now with Mr Biden.\n\nBut India\'s "strategic autonomy" has not been sacrificed.

```
Washington would have wanted India to go a step further on Russia and probably tak
e a harder public stand on China.\n\nBut the Biden administration didn\'t seem dis
appointed as Mr Modi repeated his line that "this was not the era of war" without
mentioning Russia. The Indian prime minister did speak about the importance of bee
fing up humanitarian assistance to Ukraine. He didn\'t mention China by name eithe
r but did talk about the importance of a free and prosperous Indo-Pacific.\n\nThis
is how far Mr Modi could have pushed his administration\'s policy without compromi
sing on strategic autonomy. It may not have been the ideal way for Washington but
it didn\'t come in the way of making Mr Modi\'s visit a success.\n\nThe United Sta
tes Air Force (USAF) and Indian Air Force (IAF) personnel are posing in front of a
United States Air Force (USAF) F-15 Eagle fighter jet during the joint \'Exercise
Cope India 2023\' at the air force station in Kalaikunda, around 170 km west of Ko
lkata, on April 24th, 2023. \nUS and Indian air force personnel pose in front of a
US fighter jet during a joint exercise in India in April\n"The two militaries are
working more closely together. They now have arrangements in place where they coul
d use each other\'s facilities for refuelling and maintenance purposes. They are h
olding joint exercises and they\'re sharing a lot more intelligence. Credit to Mr
Modi for managing to really test the limits of strategic autonomy. In the sense th
at he is getting about as close as you can to a major power without signing on to
a full-fledged alliance," Mr Kugelman says.\n\nIndia and the US have had major tra
de differences in recent years over tariffs. Trade relations particularly suffered
during the Trump administration.\n\nThe two sides were not expected to announce an
ything major in trade as it was understood that the discussions over that could co
ntinue later without overshadowing the visit.\n\nBut surprisingly, the two sides a
nnounced that six separate trade disputes at the World Trade Organization were res
olved, including one that involved tariffs.\n\nThe US is now India\'s top trading
partner at $130bn in goods and Delhi is Washington\'s eighth largest partner. Whil
e these numbers are impressive, analysts and policymakers feel there is a huge unt
apped potential. India is also a burgeoning market with an expanding middle class
and it\'s been positioning itself as an alternative to China to become a manufactu
ring hub for the world.\n\nPresident Joe Biden and Indian Prime Minister Narendra
Modi participate in an arrival ceremony on the South Lawn of the White House on Th
ursday, June 22, 2023 in Washington, DC. President Biden is the first U.S. Preside
nt to invite Prime Minister Modi for an official state visit\nSome 2.7 million Ind
ians live in the US\nMany global firms and nations are interested in the proposal
as they look to free the global supply chain from China\'s dominance. In that cont
ext, the resolution of trade disputes will give further impetus to unlocking the f
ull potential of India-US trade ties. Mr Modi has said that "even sky is not the l
imit (for India-US) ties".\n\nCritics in Washington have questioned India\'s "demo
cratic backsliding" under Mr Modi and his Hindu nationalist Bharatiya Janata Party
(BJP). Mr Obama, in a television interview this week, emphasised the significance
of addressing the "protection of the Muslim minority in a predominantly Hindu Indi
a" during discussions between Mr Biden and Mr Modi. "The progressives in the Democ
ratic Party are disturbed by what is happening in India. The realists and centrist
s are all for strengthening the relationship because of the China factor," says Ms
Sirohi.\n\nBut on the whole, there is a bipartisan agreement to make the relations
hip deeper and broader. "The India-US strategic partnership has certainly moved to
the next level. It\'s one of mutual need and mutual benefit," says Ms Sirohi.'
```

In [35]:
```
mytokenizer = Tokenizer()
mytokenizer.fit_on_texts([mytext])
total_words = len(mytokenizer.word_index) + 1
```

In [36]:
```
mytokenizer.word_index
```

Out[36]:

```
{'the': 1,
 'to': 2,
 'in': 3,
 'a': 4,
 'and': 5,
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 'as': 15,
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 'but': 20,
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```

```
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 'next': 595,
 'level': 596,
 'need': 597,
 'benefit': 598}
```

In [37]:
```
my_input_sequences = []
for line in mytext.split('\n'):
    #print(line)
    token_list = mytokenizer.texts_to_sequences([line])[0]
    #print(token_list)
    for i in range(1, len(token_list)):
        my_n_gram_sequence = token_list[:i+1]
        #print(my_n_gram_sequence)
        my_input_sequences.append(my_n_gram_sequence)
        #print(input_sequences)
```

In [38]:
```
max_sequence_len = max([len(seq) for seq in my_input_sequences])
input_sequences = np.array(pad_sequences(my_input_sequences, maxlen=max_sequence_le
```

In [39]:
```
input_sequences[1]
```

Out[39]:
```
array([  0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,
         0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,
         0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,
         0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,
         0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,
         0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,
         0,   0,  99,   4, 177])
```

In [40]:
```
X = input_sequences[:, :-1]
y = input_sequences[:, -1]
```

In [41]:
```
X[1]
```

Out[41]:
```
array([ 0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,
        0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,
        0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,
        0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,
        0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0, 99,  4])
```

In [42]:
```
y
```

Out[42]:
```
array([  4, 177,  50, ...,  25,  59,  46])
```

In [43]:
```
y = np.array(tf.keras.utils.to_categorical(y, num_classes=total_words))
```

In [44]:
```
y[1]
```

Out[44]:

```
array([0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 1., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
       0., 0., 0., 0.], dtype=float32)
```

In [45]:

```
model = Sequential()
model.add(Embedding(total_words, 100, input_length=max_sequence_len-1))
model.add(LSTM(150))
model.add(Dense(total_words, activation='softmax'))
print(model.summary())
```

```
Model: "sequential"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 embedding (Embedding)       (None, 82, 100)           59900

 lstm (LSTM)                 (None, 150)               150600

 dense (Dense)               (None, 599)               90449

=================================================================
Total params: 300,949
Trainable params: 300,949
Non-trainable params: 0
_________________________________________________________________
None
```

In [51]:
```
model.compile(loss='categorical_crossentropy', optimizer='adam', metrics=['accuracy
model.fit(X, y, epochs=200, verbose=1)
```

```
Epoch 1/200
43/43 [==============================] - 9s 125ms/step - loss: 0.0624 - accuracy:
0.9861
Epoch 2/200
43/43 [==============================] - 5s 108ms/step - loss: 0.0515 - accuracy:
0.9861
Epoch 3/200
43/43 [==============================] - 5s 109ms/step - loss: 0.0467 - accuracy:
0.9847
Epoch 4/200
43/43 [==============================] - 5s 111ms/step - loss: 0.0447 - accuracy:
0.9840
Epoch 5/200
43/43 [==============================] - 5s 108ms/step - loss: 0.0419 - accuracy:
0.9847
Epoch 6/200
43/43 [==============================] - 5s 113ms/step - loss: 0.0411 - accuracy:
0.9854
Epoch 7/200
43/43 [==============================] - 5s 123ms/step - loss: 0.0391 - accuracy:
0.9854
Epoch 8/200
43/43 [==============================] - 5s 117ms/step - loss: 0.0386 - accuracy:
0.9861
Epoch 9/200
43/43 [==============================] - 5s 109ms/step - loss: 0.0364 - accuracy:
0.9869
Epoch 10/200
43/43 [==============================] - 5s 108ms/step - loss: 0.0363 - accuracy:
0.9861
Epoch 11/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0359 - accuracy:
0.9861
Epoch 12/200
43/43 [==============================] - 5s 119ms/step - loss: 0.0357 - accuracy:
0.9854
Epoch 13/200
43/43 [==============================] - 5s 119ms/step - loss: 0.0345 - accuracy:
0.9854
Epoch 14/200
43/43 [==============================] - 5s 116ms/step - loss: 0.0329 - accuracy:
0.9861
Epoch 15/200
43/43 [==============================] - 5s 112ms/step - loss: 0.0335 - accuracy:
0.9854
Epoch 16/200
43/43 [==============================] - 5s 111ms/step - loss: 0.0328 - accuracy:
0.9861
Epoch 17/200
43/43 [==============================] - 5s 124ms/step - loss: 0.0339 - accuracy:
0.9847
Epoch 18/200
43/43 [==============================] - 5s 113ms/step - loss: 0.0318 - accuracy:
0.9869
Epoch 19/200
43/43 [==============================] - 5s 121ms/step - loss: 0.0322 - accuracy:
```

```
0.9861
Epoch 20/200
43/43 [==============================] - 5s 112ms/step - loss: 0.0312 - accuracy:
0.9847
Epoch 21/200
43/43 [==============================] - 5s 111ms/step - loss: 0.0321 - accuracy:
0.9854
Epoch 22/200
43/43 [==============================] - 5s 121ms/step - loss: 0.0310 - accuracy:
0.9869
Epoch 23/200
43/43 [==============================] - 6s 130ms/step - loss: 0.0309 - accuracy:
0.9861
Epoch 24/200
43/43 [==============================] - 6s 148ms/step - loss: 0.0300 - accuracy:
0.9861
Epoch 25/200
43/43 [==============================] - 6s 149ms/step - loss: 0.0310 - accuracy:
0.9840
Epoch 26/200
43/43 [==============================] - 5s 126ms/step - loss: 0.0302 - accuracy:
0.9847
Epoch 27/200
43/43 [==============================] - 6s 130ms/step - loss: 0.0297 - accuracy:
0.9861
Epoch 28/200
43/43 [==============================] - 6s 134ms/step - loss: 0.0297 - accuracy:
0.9847
Epoch 29/200
43/43 [==============================] - 6s 132ms/step - loss: 0.0302 - accuracy:
0.9854
Epoch 30/200
43/43 [==============================] - 6s 135ms/step - loss: 0.0301 - accuracy:
0.9840
Epoch 31/200
43/43 [==============================] - 6s 134ms/step - loss: 0.0287 - accuracy:
0.9861
Epoch 32/200
43/43 [==============================] - 6s 130ms/step - loss: 0.0294 - accuracy:
0.9861
Epoch 33/200
43/43 [==============================] - 6s 134ms/step - loss: 0.0294 - accuracy:
0.9861
Epoch 34/200
43/43 [==============================] - 6s 138ms/step - loss: 0.0296 - accuracy:
0.9861
Epoch 35/200
43/43 [==============================] - 6s 142ms/step - loss: 0.0292 - accuracy:
0.9869
Epoch 36/200
43/43 [==============================] - 7s 152ms/step - loss: 0.0286 - accuracy:
0.9861
Epoch 37/200
43/43 [==============================] - 6s 138ms/step - loss: 0.0293 - accuracy:
0.9847
Epoch 38/200
```

```
43/43 [==============================] - 5s 125ms/step - loss: 0.0286 - accuracy:
0.9861
Epoch 39/200
43/43 [==============================] - 5s 117ms/step - loss: 0.0291 - accuracy:
0.9840
Epoch 40/200
43/43 [==============================] - 5s 111ms/step - loss: 0.0287 - accuracy:
0.9869
Epoch 41/200
43/43 [==============================] - 5s 125ms/step - loss: 0.0284 - accuracy:
0.9847
Epoch 42/200
43/43 [==============================] - 5s 120ms/step - loss: 0.0284 - accuracy:
0.9876
Epoch 43/200
43/43 [==============================] - 5s 116ms/step - loss: 0.0285 - accuracy:
0.9847
Epoch 44/200
43/43 [==============================] - 5s 112ms/step - loss: 0.0279 - accuracy:
0.9861
Epoch 45/200
43/43 [==============================] - 5s 111ms/step - loss: 0.0287 - accuracy:
0.9854
Epoch 46/200
43/43 [==============================] - 5s 117ms/step - loss: 0.0277 - accuracy:
0.9861
Epoch 47/200
43/43 [==============================] - 6s 136ms/step - loss: 0.0280 - accuracy:
0.9854
Epoch 48/200
43/43 [==============================] - 5s 120ms/step - loss: 0.0281 - accuracy:
0.9847
Epoch 49/200
43/43 [==============================] - 5s 122ms/step - loss: 0.0291 - accuracy:
0.9854
Epoch 50/200
43/43 [==============================] - 5s 120ms/step - loss: 0.0282 - accuracy:
0.9854
Epoch 51/200
43/43 [==============================] - 5s 121ms/step - loss: 0.0278 - accuracy:
0.9869
Epoch 52/200
43/43 [==============================] - 6s 131ms/step - loss: 0.0276 - accuracy:
0.9861
Epoch 53/200
43/43 [==============================] - 6s 131ms/step - loss: 0.0278 - accuracy:
0.9854
Epoch 54/200
43/43 [==============================] - 6s 132ms/step - loss: 0.0279 - accuracy:
0.9876
Epoch 55/200
43/43 [==============================] - 6s 131ms/step - loss: 0.0278 - accuracy:
0.9847
Epoch 56/200
43/43 [==============================] - 6s 148ms/step - loss: 0.0272 - accuracy:
0.9861
```

```
Epoch 57/200
43/43 [==============================] - 6s 134ms/step - loss: 0.0281 - accuracy:
0.9854
Epoch 58/200
43/43 [==============================] - 5s 126ms/step - loss: 0.0270 - accuracy:
0.9861
Epoch 59/200
43/43 [==============================] - 5s 121ms/step - loss: 0.0283 - accuracy:
0.9876
Epoch 60/200
43/43 [==============================] - 6s 137ms/step - loss: 0.0277 - accuracy:
0.9861
Epoch 61/200
43/43 [==============================] - 6s 136ms/step - loss: 0.0275 - accuracy:
0.9854
Epoch 62/200
43/43 [==============================] - 5s 114ms/step - loss: 0.0281 - accuracy:
0.9854
Epoch 63/200
43/43 [==============================] - 5s 124ms/step - loss: 0.0271 - accuracy:
0.9869
Epoch 64/200
43/43 [==============================] - 5s 119ms/step - loss: 0.0280 - accuracy:
0.9847
Epoch 65/200
43/43 [==============================] - 6s 135ms/step - loss: 0.0272 - accuracy:
0.9876
Epoch 66/200
43/43 [==============================] - 5s 120ms/step - loss: 0.0278 - accuracy:
0.9869
Epoch 67/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0273 - accuracy:
0.9869
Epoch 68/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0264 - accuracy:
0.9854
Epoch 69/200
43/43 [==============================] - 5s 116ms/step - loss: 0.0272 - accuracy:
0.9854
Epoch 70/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0265 - accuracy:
0.9869
Epoch 71/200
43/43 [==============================] - 5s 115ms/step - loss: 0.0275 - accuracy:
0.9847
Epoch 72/200
43/43 [==============================] - 5s 114ms/step - loss: 0.0274 - accuracy:
0.9854
Epoch 73/200
43/43 [==============================] - 5s 117ms/step - loss: 0.0273 - accuracy:
0.9854
Epoch 74/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0280 - accuracy:
0.9847
Epoch 75/200
43/43 [==============================] - 5s 115ms/step - loss: 0.0274 - accuracy:
```

```
0.9847
Epoch 76/200
43/43 [==============================] - 5s 117ms/step - loss: 0.0270 - accuracy:
0.9869
Epoch 77/200
43/43 [==============================] - 5s 114ms/step - loss: 0.0273 - accuracy:
0.9861
Epoch 78/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0282 - accuracy:
0.9825
Epoch 79/200
43/43 [==============================] - 5s 119ms/step - loss: 0.0271 - accuracy:
0.9876
Epoch 80/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0272 - accuracy:
0.9876
Epoch 81/200
43/43 [==============================] - 5s 117ms/step - loss: 0.0282 - accuracy:
0.9840
Epoch 82/200
43/43 [==============================] - 5s 114ms/step - loss: 0.0267 - accuracy:
0.9840
Epoch 83/200
43/43 [==============================] - 5s 116ms/step - loss: 0.0270 - accuracy:
0.9854
Epoch 84/200
43/43 [==============================] - 5s 115ms/step - loss: 0.0271 - accuracy:
0.9854
Epoch 85/200
43/43 [==============================] - 5s 117ms/step - loss: 0.0268 - accuracy:
0.9847
Epoch 86/200
43/43 [==============================] - 5s 114ms/step - loss: 0.0269 - accuracy:
0.9847
Epoch 87/200
43/43 [==============================] - 5s 116ms/step - loss: 0.0269 - accuracy:
0.9876
Epoch 88/200
43/43 [==============================] - 5s 114ms/step - loss: 0.0267 - accuracy:
0.9840
Epoch 89/200
43/43 [==============================] - 5s 117ms/step - loss: 0.0266 - accuracy:
0.9854
Epoch 90/200
43/43 [==============================] - 5s 114ms/step - loss: 0.0272 - accuracy:
0.9854
Epoch 91/200
43/43 [==============================] - 5s 117ms/step - loss: 0.0267 - accuracy:
0.9876
Epoch 92/200
43/43 [==============================] - 5s 125ms/step - loss: 0.0270 - accuracy:
0.9847
Epoch 93/200
43/43 [==============================] - 5s 119ms/step - loss: 0.0264 - accuracy:
0.9869
Epoch 94/200
```

```
43/43 [==============================] - 5s 118ms/step - loss: 0.0277 - accuracy:
0.9869
Epoch 95/200
43/43 [==============================] - 5s 114ms/step - loss: 0.0271 - accuracy:
0.9861
Epoch 96/200
43/43 [==============================] - 5s 114ms/step - loss: 0.0267 - accuracy:
0.9861
Epoch 97/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0276 - accuracy:
0.9861
Epoch 98/200
43/43 [==============================] - 5s 114ms/step - loss: 0.0267 - accuracy:
0.9847
Epoch 99/200
43/43 [==============================] - 5s 115ms/step - loss: 0.0268 - accuracy:
0.9869
Epoch 100/200
43/43 [==============================] - 5s 117ms/step - loss: 0.0272 - accuracy:
0.9861
Epoch 101/200
43/43 [==============================] - 5s 114ms/step - loss: 0.0262 - accuracy:
0.9869
Epoch 102/200
43/43 [==============================] - 5s 114ms/step - loss: 0.0266 - accuracy:
0.9869
Epoch 103/200
43/43 [==============================] - 5s 117ms/step - loss: 0.0265 - accuracy:
0.9861
Epoch 104/200
43/43 [==============================] - 5s 116ms/step - loss: 0.0268 - accuracy:
0.9861
Epoch 105/200
43/43 [==============================] - 5s 117ms/step - loss: 0.0265 - accuracy:
0.9854
Epoch 106/200
43/43 [==============================] - 5s 120ms/step - loss: 0.0269 - accuracy:
0.9854
Epoch 107/200
43/43 [==============================] - 5s 115ms/step - loss: 0.0268 - accuracy:
0.9869
Epoch 108/200
43/43 [==============================] - 5s 114ms/step - loss: 0.0271 - accuracy:
0.9869
Epoch 109/200
43/43 [==============================] - 6s 130ms/step - loss: 0.0263 - accuracy:
0.9861
Epoch 110/200
43/43 [==============================] - 6s 133ms/step - loss: 0.0270 - accuracy:
0.9869
Epoch 111/200
43/43 [==============================] - 5s 127ms/step - loss: 0.0265 - accuracy:
0.9861
Epoch 112/200
43/43 [==============================] - 5s 127ms/step - loss: 0.0269 - accuracy:
0.9861
```

```
Epoch 113/200
43/43 [==============================] - 5s 124ms/step - loss: 0.0270 - accuracy:
0.9832
Epoch 114/200
43/43 [==============================] - 5s 122ms/step - loss: 0.0269 - accuracy:
0.9861
Epoch 115/200
43/43 [==============================] - 6s 131ms/step - loss: 0.0266 - accuracy:
0.9869
Epoch 116/200
43/43 [==============================] - 5s 119ms/step - loss: 0.0269 - accuracy:
0.9847
Epoch 117/200
43/43 [==============================] - 5s 119ms/step - loss: 0.0264 - accuracy:
0.9861
Epoch 118/200
43/43 [==============================] - 5s 116ms/step - loss: 0.0263 - accuracy:
0.9861
Epoch 119/200
43/43 [==============================] - 5s 121ms/step - loss: 0.0263 - accuracy:
0.9861
Epoch 120/200
43/43 [==============================] - 5s 115ms/step - loss: 0.0267 - accuracy:
0.9869
Epoch 121/200
43/43 [==============================] - 5s 116ms/step - loss: 0.0264 - accuracy:
0.9861
Epoch 122/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0268 - accuracy:
0.9854
Epoch 123/200
43/43 [==============================] - 5s 119ms/step - loss: 0.0275 - accuracy:
0.9847
Epoch 124/200
43/43 [==============================] - 5s 119ms/step - loss: 0.0273 - accuracy:
0.9854
Epoch 125/200
43/43 [==============================] - 5s 119ms/step - loss: 0.0266 - accuracy:
0.9854
Epoch 126/200
43/43 [==============================] - 5s 115ms/step - loss: 0.0264 - accuracy:
0.9847
Epoch 127/200
43/43 [==============================] - 5s 120ms/step - loss: 0.0262 - accuracy:
0.9854
Epoch 128/200
43/43 [==============================] - 5s 124ms/step - loss: 0.0267 - accuracy:
0.9869
Epoch 129/200
43/43 [==============================] - 5s 119ms/step - loss: 0.0267 - accuracy:
0.9861
Epoch 130/200
43/43 [==============================] - 5s 122ms/step - loss: 0.0271 - accuracy:
0.9854
Epoch 131/200
43/43 [==============================] - 5s 117ms/step - loss: 0.0261 - accuracy:
```

```
0.9854
Epoch 132/200
43/43 [==============================] - 5s 124ms/step - loss: 0.0268 - accuracy:
0.9840
Epoch 133/200
43/43 [==============================] - 5s 116ms/step - loss: 0.0264 - accuracy:
0.9876
Epoch 134/200
43/43 [==============================] - 5s 115ms/step - loss: 0.0263 - accuracy:
0.9869
Epoch 135/200
43/43 [==============================] - 5s 123ms/step - loss: 0.0264 - accuracy:
0.9847
Epoch 136/200
43/43 [==============================] - 5s 117ms/step - loss: 0.0264 - accuracy:
0.9840
Epoch 137/200
43/43 [==============================] - 5s 115ms/step - loss: 0.0266 - accuracy:
0.9869
Epoch 138/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0263 - accuracy:
0.9869
Epoch 139/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0266 - accuracy:
0.9869
Epoch 140/200
43/43 [==============================] - 5s 124ms/step - loss: 0.0265 - accuracy:
0.9861
Epoch 141/200
43/43 [==============================] - 5s 123ms/step - loss: 0.0259 - accuracy:
0.9861
Epoch 142/200
43/43 [==============================] - 5s 116ms/step - loss: 0.0261 - accuracy:
0.9876
Epoch 143/200
43/43 [==============================] - 5s 120ms/step - loss: 0.0265 - accuracy:
0.9869
Epoch 144/200
43/43 [==============================] - 5s 117ms/step - loss: 0.0264 - accuracy:
0.9854
Epoch 145/200
43/43 [==============================] - 5s 117ms/step - loss: 0.0262 - accuracy:
0.9876
Epoch 146/200
43/43 [==============================] - 5s 120ms/step - loss: 0.0263 - accuracy:
0.9861
Epoch 147/200
43/43 [==============================] - 5s 117ms/step - loss: 0.0263 - accuracy:
0.9861
Epoch 148/200
43/43 [==============================] - 5s 116ms/step - loss: 0.0263 - accuracy:
0.9876
Epoch 149/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0267 - accuracy:
0.9854
Epoch 150/200
```

```
43/43 [==============================] - 5s 114ms/step - loss: 0.0270 - accuracy:
0.9861
Epoch 151/200
43/43 [==============================] - 5s 115ms/step - loss: 0.0263 - accuracy:
0.9861
Epoch 152/200
43/43 [==============================] - 5s 117ms/step - loss: 0.0261 - accuracy:
0.9861
Epoch 153/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0260 - accuracy:
0.9861
Epoch 154/200
43/43 [==============================] - 5s 123ms/step - loss: 0.0267 - accuracy:
0.9869
Epoch 155/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0259 - accuracy:
0.9854
Epoch 156/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0262 - accuracy:
0.9861
Epoch 157/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0262 - accuracy:
0.9876
Epoch 158/200
43/43 [==============================] - 5s 117ms/step - loss: 0.0268 - accuracy:
0.9847
Epoch 159/200
43/43 [==============================] - 5s 116ms/step - loss: 0.0271 - accuracy:
0.9847
Epoch 160/200
43/43 [==============================] - 5s 116ms/step - loss: 0.0265 - accuracy:
0.9869
Epoch 161/200
43/43 [==============================] - 5s 117ms/step - loss: 0.0263 - accuracy:
0.9869
Epoch 162/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0262 - accuracy:
0.9861
Epoch 163/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0265 - accuracy:
0.9883
Epoch 164/200
43/43 [==============================] - 5s 115ms/step - loss: 0.0264 - accuracy:
0.9861
Epoch 165/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0262 - accuracy:
0.9854
Epoch 166/200
43/43 [==============================] - 5s 120ms/step - loss: 0.0263 - accuracy:
0.9869
Epoch 167/200
43/43 [==============================] - 5s 121ms/step - loss: 0.0258 - accuracy:
0.9861
Epoch 168/200
43/43 [==============================] - 5s 119ms/step - loss: 0.0265 - accuracy:
0.9861
```

```
Epoch 169/200
43/43 [==============================] - 5s 119ms/step - loss: 0.0260 - accuracy:
0.9869
Epoch 170/200
43/43 [==============================] - 5s 120ms/step - loss: 0.0268 - accuracy:
0.9854
Epoch 171/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0266 - accuracy:
0.9854
Epoch 172/200
43/43 [==============================] - 5s 116ms/step - loss: 0.0263 - accuracy:
0.9847
Epoch 173/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0263 - accuracy:
0.9869
Epoch 174/200
43/43 [==============================] - 5s 116ms/step - loss: 0.0271 - accuracy:
0.9840
Epoch 175/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0266 - accuracy:
0.9869
Epoch 176/200
43/43 [==============================] - 5s 116ms/step - loss: 0.0259 - accuracy:
0.9861
Epoch 177/200
43/43 [==============================] - 5s 116ms/step - loss: 0.0262 - accuracy:
0.9869
Epoch 178/200
43/43 [==============================] - 5s 119ms/step - loss: 0.0259 - accuracy:
0.9847
Epoch 179/200
43/43 [==============================] - 5s 121ms/step - loss: 0.0260 - accuracy:
0.9869
Epoch 180/200
43/43 [==============================] - 5s 121ms/step - loss: 0.0261 - accuracy:
0.9861
Epoch 181/200
43/43 [==============================] - 5s 121ms/step - loss: 0.0262 - accuracy:
0.9869
Epoch 182/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0268 - accuracy:
0.9854
Epoch 183/200
43/43 [==============================] - 5s 119ms/step - loss: 0.0261 - accuracy:
0.9861
Epoch 184/200
43/43 [==============================] - 5s 119ms/step - loss: 0.0260 - accuracy:
0.9854
Epoch 185/200
43/43 [==============================] - 5s 116ms/step - loss: 0.0261 - accuracy:
0.9861
Epoch 186/200
43/43 [==============================] - 5s 123ms/step - loss: 0.0263 - accuracy:
0.9876
Epoch 187/200
43/43 [==============================] - 5s 116ms/step - loss: 0.0262 - accuracy:
```

```
0.9861
Epoch 188/200
43/43 [==============================] - 5s 119ms/step - loss: 0.0260 - accuracy:
0.9861
Epoch 189/200
43/43 [==============================] - 5s 116ms/step - loss: 0.0266 - accuracy:
0.9854
Epoch 190/200
43/43 [==============================] - 5s 119ms/step - loss: 0.0263 - accuracy:
0.9876
Epoch 191/200
43/43 [==============================] - 5s 116ms/step - loss: 0.0259 - accuracy:
0.9861
Epoch 192/200
43/43 [==============================] - 5s 121ms/step - loss: 0.0264 - accuracy:
0.9869
Epoch 193/200
43/43 [==============================] - 5s 121ms/step - loss: 0.0261 - accuracy:
0.9854
Epoch 194/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0262 - accuracy:
0.9854
Epoch 195/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0262 - accuracy:
0.9854
Epoch 196/200
43/43 [==============================] - 5s 122ms/step - loss: 0.0262 - accuracy:
0.9861
Epoch 197/200
43/43 [==============================] - 5s 116ms/step - loss: 0.0260 - accuracy:
0.9847
Epoch 198/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0263 - accuracy:
0.9861
Epoch 199/200
43/43 [==============================] - 5s 116ms/step - loss: 0.0259 - accuracy:
0.9861
Epoch 200/200
43/43 [==============================] - 5s 118ms/step - loss: 0.0255 - accuracy:
0.9861
```

Out[51]: `<keras.callbacks.History at 0x24b9bc518d0>`

In [52]:
```
input_text = "Joe biden"
predict_next_words= 11

for _ in range(predict_next_words):
    token_list = mytokenizer.texts_to_sequences([input_text])[0]
    print(token_list)
    token_list = pad_sequences([token_list], maxlen=max_sequence_len-1, padding='pr
    predicted = np.argmax(model.predict(token_list), axis=-1)
    output_word = ""
    for word, index in mytokenizer.word_index.items():
        if index == predicted:
            output_word = word
            break
```

```
    input_text += " " + output_word

print(input_text)
```

```
[72, 14]
1/1 [==============================] - 1s 637ms/step
[72, 14, 5]
1/1 [==============================] - 0s 39ms/step
[72, 14, 5, 28]
1/1 [==============================] - 0s 36ms/step
[72, 14, 5, 28, 29]
1/1 [==============================] - 0s 38ms/step
[72, 14, 5, 28, 29, 30]
1/1 [==============================] - 0s 38ms/step
[72, 14, 5, 28, 29, 30, 71]
1/1 [==============================] - 0s 39ms/step
[72, 14, 5, 28, 29, 30, 71, 11]
1/1 [==============================] - 0s 41ms/step
[72, 14, 5, 28, 29, 30, 71, 11, 536]
1/1 [==============================] - 0s 38ms/step
[72, 14, 5, 28, 29, 30, 71, 11, 536, 3]
1/1 [==============================] - 0s 38ms/step
[72, 14, 5, 28, 29, 30, 71, 11, 536, 3, 23]
1/1 [==============================] - 0s 37ms/step
[72, 14, 5, 28, 29, 30, 71, 11, 536, 3, 23, 537]
1/1 [==============================] - 0s 40ms/step
Joe biden and indian prime minister narendra modi participate in an arrival ceremo
ny
```

In [ ]: