ClassQuiz-K214188(Tweet-Text-Generation)

November 5, 2022

```python
[404]: import numpy as np # linear algebra
       import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)
       from __future__ import print_function
       from keras.callbacks import LambdaCallback
       from keras.models import Sequential
       from keras.layers import Dense
       from keras.layers import LSTM
       from keras.layers import Dropout
       from keras.optimizers import RMSprop
       from keras.optimizers import Adam
       from keras.utils.data_utils import get_file
       import numpy as np
       import random
       import sys
       import io
       import re
       import chardet

       #import re
       #import nltk
       #import string
       #from nltk.stem import WordNetLemmatizer
       #from nltk.corpus import stopwords
       #from nltk.sentiment.vader import SentimentIntensityAnalyzer
       #nltk.download('vader_lexicon')
       #nltk.download('wordnet')
       #nltk.download('stopwords')
```

```python
[405]: #df = pd.read_csv("realDonaldTrump_in_office.csv")
       #df = pd.read_csv("realDonaldTrump_in_office.csv")
       with open("realDonaldTrump_in_office.csv", 'r', encoding='utf8') as temp_f:
           # get No of columns in each line
           col_count = [ len(l.split(",")) for l in temp_f.readlines() ]

       ### Generate column names  (names will be 0, 1, 2, ..., maximum columns - 1)
       column_names = [i for i in range(0, max(col_count))]
```

```
### Read csv
df = pd.read_csv("realDonaldTrump_in_office.csv", header=None, delimiter=",",
    ↪names=column_names)
```

[406]: `df.head()`

[406]:
```
                    0                 1  \
0                  ID              Time
1  @realDonaldTrump   2017-01-20 06:31
2  @realDonaldTrump   2017-01-20 11:51
3  @realDonaldTrump   2017-01-20 11:51
4  @realDonaldTrump   2017-01-20 11:52


                                               2  \
0                                      Tweet URL
1   https://twitter.com/realDonaldTrump/status/82…
2   https://twitter.com/realDonaldTrump/status/82…
3   https://twitter.com/realDonaldTrump/status/82…
4   https://twitter.com/realDonaldTrump/status/82…


                                               3  \
0                                     Tweet Text
1   "It all begins today! I will see you at 11:00…
2   "Today we are not merely transferring power f…
3                             "power from Washington
4   "What truly matters is not which party contro…


                                               4  \
0                                            NaN
1                                            NaN
2   or from one party to another ‚Äì but we are t…
3                    D.C. and giving it back to you
4   but whether our government is controlled by t…


                                               5    6    7    8    9   10   11  \
0                                            NaN  NaN  NaN  NaN  NaN  NaN  NaN
1                                            NaN  NaN  NaN  NaN  NaN  NaN  NaN
2                                            NaN  NaN  NaN  NaN  NaN  NaN  NaN
3   the American People. # InaugurationDay"  NaN  NaN  NaN  NaN  NaN  NaN  NaN
4                                            NaN  NaN  NaN  NaN  NaN  NaN  NaN


    12   13   14   15   16   17   18   19
0  NaN  NaN  NaN  NaN  NaN  NaN  NaN  NaN
1  NaN  NaN  NaN  NaN  NaN  NaN  NaN  NaN
2  NaN  NaN  NaN  NaN  NaN  NaN  NaN  NaN
3  NaN  NaN  NaN  NaN  NaN  NaN  NaN  NaN
4  NaN  NaN  NaN  NaN  NaN  NaN  NaN  NaN
```

```
[407]: df['final_tweet'] = df[df.columns[3:]].apply(
           lambda x: ','.join(x.dropna().astype(str)),
           axis=1
       )
```

```
[408]: df['final_tweet']
```

```
[408]: 0                                        Tweet Text
       1              "It all begins today! I will see you at 11:00…
       2              "Today we are not merely transferring power f…
       3              "power from Washington, D.C. and giving it ba…
       4              "What truly matters is not which party contro…
                                            …
       23069          "I am asking for everyone at the U.S. Capitol…
       23070                              "https://t.co/Pm2PKV0Fp3"
       23071                              "https://t.co/csX07ZVWGe"
       23072          "The 75,000,000 great American Patriots who v…
       23073          "To all of those who have asked, I will not b…
       Name: final_tweet, Length: 23074, dtype: object
```

```
[409]: #Remove URLs


       def cleaning_PicURL (text):
           text = re.sub(r'pic.twitter.com/[\w]*',"", text)
           return text

       #f['text'] = df['text'].apply(lambda x: cleaning_PicURL(x))



       temp_list = []
       for index, row in df.iterrows():
           #print(row['final_tweet'])
           text = cleaning_PicURL(row['final_tweet'])
           text = re.sub(r'https?:\/\/\S*', '', text, flags=re.MULTILINE)
           temp_list.append(text)

       temp_list
       df['removeURL'] = temp_list
       df['removeURL']



       #text = re.sub(r'https?:\/\/\S*', '', df['final_tweet'][11], flags=re.MULTILINE)
       #text
```

```
df['removeURL'] = df['removeURL'].replace(r'[^0-9a-zA-Z ]', '', regex=True).
 ↪replace("'", '')
df.dropna(subset=['removeURL'], inplace=True)
df
```

[409]:   0   1 \
       0   ID   Time
       1   @realDonaldTrump   2017-01-20 06:31
       2   @realDonaldTrump   2017-01-20 11:51
       3   @realDonaldTrump   2017-01-20 11:51
       4   @realDonaldTrump   2017-01-20 11:52
       …   …   …
       23069 @realDonaldTrump   2021-01-07 04:13
       23070 @realDonaldTrump   2021-01-07 05:17
       23071 @realDonaldTrump   2021-01-08 08:10
       23072 @realDonaldTrump   2021-01-08 22:46
       23073 @realDonaldTrump   2021-01-08 23:44

                                                           2 \
       0   Tweet URL
       1   https://twitter.com/realDonaldTrump/status/82…
       2   https://twitter.com/realDonaldTrump/status/82…
       3   https://twitter.com/realDonaldTrump/status/82…
       4   https://twitter.com/realDonaldTrump/status/82…
       …   …
       23069   https://twitter.com/realDonaldTrump/status/13…
       23070   https://twitter.com/realDonaldTrump/status/13…
       23071   https://twitter.com/realDonaldTrump/status/13…
       23072   https://twitter.com/realDonaldTrump/status/13…
       23073   https://twitter.com/realDonaldTrump/status/13…

                                                           3 \
       0   Tweet Text
       1   "It all begins today! I will see you at 11:00…
       2   "Today we are not merely transferring power f…
       3   "power from Washington
       4   "What truly matters is not which party contro…
       …   …
       23069   "I am asking for everyone at the U.S. Capitol…
       23070   "https://t.co/Pm2PKV0Fp3"
       23071   "https://t.co/csX07ZVWGe"
       23072   "The 75
       23073   "To all of those who have asked

                                                           4 \
       0   NaN
       1   NaN
```

```
2      or from one party to another ‚Äì but we are t…
3                     D.C. and giving it back to you
4      but whether our government is controlled by t…
…                                              …
23069  WE are the Party of Law &amp; Order - respect…
23070                                         NaN
23071                                         NaN
23072                                         000
23073  I will not be going to the Inauguration on Ja…


                                              5              6  \
0                                           NaN            NaN
1                                           NaN            NaN
2                                           NaN            NaN
3           the American People. # InaugurationDay"        NaN
4                                           NaN            NaN
…                                              …              …
23069                                       NaN            NaN
23070                                       NaN            NaN
23071                                       NaN            NaN
23072  000 great American Patriots who voted for me   AMERICA FIRST
23073                                       NaN            NaN


                              7  \
0                           NaN
1                           NaN
2                           NaN
3                           NaN
4                           NaN
…                             …
23069                       NaN
23070                       NaN
23071                       NaN
23072   and MAKE AMERICA GREAT AGAIN
23073                       NaN


                                              8              9  \
0                                           NaN            NaN
1                                           NaN            NaN
2                                           NaN            NaN
3                                           NaN            NaN
4                                           NaN            NaN
…                                              …              …
23069                                       NaN            NaN
23070                                       NaN            NaN
23071                                       NaN            NaN
23072   will have a GIANT VOICE long into the future…   shape or form!!!"
```

```
23073                                                        NaN              NaN

            …    12    13    14    15    16    17    18    19  \
0           …   NaN   NaN   NaN   NaN   NaN   NaN   NaN   NaN
1           …   NaN   NaN   NaN   NaN   NaN   NaN   NaN   NaN
2           …   NaN   NaN   NaN   NaN   NaN   NaN   NaN   NaN
3           …   NaN   NaN   NaN   NaN   NaN   NaN   NaN   NaN
4           …   NaN   NaN   NaN   NaN   NaN   NaN   NaN   NaN

…       …   …    …    …    …    …    …    …
23069       …   NaN   NaN   NaN   NaN   NaN   NaN   NaN   NaN
23070       …   NaN   NaN   NaN   NaN   NaN   NaN   NaN   NaN
23071       …   NaN   NaN   NaN   NaN   NaN   NaN   NaN   NaN
23072       …   NaN   NaN   NaN   NaN   NaN   NaN   NaN   NaN
23073       …   NaN   NaN   NaN   NaN   NaN   NaN   NaN   NaN


                                              final_tweet  \
0                                              Tweet Text
1          "It all begins today! I will see you at 11:00…
2          "Today we are not merely transferring power f…
3          "power from Washington, D.C. and giving it ba…
4          "What truly matters is not which party contro…
…                                                       …
23069      "I am asking for everyone at the U.S. Capitol…
23070                            "https://t.co/Pm2PKV0Fp3"
23071                            "https://t.co/csX07ZVWGe"
23072      "The 75,000,000 great American Patriots who v…
23073      "To all of those who have asked, I will not b…


                                                 removeURL
0                                              Tweet Text
1          It all begins today I will see you at 1100 AM…
2          Today we are not merely transferring power fr…
3          power from Washington DC and giving it back t…
4          What truly matters is not which party control…
…                                                       …
23069      I am asking for everyone at the US Capitol to…
23070
23071
23072      The 75000000 great American Patriots who vote…
23073      To all of those who have asked I will not be …

[23074 rows x 22 columns]
```

```python
[410]: text = df['removeURL'].str.lower()

       print('max tweet len:',text.map(len).max())
       print('min tweet len:',text.map(len).min())
```

```
text.map(len).hist();
```

max tweet len: 560
min tweet len: 1
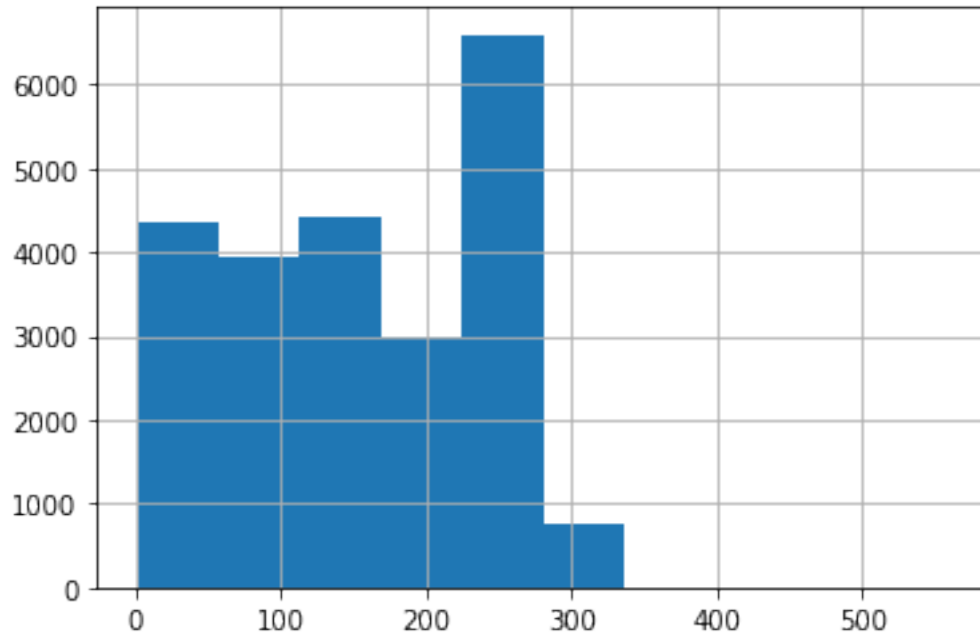
[411]:
```
chars = sorted(list(set(''.join(text))))
print('total chars:', len(chars))
char_indices = dict((c, i) for i, c in enumerate(chars))
indices_char = dict((i, c) for i, c in enumerate(chars))
```

total chars: 37

[412]:
```
chars
```

[412]:
```
[' ',
 '0',
 '1',
 '2',
 '3',
 '4',
 '5',
 '6',
 '7',
 '8',
 '9',
 'a',
```

```
    'b',
    'c',
    'd',
    'e',
    'f',
    'g',
    'h',
    'i',
    'j',
    'k',
    'l',
    'm',
    'n',
    'o',
    'p',
    'q',
    'r',
    's',
    't',
    'u',
    'v',
    'w',
    'x',
    'y',
    'z']
```

```
[413]:  for c in chars[-19:]:
            print('\nCHAR:', c)
            smple = [x for x in text if c in x]
            print(random.sample(smple,min(3,len(smple))))
```

```
CHAR: h
[' rt apscoop special episode with the brilliant mzhemingway on the russia
collusion hoax and kavanaugh   watch the full video   listen to the podcast  ',
' nadler ripped final argument away from schiff thinks shifty did a terrible job
they are fighting big time ', ' i want to applaud the fbi secret service
department of justice the us attorneys office for the southern district of new
york the nypd and all law enforcement partners across the country for their
incredible work skill and determination']

CHAR: i
[' the pledge of allegiance to our great country in st louis park minnesota is
under siege that is why i am going to win the great state of minnesota in the
2020 election people are sick and tired of this stupidity and disloyalty to our
wonderful usa', ' china talks are going very well', ' we have just built this
powerful wall in new mexico completed on january 30 2019  47 days ahead of
schedule many miles more now under construction finishthewall ']
```

CHAR: j
[' this was the originally projected path of the hurricane in its early stages
as you can see almost all models predicted it to go through florida also hitting
georgia and alabama i accept the fake news apologies ', ' rt oann in the next
for edition of one america news investigates join chanelrion as she interviews
several witnesses who debunk adam schiffs baseless impeachment case against
president trump tune in sat dec 7th amp sun dec 8th at 10am est 7am pst amp
again at 5pm est 2pm pst ', ' rt gopchairwoman the economic boom continues
273k jobs added in february   7m jobs added since realdonaldtrump was elected
unemployment at a 50year low manufacturing construction defied expectations
posting solid job growth ']

CHAR: k
[' rt realdonaldtrump big pharma is taking television ads trying to make the
case that i am raising prescription drug prices on seniors the ad is a lie what
i have done will lead to a 50 reduction in prices at least amp big pharma is not
happy about it no other president would', ' wacky amp totally unhinged tom
steyer who has been fighting me and my make america great again agenda from
beginning never wins elections', ' thank you rand ']

CHAR: l
[' i work from early in the morning until late at night havent left the white
house in many months except to launch hospital ship comfort in order to take
care of trade deals military rebuilding etc and then i read a phony story in the
failing nytimes about my work', ' rt realdonaldtrump billhagertytn an
outstanding man and one of the best ambassadors ever japan is running an
excellent campaign for the senate he loves tennessee and loves our country we
need him badly in washington he has my complete and total endorsement ', ' rt
foxandfriends chicago approves new plan to hide illegal immigrants from the feds
plus give them access to city services ']

CHAR: m
[' rt scavino45 happening now 208ame our great flotus melania trumpvisiting a
kenyan elephant orphanage', ' mini is illegally buying the democrat nomination
they are taking it away from bernie again mini mike major party nominations are
not for sale good luck in the debate tomorrow night and remember no standing on
boxes', ' rt presssec president realdonaldtrump just signed an eo to prevent
hoarding amp price gouging of supplies needed in our war against the coronavirus
this sends a strong message we will not let those hoarding vital supplies amp
price gougers to harm the health of america in this hour of need ']

CHAR: n
[' representative ilhan omar is again under fire for her terrible comments
concerning israel jewish groups have just sent a petition to speaker pelosi
asking her to remove omar from foreign relations committee a dark day for
israel', ' rt realkylemorris alabama and lsu fans welcome president
realdonaldtrump and first lady melania trump to tuscaloosa alabama ', ' rt gop

realdonaldtrump is putting america first ']

CHAR: o
[' working hard thank you ', ' just had a great latinosfortrump roundtable in
doral florida we have achieved more for hispanicamericans in less than 47 months
than joe biden has achieved in 47 years and the best is yet to come thank you
maga   ', ' thank you franklingraham it is a time of shame for our country the
democrats know what they are doing is wrong ']

CHAR: p
[' rt realmattcouch will you pray with me tonight for rudy america the power of
prayer in numbers is staggering lord please put your hedge of protection around
rudy giuliani tonight we know that you are a healing god please lift rudy up amp
get him back quickly fighting for our republic oh lord', ' obama who wouldnt
even endorse biden until everyone else was out of the primaries and even then
waited a long time is now making a commercial of support remember i wouldnt even
be here if it werent for them i wouldnt be president they did a terrible job', '
if thinking that james comey is not a good fbi director is tantamount to being
an agent of russia than just list all the people that are agents of russia
chuck schumer nancy pelosi rod rosenstein who wrote the memo to get rid of comey
the inspector general trey gowdy']

CHAR: q
[' the national guard has been released in minneapolis to do the job that the
democrat mayor couldnt do should have been used 2 days ago amp there would not
have been damage amp police headquarters would not have been taken over amp
ruined great job by the national guard no games', ' when you give a crazed
crying lowlife a break and give her a job at the white house i guess it just
didnt work out good work by general kelly for quickly firing that dog', ' will
be interviewed at 500 am eastern by joesquawk on cnbc at the world economic
forum in davos switzerland enjoy']

CHAR: r
[' peter navarro releases 36page report alleging election fraud more than
sufficient to swing victory to trump a great report by peter statistically
impossible to have lost the 2020 election big protest in dc on january 6th be
there will be wild', ' joe wants to shut down this country i want to keep it
open', ' chinese telecom giant huawei hires former obama cyber security official
as a lobbyist this is not good or acceptable foxnews stevehiltonx']

CHAR: s
[' i am deeply saddened by the loss of my friend charles evers charles was a
trail blazer in politics and a fearless leader alongside his brother medgar for
civil rights ', ' cnn msnbc whether we are republican or democrat we must now
focus on strengthening background checks', ' petestauber won big last night in
minnesota a big star in hockey he will be an even bigger star in politics it all
begins with a win in november pete has my complete and total endorsement']

CHAR: t
[' rt realdonaldtrump our highest respect to the family of david dorn a great
police captain from st louis who was viciously shot and killed by despicable
looters last night we honor our police officers perhaps more than ever before
thank you ', ' watched north dakotas rep kevin cramer easily win debate with
senator heidi heitkamp great job kevin you will be a great senator', ' rt gop
for more information visit   ']

CHAR: u
[' the economy is doing great more people working in usa today than at any time
in our history media barely covers foxandfriends', ' bad ratings cnn amp msnbc
got scammed when they covered the antitrump russia rally walltowall they
probably knew it was fake news but because it was a rally against me they pushed
it hard anyway two really dishonest newscasters but the public is wise', '
george gstephanopoulos ask crazy nancy why she allowed adam shifty schiff to
totally make up my conversation with the ukrainian president amp read his false
words to congress and the world as though i said it he got caught ask why
hearing was most unfair amp biased in history']

CHAR: v
[' just did an interview with harrisfaulkner on foxnews airing now 1pme enjoy',
' thank you very much working hard ', ' rt seitzer1 ufcs gamebredfighter gives
one of the best vote for trump speeches ive heard ']

CHAR: w
[' got too frisky or out of line they would quickly come down on them hard
didnt know what hit them the front line was replaced with fresh agents like
magic big crowd professionally organized but nobody came close to breaching the
fence if they had they would', ' mexico was not being cooperative on the border
in things we had or didnt have and now i have full confidence especially after
speaking to their president yesterday that they will be very cooperative and
want to get the job properly done importantly some things', ' now that the
democrats and the fake news media have gone bust on every other of their witch
hunt schemes they are trying to start one just as ridiculous as the others call
it the ukraine witch hunt while at the same time trying to protect sleepy joe
biden will fail again']

CHAR: x
[' rt realdonaldtrump john bolton was one of the dumbest people in government
that ive had the pleasure to work with a sullen dull and quiet guy he added
nothing to national security except gee lets go to war also illegally released
much classified information a real dope', ' it was my honor to sign a
presidential memorandum facilitating the cancellation of student loan debt for
25k of our most severely disabled veterans with todays order we express the
everlasting love amp loyalty of a truly grateful nation god bless our vets amp
god bless america ', ' women for kavanaugh and many others who support this very
good man are gathering all over capital hill in preparation for a 35 pm vote it
is a beautiful thing to see and they are not paid professional protesters who

are handed expensive signs big day for america']

CHAR: y
[' why are the democrats allowed to make fake and fraudulent ads they should be
called out they did nothing when they had the chance i have done far more than
any president in first 3 12 years', ' fake nbcnews made up a story that i wanted
a tenfold increase in our us nuclear arsenal pure fiction made up to demean nbc
cnn', ' 60minutes amp third place anchor norahodonnell are doing everything in
their power to demean our country much to the benefit of the radical left
democrats tonight they put on yet another fake whistleblower a disgruntled
employee who supports dems fabricates stories amp']

CHAR: z
[' a great day in arizona ', ' to every one of the heroes we recognized today
thank you and god bless you all ', ' rt jimjordan 2 of those 5 meetings happened
after ukraine learned aid was paused vp pence met president zelensky on 91 sens
johnson and murphy met zelensky on 95 if ever the quid pro quo was going to
come up 1 of these 2 meetings wouldve been the time but it didnt 33']

```python
[414]:  # cut the text in semi-redundant sequences of maxlen characters
        maxlen = 40
        step = 1
        sentences = []
        next_chars = []
        for x in text:
            for i in range(0, len(x) - maxlen, step):
                sentences.append(x[i: i + maxlen])
                next_chars.append(x[i + maxlen])
        print('nb sequences:', len(sentences))
```

nb sequences: 2724604

```python
[415]:  ## check example
        for i in range(3):
            print(sentences[i],'==>',next_chars[i])
```

 it all begins today i will see you at 1 ==> 1
it all begins today i will see you at 11 ==> 0
t all begins today i will see you at 110 ==> 0

```python
[416]:  text[1]
```

```
[416]: ' it all begins today i will see you at 1100 am for the swearingin the movement
       continues  the work begins'
```

```python
[417]:  print('Vectorization...')
        x = np.zeros((len(sentences), maxlen, len(chars)), dtype=np.bool)
        y = np.zeros((len(sentences), len(chars)), dtype=np.bool)
        for i, sentence in enumerate(sentences):
```

```
    for t, char in enumerate(sentence):
        x[i, t, char_indices[char]] = 1
    y[i, char_indices[next_chars[i]]] = 1
```

Vectorization…

```
C:\Users\Faiz\AppData\Local\Temp\ipykernel_43396\3587441563.py:2:
DeprecationWarning: `np.bool` is a deprecated alias for the builtin `bool`. To
silence this warning, use `bool` by itself. Doing this will not modify any
behavior and is safe. If you specifically wanted the numpy scalar type, use
`np.bool_` here.
Deprecated in NumPy 1.20; for more details and guidance:
https://numpy.org/devdocs/release/1.20.0-notes.html#deprecations
  x = np.zeros((len(sentences), maxlen, len(chars)), dtype=np.bool)
C:\Users\Faiz\AppData\Local\Temp\ipykernel_43396\3587441563.py:3:
DeprecationWarning: `np.bool` is a deprecated alias for the builtin `bool`. To
silence this warning, use `bool` by itself. Doing this will not modify any
behavior and is safe. If you specifically wanted the numpy scalar type, use
`np.bool_` here.
Deprecated in NumPy 1.20; for more details and guidance:
https://numpy.org/devdocs/release/1.20.0-notes.html#deprecations
  y = np.zeros((len(sentences), len(chars)), dtype=np.bool)
```

1 build the model: a single LSTM¶

```
[418]: print('Build model...')
       model = Sequential()
       model.add(LSTM(128, input_shape=(maxlen, len(chars))))
       model.add(Dense(len(chars), activation='softmax'))

       # optimizer = RMSprop(lr=0.01)
       optimizer = Adam()
       model.compile(loss='categorical_crossentropy', optimizer=optimizer)
```

Build model…

2 Sampler

```
[419]: def sample(preds, temperature=1.0):
           # helper function to sample an index from a probability array
           preds = np.asarray(preds).astype('float64')
           preds = np.log(preds) / temperature
           exp_preds = np.exp(preds)
           preds = exp_preds / np.sum(exp_preds)
           probas = np.random.multinomial(1, preds, 1)
           return np.argmax(probas)
```

```
[420]: for temperature in [0.1, 0.2, 0.3,  0.5, 1.0, 1.2, 1.3]:
           print(sample([.1,.3,.5,.1],temperature=temperature))
```

```
2
2
2
2
1
1
1
```

3   Generate Text at Epoch End

```
[421]: def on_epoch_end(epoch, _):
           # Function invoked at end of each epoch. Prints generated text.
           print()
           print('----- Generating text after Epoch: %d' % epoch)

       #     start_index = random.randint(0, len(text) - maxlen - 1)
           tweet = np.random.choice(text) # select random tweet
           start_index = 0

           for diversity in [0.2, 0.5, 1.0, 1.2]:
               print('----- diversity:', diversity)

               generated = ''
               sentence = tweet[start_index: start_index + maxlen]
               generated += sentence
               print('----- Generating with seed: "' + sentence + '"')
               sys.stdout.write(generated)

               for i in range(120):
                   x_pred = np.zeros((1, maxlen, len(chars)))
                   for t, char in enumerate(sentence):
                       x_pred[0, t, char_indices[char]] = 1.

                   preds = model.predict(x_pred, verbose=0)[0]
                   next_index = sample(preds, diversity)
                   next_char = indices_char[next_index]

                   generated += next_char
                   sentence = sentence[1:] + next_char

                   sys.stdout.write(next_char)
                   sys.stdout.flush()
               print()
```

```
[422]:  epochs = 1

        print_callback = LambdaCallback(on_epoch_end=on_epoch_end)

        model.fit(x, y,
                batch_size=128,
                epochs=epochs,
                callbacks=[print_callback])
```

```
21285/21286 [============================>.] - ETA: 0s - loss: 1.8116
----- Generating text after Epoch: 0
----- diversity: 0.2
----- Generating with seed: " happy thanksgiving "
 happy thanksgiving  a  a a aa a aaaa iaaa aaaa a aaaaa aaaa aaaaaia a aaaiaa
aaaaa aaaa aaaaa aaae a  aaaa aaaiaa aaaa aaaaaaa aaaa aaaaaa
----- diversity: 0.5
----- Generating with seed: " happy thanksgiving "
 happy thanksgiving oaaaaaas a a aiaaa  aaaa aaas a aias a aietriaaiana
eaaoaseaaoaiaoaaaoooiataiiaaisa oaiao  asonaian caoaaisaaaonioaaaics
----- diversity: 1.0
----- Generating with seed: " happy thanksgiving "
 happy thanksgiving atbiafanaia noosns eaoss   lvioosr aae o ofainaoa laenaae
aonaaaeenrearoiibaiulijd so alao c ocmaaohiaasvlilon    li aiic
----- diversity: 1.2
----- Generating with seed: " happy thanksgiving "
 happy thanksgiving a a iaiicolauaoits ia1cn mauessacnuzaaaoiscriaoeia
pamrbaptaioaamioaaaaetoaoetsaamoanaaaefsiiaaraeaemeoaui siaabeumstain
21286/21286 [=============================] - 1041s 49ms/step - loss: 1.8116
```

[422]: <keras.callbacks.History at 0x1d000455e50>

```
[423]:  print('Build model...')
        model2 = Sequential()
        model2.add(LSTM(128, input_shape=(maxlen, len(chars)),return_sequences=True))
        model2.add(Dropout(0.2))
        model2.add(LSTM(128))
        model2.add(Dropout(0.2))
        model2.add(Dense(len(chars), activation='softmax'))

        # optimizer = RMSprop(lr=0.01)
        optimizer = Adam()
        model2.compile(loss='categorical_crossentropy', optimizer=optimizer)
```

Build model…

4 Print Test Sentence¶

```
[424]: def generate_w_seed(sentence,diversity):
           sentence = sentence[0:maxlen]
           print(f'seed: {sentence}')
           print(f'diversity: {diversity}')
           generated = ''
           generated += sentence

           sys.stdout.write(generated)

           for i in range(120):
               x_pred = np.zeros((1, maxlen, len(chars)))
               for t, char in enumerate(sentence):
                   x_pred[0, t, char_indices[char]] = 1.

               preds = model.predict(x_pred, verbose=0)[0]
               next_index = sample(preds, diversity)
               next_char = indices_char[next_index]

               generated += next_char
               sentence = sentence[1:] + next_char

               sys.stdout.write(next_char)
               sys.stdout.flush()
           print()
           return
```

```
[ ]: for s in random.sample(list(text),5):
         for diversity in [0.2, 0.5, 1.0, 1.2]:
             generate_w_seed(s,diversity)
             print()
```

```
seed:  the passage of the deptvetaffairs accou
diversity: 0.2
 the passage of the deptvetaffairs account to the people the fact to continue to
continue to the state and the fake news we are in the state of the state to the

seed:  the passage of the deptvetaffairs accou
diversity: 0.5
 the passage of the deptvetaffairs account are that with the court to the befe
to do the ross in the one lies make for our country border congress to the
united

seed:  the passage of the deptvetaffairs accou
diversity: 1.0
 the passage of the deptvetaffairs accountlortime on great votes annoum i state
on thisgly dent with repease to come commino of our now have to secoble tought o
```

```
seed:  the passage of the deptvetaffairs accou
diversity: 1.2
 the passage of the deptvetaffairs accoud memanes inwa trimp torky ressead dece
fron stach each border mirtaitia houst brignt to that leakly oarfige faco your f


seed:  president trump has done more for minor
diversity: 0.2
 president trump has done more for minor to the entor to the state to the donald
to the fake news and the state to state of the state of the people to state of


seed:  president trump has done more for minor
diversity: 0.5
 president trump has done more for minory of all would be strong of the legal
even and resented on the republicans are to contirut of the state of the stant
and


seed:  president trump has done more for minor
diversity: 1.0
 president trump has done more for minoracement peot foe is trimetememilifutial
in dreats to congress and is strong impoport openiba our planduphe fortirup fake


seed:  president trump has done more for minor
diversity: 1.2
 president trump has done more for minor pribugh of theysbew to my imponstyons
inleniy democrats hes nvmilateand to yout  s our north a tan it was for a
country


seed:  russia iran syria amp many others are n
diversity: 0.2
 russia iran syria amp many others are not in the people they have to continue
to state to the country the fact to the far because to state the world be a
great


seed:  russia iran syria amp many others are n
diversity: 0.5
 russia iran syria amp many others are not was to
```

[ ]: