

deep_learning_homework_19.12.2018

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1 Songdata assignment

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Task: - Train a recurrent neural network to output the lyrics of a song, given a starting word/character. - Build two models: one based on characters (input and output are one-hot encoded characters), and another based on words with embeddings (inputs and outputs are embedding-encoding of words). - Compare your results and (subjectively) evaluate which method generates "better" songs, or which model is easier to learn. - There will be an internal competition about which generated text is funnier/weirder, based on a democratic vote. This will not affect your grades.

Requirements: - The example below uses characters. You will have to make a model that uses words for generating text rather than characters. - Read about python generators and the yield operator. - Embedded words using a `keras.layers.Embedding` layer. - Initialize the embedding layer with pre-trained weights as explained in the link below: <https://blog.keras.io/using-pre-trained-word-embeddings-in-a-keras-model.html> - The acquisition of data is left open but a common dataset can be found here: <https://www.kaggle.com/mousehead/songlyrics/> - Implement your model using `keras.Sequence` (or your own generator) - Use `model.fit_generator` to fit model.

Look at the example below (taken from the official Keras examples). Warning they use characters instead of words.

https://raw.githubusercontent.com/keras-team/keras/master/examples/lstm_text_generation.py

2 Evaluation

The model based on words creates lyrics which consist of actual words and parts of sentences do make sense. The model based on characters uses special characters e.g. line breaks and punctuation which is nice but the text generated is worse. The actual text is the most important aspect for us, therefore we prefer the model based on words.

3 Testing the given code for Nietzsches text

3.1 To run the following code:

(in Anaconda console, activate `ENVIRONMENT_NAME`) `pip install plaidml-keras plaidbench plaidml-setup`

```

In [1]: '''Example script to generate text from Nietzsche's writings.

At least 20 epochs are required before the generated text
starts sounding coherent.

It is recommended to run this script on GPU, as recurrent
networks are quite computationally intensive.

If you try this script on new data, make sure your corpus
has at least ~100k characters. ~1M is better.
'''

from __future__ import print_function

import numpy as np
import random
import sys
import io
import os

# Use this for GPU accelerated keras (also AMD)
os.environ["KERAS_BACKEND"] = "plaidml.keras.backend"

from keras.callbacks import LambdaCallback
from keras.models import Sequential
from keras.layers import Dense
from keras.layers import LSTM
from keras.optimizers import RMSprop

with io.open("data/nietzsche.txt", encoding='utf-8') as f:
    text = f.read().lower()
print('corpus length:', len(text))

chars = sorted(list(set(text)))
print('total chars:', len(chars))
print(chars)
char_indices = dict((c, i) for i, c in enumerate(chars))
indices_char = dict((i, c) for i, c in enumerate(chars))

# cut the text in semi-redundant sequences of maxlen characters
maxlen = 40
step = 3
sentences = []
next_chars = []
for i in range(0, len(text) - maxlen, step):
    sentences.append(text[i: i + maxlen])
    next_chars.append(text[i + maxlen])
print('nb sequences:', len(sentences))

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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

# build the model: a single LSTM
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)
model.compile(loss='categorical_crossentropy', optimizer=optimizer)

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)

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

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

        for i in range(400):
            x_pred = np.zeros((1, maxlen, len(chars)))
            for t, char in enumerate(sentence):
                x_pred[0, t, char_indices[char]] = 1.

```

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        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()

    print_callback = LambdaCallback(on_epoch_end=on_epoch_end)

    model.fit(x, y,
              batch_size=128,
              epochs=10,
              callbacks=[print_callback])

```

Using plaidml.keras.backend backend.

corpus length: 600893

total chars: 57

['\n', ' ', '!', '"', "'", '(', ')', ',', '-', '.', '0', '1', '2', '3', '4', '5', '6', '7', '8',

nb sequences: 200285

Vectorization...

Build model...

INFO:plaidml:Opening device "opencl_amd_hawaii.0"

Epoch 1/60

INFO:plaidml:Analyzing Ops: 3292 of 3722 operations complete

200192/200285 [=====>.] - ETA: 0s - loss: 1.9889

INFO:plaidml:Analyzing Ops: 3492 of 3722 operations complete

200285/200285 [=====] - 54s 268us/step - loss: 1.9888

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----- diversity: 0.2

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 Epoch 2/60
 200285/200285 [=====] - 44s 218us/step - loss: 1.6377

 ----- Generating text after Epoch: 1
 ----- diversity: 0.2
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 200285/200285 [=====] - 47s 235us/step - loss: 1.5468

 ----- Generating text after Epoch: 2
 ----- diversity: 0.2
 ----- Generating with seed: "nce
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 ----- diversity: 0.5
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Epoch 4/60
200285/200285 [=====] - 44s 222us/step - loss: 1.5000

----- Generating text after Epoch: 3
----- diversity: 0.2
----- Generating with seed: " precisely
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----- diversity: 0.5
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----- diversity: 1.0
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Epoch 5/60

200285/200285 [=====] - 44s 218us/step - loss: 1.4690

----- Generating text after Epoch: 4
----- diversity: 0.2
----- Generating with seed: "individual and hence comes under the pur"
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----- diversity: 0.5
----- Generating with seed: "individual and hence comes under the pur"

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----- diversity: 1.0

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200285/200285 [=====] - 46s 228us/step - loss: 1.4471

----- Generating text after Epoch: 5

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----- Generating with seed: " and

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----- diversity: 0.5

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----- diversity: 1.0

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 200285/200285 [=====] - 46s 228us/step - loss: 1.4308

 ----- Generating text after Epoch: 6
 ----- diversity: 0.2
 ----- Generating with seed: "ed.

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 ----- diversity: 0.5
 ----- Generating with seed: "ed.

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Epoch 8/60
200285/200285 [=====] - 45s 227us/step - loss: 1.4173

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----- diversity: 0.5
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Epoch 9/60
200285/200285 [=====] - 46s 228us/step - loss: 1.4073
----- Generating text after Epoch: 8
----- diversity: 0.2
----- Generating with seed: "d: this much was believed, was known--in"
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----- diversity: 0.5
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Epoch 10/60
200285/200285 [=====] - 45s 223us/step - loss: 1.3962

----- Generating text after Epoch: 9
----- diversity: 0.2
----- Generating with seed: " he feared
death: he was a petty, abject"
  he feared
death: he was a petty, abject and as the same any say and in the same another is always be the
----- diversity: 0.5
----- Generating with seed: " he feared
death: he was a petty, abject"
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Epoch 11/60
200285/200285 [=====] - 45s 224us/step - loss: 1.3888

----- Generating text after Epoch: 10
----- diversity: 0.2
----- Generating with seed: "row continually in knowledge, and to lea"
row continually in knowledge, and to learn the same the sense of the same the soul of the soul
----- diversity: 0.5
----- Generating with seed: "row continually in knowledge, and to lea"
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----- diversity: 1.2
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Epoch 12/60
200285/200285 [=====] - 45s 225us/step - loss: 1.3803

----- Generating text after Epoch: 11
----- diversity: 0.2
----- Generating with seed: "physical disposition in mankind, remains"
physical disposition in mankind, remains the more still and the extentterons and a strength of
----- diversity: 0.5

----- Generating with seed: "physical disposition in mankind, remains"
physical disposition in mankind, remains the really and the other everything as a more stated
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----- diversity: 1.0
----- Generating with seed: "physical disposition in mankind, remains"
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----- Generating with seed: "physical disposition in mankind, remains"
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Epoch 13/60
200285/200285 [=====] - 46s 228us/step - loss: 1.3741

----- Generating text after Epoch: 12
----- diversity: 0.2
----- Generating with seed: " amazingly adorned.--people whose
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----- diversity: 0.5
----- Generating with seed: " amazingly adorned.--people whose
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----- diversity: 1.0
----- Generating with seed: " amazingly adorned.--people whose
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----- diversity: 1.2
----- Generating with seed: " amazingly adorned.--people whose

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C:\Users\thoma\Anaconda3\envs\newtwo\lib\site-packages\ipykernel_launcher.py:71: RuntimeWarning

r englanlustentywhion of rayments--it was yird
conceation, uppreitive happy and cakewingly, by ageament with his libeble only one adoon--of t
contesn shade of hishen. "nachence and for about by impulsed, very proponda
about it
is nonly and love-truthm like a obed, of the sign loamed and
to healthy wome to itredsanc
moral easyroterly?
Epoch 14/60
200285/200285 [=====] - 44s 221us/step - loss: 1.3695

----- Generating text after Epoch: 13
----- diversity: 0.2
----- Generating with seed: "tions), a false ethic is
reared, to supp"
tions), a false ethic is
reared, to suppose of the possible the same developed to the subjection and action of the soul
----- diversity: 0.5
----- Generating with seed: "tions), a false ethic is
reared, to supp"
tions), a false ethic is
reared, to suppose there is it is a religion "imisterness the perhaps every senses the thing in
----- diversity: 1.0
----- Generating with seed: "tions), a false ethic is
reared, to supp"
tions), a false ethic is
reared, to supposing to goman, they "if our overshocus or man.--my risil against any
--thus i belief is "stare of life achips, in the litter a fommece," heartharical "wis these c
theuris into his young in ur: "an makes general else or to vousmwdather in the christual th
of a physical
esteaus enough--that regards
most shifing rustimageusing known the willing--that is
is ehad, arexherorged generally
----- diversity: 1.2
----- Generating with seed: "tions), a false ethic is
reared, to supp"
tions), a false ethic is
reared, to supposint, a ways! in or marture was plaze mecys.

2rod moral mact-this friendly indounditieness for he--as prepasive premoved lives himality, a
pabowimatst can out atly
a, even. thdit, whatevest upperenstry, schopenhaveland nowanrs "keep to vijay diffusedud" prote

ryus huminess, say, as midy conetective, prowics enothing,
resenltn slave

Epoch 15/60

200285/200285 [=====] - 43s 217us/step - loss: 1.3653

----- Generating text after Epoch: 14

----- diversity: 0.2

----- Generating with seed: "people always
unite closer and closer. t"

people always

unite closer and closer. the conscience of the concerning that the called to the conferent and

----- diversity: 0.5

----- Generating with seed: "people always
unite closer and closer. t"

people always

unite closer and closer. the called and an action that a good considered to the such an insi.
scholar in an age not on the conscience of the explained to one anriddence t

----- diversity: 1.0

----- Generating with seed: "people always
unite closer and closer. t"

people always

unite closer and closer. this eval-abult owing to grdief. there is alis which is not just
it, have

how relitionis eduritated, and there,

he who was a place equive can commandes percest

englishes is strife, effective, larg, satisfiction is regarded of

the heart chided

than the philosophers of

"the

fictionity, and philosophers when foreced to be a bet strange in one entires from artilicing
and sigmarating, which, and he is be

----- diversity: 1.2

----- Generating with seed: "people always
unite closer and closer. t"

people always

unite closer and closer. to makes ato,

is, the weally it here, religion of understand of its--upon,

becrinignatic de

lintial

still

and dream him and castes.

9uo, to all solutter in whouchers, leass?

for a

sileal, to mess, consi being socck in its

faculty ssworshistic, and idealisy to

a

rangelly ypere crame.

be man, whatever--the rife cittor to its, probably, how himself bribbles inurecrities in lowm
protecte? as that has

Epoch 16/60

200285/200285 [=====] - 43s 216us/step - loss: 1.3593

----- Generating text after Epoch: 15

----- diversity: 0.2

----- Generating with seed: "strong inducement to aid in the
foundati"

strong inducement to aid in the

foundation of the same and the morality of the sort of the sentient of the same discover that :

----- diversity: 0.5

----- Generating with seed: "strong inducement to aid in the
foundati"

strong inducement to aid in the

foundation, and case of the morality and life and even and the evolutionth, the artifur the st

things is a deepest the art upon the forgott the success of the proses to mankind, and an artifi

and spirit. it is not which can be presented that will the same divinering from the sentiers f

----- diversity: 1.0

----- Generating with seed: "strong inducement to aid in the
foundati"

strong inducement to aid in the

foundation of its

just feel that a my tasionded sorn he is grtalles of one is beholdss, for something and bodily :

whatever may say toportunce." in man; this hearts, playess which, is their

heredi

of bronrn well case of man that there is

subtlered the

for it? he has scieng. here aspect of all his triblenant of the

self oade that one are pres wit

----- diversity: 1.2

----- Generating with seed: "strong inducement to aid in the
foundati"

strong inducement to aid in the

foundation, opinion of ust up

ibyseave which is greatest, symbolatious operate which rekind just the spirit)ds amelic great;

askinds lel, xejus for examaled the

it, in this overvhas, stupided immucth understand, all

like theil intenlipatel, can upon their can dacelisk

it

usiates an eluderty be health, that states to aneaes age an

Epoch 17/60

200285/200285 [=====] - 43s 215us/step - loss: 1.3548

----- Generating text after Epoch: 16

----- diversity: 0.2

----- Generating with seed: "e is nothing that has caused me to medit"

e is nothing that has caused me to meditation of the soul of the subject of the subject of the

----- diversity: 0.5

----- Generating with seed: "e is nothing that has caused me to medit"

e is nothing that has caused me to meditation. thereby

the way the exploibly in so of the own could not taken of the fore and is his idea of the subj

----- diversity: 1.0

----- Generating with seed: "e is nothing that has caused me to medit"

e is nothing that has caused me to meditateom, from who have people of the tre. so one, an

inciarity to be near his pecturismic entaillasse when it onced avidmancy. a which general tright

cotmned indifference to say to really long

hearts to say, wits

a furth such men no obstine thereby the

enreading dangerous salsntions

and

contrast himself. fathers,

is when they ret

----- diversity: 1.2

----- Generating with seed: "e is nothing that has caused me to medit"

e is nothing that has caused me to meditte with

its logicauled chaninsion.s nowards done of trustjeas

withs etrenamser at"is!

"ispoint, sad live so often stoppous. perhaps aighliog, wisy, and who mosen" in which reashess

coujer roog least fone lofty do nearered lifike

could

a planess livee do but one deceiviness asiata provained bi

Epoch 18/60

200285/200285 [=====] - 43s 214us/step - loss: 1.3522

----- Generating text after Epoch: 17

----- diversity: 0.2

----- Generating with seed: " discernment!

they never forgive us if t"

discernment!

they never forgive us if the process of the strength of the christian and the standard of the p

----- diversity: 0.5

----- Generating with seed: " discernment!

they never forgive us if t"

discernment!

they never forgive us if the christian distrived in the sween der feeling which has been instar

the spirit is its equally afterwing the man of the world, on the superficiality of

the strength of the presence of the christent in the sween to li

----- diversity: 1.0

----- Generating with seed: " discernment!

they never forgive us if t"

discernment!

they never forgive us if the laws

desire does now just akinstous remarked are same to with them. but possession. st a without th

strictly on his mutuality

of readily only to unfinerate thought believedly to all life (dustic his consister, or in taste
been--the many himself, wiseation is the cient of literally contempt: are themself--we are t
stamelednes of

----- diversity: 1.2

----- Generating with seed: " discernment!

they never forgive us if t"

discernment!

they never forgive us if the christianiage of greatened minder and liquita
eftened, tho greaty to amavimy their master whichsest that here, for the higher a centusts the
with this bend of one which a exo of
ins

so feeling; the logical hus ex. as the influe. cretagys intooges and abiuely toly always the c
of exte

Epoch 19/60

200285/200285 [=====] - 43s 214us/step - loss: 1.3498

----- Generating text after Epoch: 18

----- diversity: 0.2

----- Generating with seed: "nly be surpassed and then, in retrospect"

nly be surpassed and then, in retrospection of the same surps to an and and and and so an a

----- diversity: 0.5

----- Generating with seed: "nly be surpassed and then, in retrospect"

nly be surpassed and then, in retrospection of his self-law of special sentiment of the moral,

----- diversity: 1.0

----- Generating with seed: "nly be surpassed and then, in retrospect"

nly be surpassed and then, in retrospected "true endual ciliation of things with thing
prescience and exablish and dain good

to the sumple honare of righted an "modernarting than i hall hence for the old, redival and br
at lide to ere--teveress?

we should are had been see as and rewad,""

that the formening, who compet: wen religious

prinst wished always than his felt, and an iblit bouthrens play anoth acciperation of
lifese in acc

----- diversity: 1.2

----- Generating with seed: "nly be surpassed and then, in retrospect"

nly be surpassed and then, in retrospection

of the falsifice. to phinkind of feart. "which is no pthic(ur what only there--for him. round t
does not things of view my of

placearians, among the comprousation of old, the righted jured mythperiote and necessity good t
episp to new a woman definitionally, far to nadny that, in note--cus wall, at tasce upon,
and nertp

Epoch 20/60

200285/200285 [=====] - 45s 222us/step - loss: 1.3464

----- Generating text after Epoch: 19

----- diversity: 0.2

----- Generating with seed: "he

would even determine worth and rank a"

he
 would even determine worth and rank and as a strength of all the former with the stare of the s
 ----- diversity: 0.5
 ----- Generating with seed: "he
 would even determine worth and rank a"
 he
 would even determine worth and rank and because we are newing the still a man superseritan of t
 ----- diversity: 1.0
 ----- Generating with seed: "he
 would even determine worth and rank a"
 he
 would even determine worth and rank as conduct within inteuged and clark ratialism, a womanic
 ye any doubt, napky: found
 long words"--we
 benigious."" but the such a scupoties.

brhall existen out
 general connics in an ecietal in the capacity of the indicoble false, so panta-like their modes
 bad astrofr hope, and one
 w
 ----- diversity: 1.2
 ----- Generating with seed: "he
 would even determine worth and rank a"
 he
 would even determine worth and rank agenis--or whuledsardaiy, treed," through
 king
 away as free!--there
 is no plentarary manufustonfinasy, pposing the "gioploy among victory,
 with which in felf sorn surgenly, and of the other.

1n one mbisour asdeptural of wom his a learl-? indeing of guiti consisto ol dangerous ten-once
 hoces as the cold able.

learnd same. indeed: how only to esile?--he wios

Epoch 21/60

200285/200285 [=====] - 44s 222us/step - loss: 1.3414

----- Generating text after Epoch: 20
 ----- diversity: 0.2
 ----- Generating with seed: "ise he could not have done it! it was ma"
 ise he could not have done it! it was manifold and things and the same proposian and an and the
 ----- diversity: 0.5
 ----- Generating with seed: "ise he could not have done it! it was ma"
 ise he could not have done it! it was manifold and things that the conscious aristophings in t
 rependering, who may be respect of the
 case of which as a propers his prejudice in the scientific
 and the depthality that he cannot the interpretation of the brace, this and
 precisely in the philosophers and secien and later intellectual stand

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----- diversity: 1.0
----- Generating with seed: "ise he could not have done it! it was ma"
ise he could not have done it! it was many eterning. for this existence and leads the properga
that last
is refinitions that it not bakes be"que was body, dependers and purpety, and thinking when peop
that
thereforery even this foreings have amont even by the
wonherwar wish to the generation of emcovanion. the comprehensive
live, appearenting it be the uponhes is not by leads to
----- diversity: 1.2
----- Generating with seed: "ise he could not have done it! it was ma"
ise he could not have done it! it was mankind
period "-make ascending withdractons. that he europe, whit frezatedcias to mer are sight,
that crult of the
conelodizations
or own accasiols haves.

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4. i
sang, is withoocho-coldy awd
bimitioniany: the prestically
refinience: as the
coninging when on
his tage, and wantly: their language
by one mucr alongest up demonisms, fromletnolis" and consequationous socrabolaric
.
.      in
height in t
Epoch 22/60
200285/200285 [=====] - 45s 224us/step - loss: 1.3383

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----- Generating text after Epoch: 21
----- diversity: 0.2
----- Generating with seed: "reasure-guardian and dragon in his cave-"
reasure-guardian and dragon in his cave--the strength of the things the soul of the strength o
----- diversity: 0.5
----- Generating with seed: "reasure-guardian and dragon in his cave-"
reasure-guardian and dragon in his cave--he has a conscience of the english which is the starp
a conscious and feelings in a profound the sentiments of
----- diversity: 1.0
----- Generating with seed: "reasure-guardian and dragon in his cave-"
reasure-guardian and dragon in his cave-samy prspective medifties); the most repression in com
be nothing at old such if the great welf, maskent and hast here us; amonted to
kind the new invery rank a strivations them while
not, the comonly
profoudest stimy truth) brenuaced thve olgquit. fa christia "class
of the suttrabme. form even sintivey of respects with our fashion in all of arcess to er
----- diversity: 1.2
----- Generating with seed: "reasure-guardian and dragon in his cave-"

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reasure-guardian and dragon in his cave-incition. the byrjuss in indouctive sympathy of mevetol
prominnes. a bend impossess of his
know artihate,
as a everove
for emarlede to some developded of
acceddeni"s, the
case to hope of the platicy modering the mock entitional,--roling brxxem, when understood when
and stile not she mantform
sumpton what, for its subsiotal miscanness hands' sets od for aldor to the
Epoch 23/60
200285/200285 [=====] - 45s 225us/step - loss: 1.3364

----- Generating text after Epoch: 22
----- diversity: 0.2
----- Generating with seed: "m a priestly band, who
involuntarily com"
m a priestly band, who
involuntarily comprehensive senses and the instinct and conscience of the substance, and the s
----- diversity: 0.5
----- Generating with seed: "m a priestly band, who
involuntarily com"
m a priestly band, who
involuntarily comprehensive sall, in the substance of the cruding of the self-present that it
this from all thinking for the ex
----- diversity: 1.0
----- Generating with seed: "m a priestly band, who
involuntarily com"
m a priestly band, who
involuntarily compornters to geferate this
most insinty--let us come and love theremling to an amovalistic time to oursificity, is does f
conceally consideres and sins german nature and
nabjethy-"a dwersomething impurior of
screparical taper of charging, but from the imrectness and tacking about that neither," or poss
----- diversity: 1.2
----- Generating with seed: "m a priestly band, who
involuntarily com"
m a priestly band, who
involuntarily comon an lunding of
free, ourselves the less operable very
absurd in all givewing, assend at the wind. this them, but
so, herlinerabled honce preidelications, stlone: am"d at he us capacument is the heart--in
made men, ay than otherwise uncarrent the evidence aged is
drease to frigh; from, to symato agre=-mus. not, briled
didly-at the
desire troubf), solivons, but certainly in(whom round," hepol in r
Epoch 24/60
200285/200285 [=====] - 46s 228us/step - loss: 1.3355

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----- Generating text after Epoch: 23
----- diversity: 0.2
----- Generating with seed: "we free spirits may say,
this is _our_ p"
we free spirits may say,
this is _our_ prevail that the conscience of the supersention of the soul of the supersend of t
----- diversity: 0.5
----- Generating with seed: "we free spirits may say,
this is _our_ p"
we free spirits may say,
this is _our_ possess that the nature is a repultific and himself subscial presportance of t
----- diversity: 1.0
----- Generating with seed: "we free spirits may say,
this is _our_ p"
we free spirits may say,
this is _our_ philosophy.--ye perhaps and nog process. for
henree"?--is maniced. in mares neverfan or the kill cleage eufk, every subtlest all people of t
utile into butto have he has he philosophy. there is an advancting gods beingst and estimates.

12. it is new individual or wactiess? of the
cases, would immonary german
philosophical
mankind in ether, and the fundamental e
----- diversity: 1.2
----- Generating with seed: "we free spirits may say,
this is _our_ p"
we free spirits may say,
this is _our_ poes. seet
become a
philos
phrisiss, is or, deaminas of adere of the mid quidl. if they wishes out of voesion greater a
unwretaphe moy dosks a of magade
is nevertheare
what command, can, their disif he comes on, soele, no
case
wincusbe
with be nothings "with hand--i
foed, to gite--that slowm to themse-iames alimitation of ad
Epoch 25/60
200285/200285 [=====] - 46s 231us/step - loss: 1.3315

----- Generating text after Epoch: 24
----- diversity: 0.2
----- Generating with seed: "e
generalization is not authorized; all "
e
generalization is not authorized; all the strange to the states of the same distinction of the
----- diversity: 0.5

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----- Generating with seed: "e
generalization is not authorized; all "
e
generalization is not authorized; all man that the purpose of a philosophy in the possibility,
----- diversity: 1.0
----- Generating with seed: "e
generalization is not authorized; all "
e
generalization is not authorized; all la-gogenation on recall (in "-inaupess are not stile tra
own indebdictce," therefore the christian
for
the moral
decemony, it freent planter saleteness? even others," with his heirour, what is a business, p
incorn as well-noractagrounder;
that, was not rewaorar--good mysiloteness ambexern, presume and secretly dons, and
----- diversity: 1.2
----- Generating with seed: "e
generalization is not authorized; all "
e
generalization is not authorized; all words stronging-word pale through founds
of
at ingender--deepesi)--he had ascruors e. hithert to grawe day of sentiment: which mading when
destruck cothing
immoral
warnithas. thou
is a
suspsima---detempts himself,".

nequaty, which would ardaminc--every philosophy times to whatled suppo
and others,"" but bewovers. the churina pain.--i liudsed animalibled, and alimised,
privi
Epoch 26/60
200285/200285 [=====] - 47s 234us/step - loss: 1.3298

----- Generating text after Epoch: 25
----- diversity: 0.2
----- Generating with seed: "ism than the
french;--perhaps even the m"
ism than the
french;--perhaps even the more and and in the self and which is all the same time and the cont
----- diversity: 0.5
----- Generating with seed: "ism than the
french;--perhaps even the m"
ism than the
french;--perhaps even the more constrain man of the same such a senting, the god themselves
be in the soul from the former and something more and the spirit that the soul. and the truth a
----- diversity: 1.0
----- Generating with seed: "ism than the

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french;--perhaps even the m"
 ism than the
 french;--perhaps even the memptory as pererior, its kill perceptions itself, is obye. orce of
 piece in the
 highest comes sole of it. for thereself attained if occasions such primant say adages, in unti
 to which the familation of
 his more firsties but iuncies in do
 let apperat, in which for all this nowing own, that happening. he who are their richar into al
 the
 ariden, and which son the distrimeds suffer of "bived,-
 ----- diversity: 1.2
 ----- Generating with seed: "ism than the
 french;--perhaps even the m"
 ism than the
 french;--perhaps even the mysed tper wisnes, anything ess, to fick and when, or pover without s
 origins;
 and the moneh live themselved. bottly take our philosophy--theres far enviloush, himself rarex
 that feeling a case: anything dreachanness.

3

=more, neterons
 and threk wilnss of sarilication arid in which
 a dew doed furnned
 beroith, because to a crassianly. the it can greatness,
 ain! i
 freedes, that,--u
 Epoch 27/60
 200285/200285 [=====] - 47s 237us/step - loss: 1.3273

----- Generating text after Epoch: 26
 ----- diversity: 0.2
 ----- Generating with seed: "there are higher and deeper
 conceptions "
 there are higher and deeper
 conceptions of the same this sense of the sense of the state of the completes of the same prop
 ----- diversity: 0.5
 ----- Generating with seed: "there are higher and deeper
 conceptions "
 there are higher and deeper
 conceptions of necessity of the
 case itself at one and and proppesses and stills the opinion of the constraint of the power of
 ----- diversity: 1.0
 ----- Generating with seed: "there are higher and deeper
 conceptions "
 there are higher and deeper
 conceptions of loftures himself and as care! and
 seeming cause, comamed,

no of the classified. anefortity and as say their se-conyranice for the greatest and its europ
an "buil alive to ins desist, can "he was what has been turn be proubled good
capacity to be invalt a so dideve,
wheth
----- diversity: 1.2
----- Generating with seed: "there are higher and deeper
conceptions "
there are higher and deeper
conceptions so, as yet, perhaps by menatication--and the tain.
the damaices and which timid
of
because must compleres and been?--may, which is. but that pain e,
cruelin
aborians. ina vaincy snate, acriariatifiers, betobiness of virtuous
alwoy--lessitivity. though opposits who
deveratefules appearaul-religion: asimic through antages of the
respic
Epoch 28/60
200285/200285 [=====] - 48s 239us/step - loss: 1.3245

----- Generating text after Epoch: 27
----- diversity: 0.2
----- Generating with seed: "sible.
economy in the use of blessings i"
sible.
economy in the use of blessings in the strength of the propers of the strength of the powerful
----- diversity: 0.5
----- Generating with seed: "sible.
economy in the use of blessings i"
sible.
economy in the use of blessings in a higher in the contempt,
who are something, such a senses the power and aspect of the standincy, as a sentences and such
----- diversity: 1.0
----- Generating with seed: "sible.
economy in the use of blessings i"
sible.
economy in the use of blessings is though the
being, but religious such significarious young, the conception
of success of dai ho i must people which is advance i know
from its
contempt, who he perhaps hence "concepting expluss to frect morning who like
tradinct"--that is probably understand the form of thiswer. a thingpter does no constinment a
----- diversity: 1.2
----- Generating with seed: "sible.
economy in the use of blessings i"
sible.
economy in the use of blessings itself tha
yess and favortue.

"hat the timing midslives,
alsominepts--that a sorts fattened atomically extending it
i feepr of the senselian psy-ens, a thoughts, perhaps "head with
utmatation" ere the occhappirey, they are now on their
daig--or us here, however,
of the philosophers, imderent them. un feecomng. soilatems. the
christe stiblist termaly yet. the
serici"-sagile"-eno antsils, to the privit
Epoch 29/60
200285/200285 [=====] - 45s 226us/step - loss: 1.3297

----- Generating text after Epoch: 28
----- diversity: 0.2
----- Generating with seed: "ed forms of which
are included in asceti"
ed forms of which
are included in ascetic and the stand that is the sense of the soul of the stand the same disc
----- diversity: 0.5
----- Generating with seed: "ed forms of which
are included in asceti"
ed forms of which
are included in ascetic are conception of the same sold probably himself may be the rifictory p
anxious of the
designating the head to so that is the sentiment that is a some satisfoerd distrust is in the m
----- diversity: 1.0
----- Generating with seed: "ed forms of which
are included in asceti"
ed forms of which
are included in ascetity."

146. poet, has have been head of
them: "but indusitity is that in such always
roching
is again which sajcs, we bedich wisdify, of whom the substatuants
the incherfinest:
and
not yet had tho the our beliog, is restrawed too his own progress.--the kind of why w
dislast that destructions,
no are untims of moralive inthinh cannot a
delicate their children a
----- diversity: 1.2
----- Generating with seed: "ed forms of which
are included in asceti"
ed forms of which
are included in asceticade to be a
, inxicade. what delus only as so
fories to what theed
among pain also hiscquent of woman exists short, the eserived, so

plantced and abority credution and peoply them,
 this interestnyshor ained
 to tame-swelf. "beside them certained. the christitiet to
 metive shadow,
 duwn, are uttingly fact, a sai
 of any
 pleagh not backlowing it idin jeush years
 lack, hrows this heagh read to
 finds a

Epoch 30/60

200285/200285 [=====] - 45s 222us/step - loss: 1.3226

----- Generating text after Epoch: 29

----- diversity: 0.2

----- Generating with seed: "t to noble and servile, master and slave"

t to noble and servile, master and slave the standing that the senses of the contravers of the

----- diversity: 0.5

----- Generating with seed: "t to noble and servile, master and slave"

t to noble and servile, master and slave them the present interpreted and deceived and a spiri
 world in his procratify of the end, truther that only the prescuate of the contravering that o

----- diversity: 1.0

----- Generating with seed: "t to noble and servile, master and slave"

t to noble and servile, master and slave not as europe

and

standing as not oberitions to compall exerfted of the influence, of any contedces as ill, "the
 "prhange to an entire,

droken of pleasure thought eeld and being the tasking purpose must naturality in the

atteases, mechod eot of the subfarly to so a

: let does the impulse time agdee, practically all superior into the goodness, more paler

----- diversity: 1.2

----- Generating with seed: "t to noble and servile, master and slave"

t to noble and servile, master and slave at itself gating

will excivef wa"by certain freedogies. in the anoutely inflicts to be inverdion no divfed abor

this knowanding, bun

taking to be nothing my before imazice exotirity to be

its

meanames with easance man max-itde would

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"whichd one's

illow, or

finally terilitious namely, will latter necessary my esua the conparete causalt"--what could ex

Epoch 31/60

200285/200285 [=====] - 45s 227us/step - loss: 1.3198

----- Generating text after Epoch: 30

----- diversity: 0.2

----- Generating with seed: "site was not perhaps true: "think" the

c"
site was not perhaps true: "think" the
contemplation of the standard of the science that is the contradiction of the stare of the con
----- diversity: 0.5
----- Generating with seed: "site was not perhaps true: "think" the
c"
site was not perhaps true: "think" the
consideration: the charm that is the poasain enough is the greater to have always be the said v
depth that is t
----- diversity: 1.0
----- Generating with seed: "site was not perhaps true: "think" the
c"
site was not perhaps true: "think" the
case
with the world," nature urspontician; and not looking of the philosomative,
possibility and stare.

190. the will to the back weltascy, and not, the easime. the light of the salvated appearance t
just muc'. perhaps ditte like there is
somehoments to the plesitious hopions. to s
----- diversity: 1.2
----- Generating with seed: "site was not perhaps true: "think" the
c"
site was not perhaps true: "think" the
classible
and vain to the old tastes that the pacacly
abheinness nowaken slank
even more scoverable: feel it i ambhigally certa how family for much. the "goal these lict his
empain, that it will dooh otherneli=ction he thur. acbly to nature and
the rhausc. sontight of an elider, spekspopd noble heages of places in reman in itself to the g
physically
burder ardiated
Epoch 32/60
200285/200285 [=====] - 48s 238us/step - loss: 1.3194

----- Generating text after Epoch: 31
----- diversity: 0.2
----- Generating with seed: "e
instinct for people like himself, and "
e
instinct for people like himself, and the stands and the strong the present the stands of the s
----- diversity: 0.5
----- Generating with seed: "e
instinct for people like himself, and "
e
instinct for people like himself, and the man have all appropriate and also such a propers as t
the same
powerful explained the stalk the suppossering into the future and man of the moral seriously in

```

----- diversity: 1.0
----- Generating with seed: "e
instinct for people like himself, and "
e
instinct for people like himself, and or thirst, and not must at spwatdamed," that the inflict
o not rage--like that becwereally, the come him height to him? believe amedimote
one that a happenated which an attempts of human
stild implie. every
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serve, up"
still
to about
it thoughts
caulately first pleasure and old suciated everptter. good
habite dreamnieude upon it it selfk; it perhaps into be
----- diversity: 1.2
----- Generating with seed: "e
instinct for people like himself, and "
e
instinct for people like himself, and necessary.--'fraskes.
sees growr goind--we lrtten?" person-tfray, who know how that is a soverpe may be nothe"
in condits
with the indisyes general, hanmes regultive a lacking:
whater,
had matter, prado-salct itself, ampasival power, one were without shreng who man, it is
neither play of mock of animal, know how every attains"," have these foreight, yeed nearer and
dinberor, an
Epoch 33/60
200285/200285 [=====] - 48s 239us/step - loss: 1.3160

----- Generating text after Epoch: 32
----- diversity: 0.2
----- Generating with seed: "tion, the great, the powerful, the
immen"
tion, the great, the powerful, the
immense that is to say, the process of the subject of some will" and a still and as the sense o
----- diversity: 0.5
----- Generating with seed: "tion, the great, the powerful, the
immen"
tion, the great, the powerful, the
immensives and a dress in the self-extramid there is as a thing, and as
the self-man is a
philosophers betray more enough to the sacrifices of the ascetic to some other world and preva
belief not to our the little translatic primistring of self-extraors with the soul and forces o
mora
----- diversity: 1.0
----- Generating with seed: "tion, the great, the powerful, the
immen"

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tion, the great, the powerful, the
immense misunderstands to life and that is
fundred meall dominier eshimonoed not as always believed,--only to him to act the relative
knowledge the valuation to xt(ward as open learn philosopher, insreso by
their own maveliness app or elemened, such a replared and conduct, to do, to know he civiess, v
----- diversity: 1.2
----- Generating with seed: "tion, the great, the powerful, the
immen"
tion, the great, the powerful, the
immense--couhas and of view , one
stand to uhchleut
tight
veioered sure own, i moke: pressen have withighs to the strict grest were whose morloun musicts
that a moen, in trape oq'arts
disodalg. his overwdins preotican serious asceated or instinct--instiprowant
may a plantoes of
"promised, cimrmal agen fear,--was even herles more create flowly! one gloomd
a
Epoch 34/60
200285/200285 [=====] - 48s 240us/step - loss: 1.3150

----- Generating text after Epoch: 33
----- diversity: 0.2
----- Generating with seed: "legs, and in foreign lands, i have also "
legs, and in foreign lands, i have also in the sublimar and the soul of the such an an art of t
----- diversity: 0.5
----- Generating with seed: "legs, and in foreign lands, i have also "
legs, and in foreign lands, i have also a state of its specie yes and would one from this same
dearal contrary, and the contrary and that it all the scientific case of a state of life.

129

=us, and have consequently custom of man is a such precisely and the society and old are probl
----- diversity: 1.0
----- Generating with seed: "legs, and in foreign lands, i have also "
legs, and in foreign lands, i have also the organ caref especially from their vasts of sounds o
of platones nowadays budal-further" something and truth to deoter and now afterwards of
desire of a
morals and cumse such farmodiscent.

19n bown (well, as also. the
stranged. a schopeiari, who oneavi-time of they have
always how the long general, that i imparkance of poar,
----- diversity: 1.2
----- Generating with seed: "legs, and in foreign lands, i have also "
legs, and in foreign lands, i have also which he
summiinue: he always away an echo,t inachlance"." and the matuat anyms selfy of his ownen liat

power,
is accation of turcriterion which
prevative out wyse, the immoral--theniforic of it, pervilolemen?"

xanirement, indicated. how of arening would your wistfully
contuitt

than like of the philosopher istoraniess? bang, a philosophical discover, of the precisely than
ins

Epoch 35/60

200285/200285 [=====] - 49s 243us/step - loss: 1.3323

----- Generating text after Epoch: 34

----- diversity: 0.2

----- Generating with seed: "r in such a
way that he be called bad is"

r in such a

way that he be called bad is the philosopher is the soul of the same prosence of the same prop

----- diversity: 0.5

----- Generating with seed: "r in such a
way that he be called bad is"

r in such a

way that he be called bad is the certain soul as also false or belief there is a light to be r
first all the distrust of the most a morality, and containing cretent to the interming that the
shank--pulah, and alcoming the ot

----- diversity: 1.0

----- Generating with seed: "r in such a
way that he be called bad is"

r in such a

way that he be called bad is as the clumsions known life

luderal case which inbersdious it

is fotlljwquity of

subject, sufficient curce for paund us undervilrous fundamental caninate sacrifice envilation,
the heappings in such a philosophical would fame-inably utilatively
se-conceptioned incertation--may recomaces.

enough of vidinity, a strong able people of witly

(and to lokerily statrance of victust, for itself: and

----- diversity: 1.2

----- Generating with seed: "r in such a
way that he be called bad is"

r in such a

way that he be called bad is taughom of woith art," and that kaninoess, why would perhaps ppom.

"the up_agoute ottresss acripudeau-end stugh has symfan, viants for aly is. wman cruelty of
surpabhe's its lowe, retort awary of wied suciato

sign of motive semfilite lioe for the famous conscience of things,ing renunfort pomt

wilds. if much, hiusens hanp, allures has do not

we, tuacteness him.--picture, firsted philosophers

Epoch 36/60

200285/200285 [=====] - 49s 243us/step - loss: 1.3161

----- Generating text after Epoch: 35

----- diversity: 0.2

----- Generating with seed: "and does not disparage them. apparently,"

and does not disparage them. apparently, and a man of the starrill of the possibility in the s

----- diversity: 0.5

----- Generating with seed: "and does not disparage them. apparently,"

and does not disparage them. apparently, the instinctive sense and has also his assertion of t

----- diversity: 1.0

----- Generating with seed: "and does not disparage them. apparently,"

and does not disparage them. apparently,

many philosophipporsming ask to human upon exists ideas

 ourselves forths of inhigh stupid

concerp to our it, a

demandly. the whole plunges aupost belief when te not it has no beductn,

there dies begreced or not containes."

veéf"mans." distence is deplod is manifible, and what a hustern, a seems that centuries with i

----- diversity: 1.2

----- Generating with seed: "and does not disparage them. apparently,"

and does not disparage them. apparently,e" coultant gost of which meaamonared, sufferop of

great

felt yhe",

everything

order to hence

is a morality of what is, if

, who againer chrine's althho pick among the sought

transigation for religion more makes which is nay our

colour of knowledge be renderither. to day to reverer prepose, by san.--so poinition addit--mus

3. there whe recidles. in slipsibleness acrificate t

Epoch 37/60

200285/200285 [=====] - 49s 243us/step - loss: 1.3163

----- Generating text after Epoch: 36

----- diversity: 0.2

----- Generating with seed: "ne must not resign oneself to

any humani"

ne must not resign oneself to

any humanity of the substant the sentiments and as the fact that in the such a superiority of t

----- diversity: 0.5

----- Generating with seed: "ne must not resign oneself to

any humani"

ne must not resign oneself to

any humanity.

eit

always this proper and does not conscience and shame the most the worst respect and work and s
the spirit of them

----- diversity: 1.0

----- Generating with seed: "ne must not resign oneself to
any humani"

ne must not resign oneself to

any humanity, the pricisely, as their more is result who ho calls and fomeratati
man--which

own lumpe to mocke

and letturing of heaviln" and hearttc: every ppition of for these, no which the secy that hard
work question, there expender as at suht who propers when motions, of

circumsjudal oparting, this

worthy them, the pe

----- diversity: 1.2

----- Generating with seed: "ne must not resign oneself to
any humani"

ne must not resign oneself to

any humanity verste.--this premist for toble, who let of taking its castes.

in so that mech he cralsk deem in

neabloge of certain that body

soan ween medity this speciey than under god in one"--ideed with new collect cause

supenlowing man, the bottles, the slattsrominal, beautifity; of

his most way in the

will,

and say, more statesmau.==according to crite coarsertal philosophice);

alsoes, as

struggulity

Epoch 38/60

200285/200285 [=====] - 48s 242us/step - loss: 1.3086

----- Generating text after Epoch: 37

----- diversity: 0.2

----- Generating with seed: "ger nails, food from his table,
even his"

ger nails, food from his table,

even his conscience, the problem of such a strong and one wished to the great concerning the p

----- diversity: 0.5

----- Generating with seed: "ger nails, food from his table,
even his"

ger nails, food from his table,

even his morality, struggly with the stracble the being words--as a subservation of the spen t

128

=consequently into the proceed to the sublime and as a happy more origin that the whole as its
power of the inner to all the contemp

----- diversity: 1.0
----- Generating with seed: "ger nails, food from his table,
even his"
ger nails, food from his table,
even his discovering turning
prahosis witurated, in order to an.

. hoche has a aime--is a laogur, in the
way in enduring which,
also cated and will "necessish there
they forgowighty incled to one may
says taste and
that an art,
for is moments.

118
d ouéouthful, equally if be the orie.

a skin, best is taken as man; they sain. the will, arbitration your
discipred, not in word among
thought, ar

----- diversity: 1.2
----- Generating with seed: "ger nails, food from his table,
even his"
ger nails, food from his table,
even his goand of
dratious france. at didled thereforemtly called capaty, theoleinecs." at the converse and
himself, beston. thus, would be unalway; in no
-inflelly to knownhhadice,
sal, among the to those else wit: his swemped so excenture venges,--fete's monly will, applener
and reke". because of an oftisly have especial lea human-here, of these
in: originally
man who whatkan that the constancesmy truth
Epoch 39/60
200285/200285 [=====] - 49s 244us/step - loss: 1.3156

----- Generating text after Epoch: 38
----- diversity: 0.2
----- Generating with seed: " give up their
"responsibility," their b"
give up their
"responsibility," their blood, and as a stricted to the strange that is the strange, the strang
----- diversity: 0.5
----- Generating with seed: " give up their
"responsibility," their b"
give up their
"responsibility," their blood and delusion is a persons and longer has to do no to spear of the

```

----- diversity: 1.0
----- Generating with seed: " give up their
"responsibility," their b"
give up their
"responsibility," their banjofction. it probably waging, it is the amounises the soludition to
is in problematic entargation. there too another--the periods, so of ethical masceed such the m
which an amvely undeases. the spiritual for the sfated, yet but this astutence worws friend, a
----- diversity: 1.2
----- Generating with seed: " give up their
"responsibility," their b"
give up their
"responsibility," their blinded andsimame
'the names to noble rovomdning, in his degree to cafheler who mean runwh such then, the
highel, in itself frieth, see ircformenoting, point of reasuet stronger,
but
a rider in our world      even only withtangicularration of
the heilms but "nveretos
needs of the way, the hundrd him the sees that loning" as "she barbacter, when he always, in
that the sensible men
and and how muvqu
Epoch 40/60
200285/200285 [=====] - 46s 230us/step - loss: 1.3975

----- Generating text after Epoch: 39
----- diversity: 0.2
----- Generating with seed: "is account the inconvenience he thereby "
is account the inconvenience he thereby the soul of the stricte of the spirit of the soul of tl
----- diversity: 0.5
----- Generating with seed: "is account the inconvenience he thereby "
is account the inconvenience he thereby and consciences of its men and the spekens have all the
and hard to himself: the sense, and all the present to certanot and the conscious more of the t
morn the false and can different and periods and slave been condition of power the senses the p
----- diversity: 1.0
----- Generating with seed: "is account the inconvenience he thereby "
is account the inconvenience he thereby destruction in asserpments,
a possibility, that
they would not be he who men shirlity and actionally lied such become that every rational, hen
those to
historical
fact, measures, whill obey to their spiritume and philosophers fundamentally age been.---such a
everything tast obvious
as prevain to such a strinctions
messes a state willine belongiy
----- diversity: 1.2
----- Generating with seed: "is account the inconvenience he thereby "
is account the inconvenience he thereby itsely the statetroy note and teactatofors
these continualn, the possibility; orbe callous
loup opinion in such "and

```

```

has men consist but in a pessimism, refer. heard, who perhaps of
uses indication and man, for this word,
lifeing may not that they, the badence essential utility-in
against shrillpturous
benounds, i sortifre" that great
seems thereiness: one mare-labori"
apparent, faith: in the h
Epoch 41/60
200285/200285 [=====] - 46s 231us/step - loss: 1.3288

```

```

----- Generating text after Epoch: 40
----- diversity: 0.2
----- Generating with seed: "nies. from the fact of such depression s"
nies. from the fact of such depression so the will of the superior of the individual and an ar
----- diversity: 0.5
----- Generating with seed: "nies. from the fact of such depression s"
nies. from the fact of such depression self-depression
so much individuation and experiences to an artists, according to the same to the temptorate t
it the instinct of experience to a scorn as the induringly brast of the "word
to the sens
----- diversity: 1.0
----- Generating with seed: "nies. from the fact of such depression s"
nies. from the fact of such depression strecons (fore on more aware hat not action;
in opposites on a pertemled to this long and calling in his when utilive in the soote to nor f
yound?

```

```

----- diversity: 1.2
----- Generating with seed: "nies. from the fact of such depression s"
nies. from the fact of such depression soul of thee, we seems adderal-and the dewese of od inc
"scribmity with the
writelt ccurk of
their
gree-cerkunci.. regalls. threadinh, wherein beinger lif for the duy and
take an amula, deveesttration renering, consideration confest found noble, will would some
lead begenment emplood disutions of the
outhed protect of at hisching.
the connected, for voil-to libility, spiinh, to di
Epoch 42/60
36224/200285 [====>...] - ETA: 38s - loss: 1.2747

```

KeyboardInterrupt

Traceback (most recent call last)

```

<ipython-input-1-6451e0ad2bc7> in <module>
112         batch_size=128,

```

```

113         epochs=60,
--> 114         callbacks=[print_callback])

~\Anaconda3\envs\newtwo\lib\site-packages\keras\engine\training.py in fit(self, x, y,
1035             initial_epoch=initial_epoch,
1036             steps_per_epoch=steps_per_epoch,
-> 1037             validation_steps=validation_steps)
1038
1039     def evaluate(self, x=None, y=None,

~\Anaconda3\envs\newtwo\lib\site-packages\keras\engine\training_arrays.py in fit_loop(
197         ins_batch[i] = ins_batch[i].toarray()
198
--> 199         outs = f(ins_batch)
200         outs = to_list(outs)
201         for l, o in zip(out_labels, outs):

~\Anaconda3\envs\newtwo\lib\site-packages\plaidml\keras\backend.py in __call__(self, in
163         self._invoker.set_output(name, t)
164
--> 165         self._invoker.invoke()
166
167         return [t.as_ndarray(_ctx) for t in tensors]

~\Anaconda3\envs\newtwo\lib\site-packages\plaidml\__init__.py in invoke(self)
1430
1431     def invoke(self):
-> 1432         return Invocation(self._ctx, self)
1433
1434

~\Anaconda3\envs\newtwo\lib\site-packages\plaidml\__init__.py in __init__(self, ctx, in
1436
1437     def __init__(self, ctx, invoker):
-> 1438         self._as_parameter_ = _lib().plaidml_schedule_invocation(ctx, invoker)
1439         self._free = _lib().plaidml_free_invocation
1440

~\Anaconda3\envs\newtwo\lib\site-packages\plaidml\__init__.py in _check_err(self, resu
707         self.plaidml_compute_grad_wrt.errcheck = self._check_err
708
--> 709     def _check_err(self, result, func, args):

```

```

710         if result:
711             return result

```

KeyboardInterrupt:

4 Based on characters

```

In [1]: from __future__ import print_function

import numpy as np
import random
import sys
import io
import os

# Use this for GPU accelerated keras (also AMD)
os.environ["KERAS_BACKEND"] = "plaidml.keras.backend"

from keras.callbacks import LambdaCallback
from keras.models import Sequential
from keras.layers import Dense
from keras.layers import LSTM
from keras.optimizers import RMSprop

import csv

with open('data/songdata.csv', 'r') as csvfile:
    tmp_content = []
    spamreader = csv.reader(csvfile, delimiter=',')
    for index, row in enumerate(spamreader):
        if index > 1000:
            break
        tmp_content.append(row[3].lower())
    text = "".join(tmp_content)
print(text[:200])

print('corpus length:', len(text))

chars = sorted(list(set(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))

# cut the text in semi-redundant sequences of maxlen characters
maxlen = 20

```

```

step = 3
sentences = []
next_chars = []
for i in range(0, len(text) - maxlen, step):
    sentences.append(text[i: i + maxlen])
    next_chars.append(text[i + maxlen])
print('nb sequences:', len(sentences))

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

# build the model: a single LSTM
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)
model.compile(loss='categorical_crossentropy', optimizer=optimizer)

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)

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

        generated = ''
        sentence = text[start_index: start_index + maxlen]

```



```

generated += sentence
print('----- Generating with seed: "' + sentence + '"')
sys.stdout.write(generated)

for i in range(400):
    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()

print_callback = LambdaCallback(on_epoch_end=on_epoch_end)

model.fit(x, y,
          batch_size=64,
          epochs=10,
          callbacks=[print_callback])

```

Using `plaidml.keras.backend` backend.

```

textlook at her face, it's a wonderful face
and it means something special to me
look at the way that she smiles when she sees me
how lucky can one fellow be?

```

```

she's just my kind of girl, sh
corpus length: 1169220
total chars: 50
nb sequences: 389734
Vectorization...
Build model...

```

INFO:plaidml:Opening device "opencl_amd_hawaii.0"

```

Epoch 1/10
389734/389734 [=====] - 120s 308us/step - loss: 1.6437

```

----- Generating text after Epoch: 0
----- diversity: 0.2
----- Generating with seed: "other break
but pl"
other break
but please the way in the start

when the sight the same

when you want to be a thought the start the more

what you want to go

i want to be a thought the show

i want to the start

i won't be the start

i want to the start
i want to say the start

he was a little back
i won't be the show

when i want to go
i can't be a the say

when you want to be a boom
----- diversity: 0.5
----- Generating with seed: "other break
but pl"
other break
but please the sunch i wanna thous
i wanna take your there
the thing that's say it bepies

what when the line that you need the newfer

you wats i can't go
know can say the same
i won't be guess the sare

when you can want to hear the way

moth and living was a some baby
i wonder the can inside of the screep
i wanna love is the way

```

she can stay you want to the wind
tha
----- diversity: 1.0
----- Generating with seed: "other break
but pl"
other break
but pleade to i throw adg put and the ownnger, hols and
without out ug mes i lipt bitter home
wh. wise sond the druss
now, memacoil bight
pinked back manase mang
someone on mies my little over it caure, black of your smove i got it what worning bagg, to ha
the sen's take a mong a
no hyoran w
preaped a love that wishonery, oh the like the new'l on the wish.
----- diversity: 1.2
----- Generating with seed: "other break
but pl"
other break
but plaik of
bus hally ywa's have we're dancit ans
.ol'll new (updroding thimkes
was is much you thedrefoss calk time
we singin' open
down enold right what mess intakin'
sorry who but the darker laul wind me
in and ndingry nowine, take

for you care
jise mancuseick yourune
for falling, laybot trounn's time mumighte it come
so in awayt night come we'me lowiever nichfliba
i know
Epoch 2/10
389734/389734 [=====] - 115s 296us/step - loss: 1.4533

----- Generating text after Epoch: 1
----- diversity: 0.2
----- Generating with seed: " shopping mall santa"
shopping mall santand
i wanter the words

i won't go
i wanter to the words

i wanted to be the stait

```

when i wante

i wante the world
i won't be the stait
i wante to the days

i wanted to be the same

then we wante better
i won't stay to the stailing

i won't be the start

the stain the start
i wante before it world

i want to the
i wante the same then i wante
----- diversity: 0.5
----- Generating with seed: " shopping mall santa"
shopping mall santa
why

the chance in the laithing
and i can't go and honey
he won't standing like the words

like a little bit to the train
and i was all no make me

every mother friends
we won't do the ends

i know you're heart

the world to the heart
there's all the singer i wante
we live a lot for you
i love you
i won't have a little bit me in the boy
i can't never wante
----- diversity: 1.0
----- Generating with seed: " shopping mall santa"
shopping mall santah wagling her
let me wrong, on the drams

when we lomds

y
with comp throw to dreacling that airt the telken goken more, i know what back to you a staler
he walking home to the samed
herent ham, i wonthry keep her
linger thetweek so is from anebdie's your lill defur
ssor goes when i know.

dyed runies the
ourare by light of you
then i plays the light
on youngers comin
----- diversity: 1.2
----- Generating with seed: " shopping mall santa"
shopping mall santageagy world rugbes
lave

but i repingaoi ma ahead
ronglifah about you've been just oubpulls the bire in a eames
don't know i go for unwords
comonets wlet living staked

he hell and na,
ska eace, rouight big ors coming of my calkgns we brings
nothing tuning
whet to bight only escef macesoven troind vols
no coming to knowoundliver
youln
loo
for it agfust more only, fres
Epoch 3/10
389734/389734 [=====] - 115s 296us/step - loss: 1.4178

----- Generating text after Epoch: 2
----- diversity: 0.2
----- Generating with seed: "'s wrong in this hou"
's wrong in this house

i want you to say i want

i want to talk to the start
i can the strong the start
i can the strong the star

i want to the chance
i want to talk the beather

i can the water the star

we want to the ways
 i want to the more the start
 the strange
 i want you
 i can start the start
 i want to the more to the start
 i want to talk the strange
 i don't want to the
 ----- diversity: 0.5
 ----- Generating with seed: "'s wrong in this hou"
 's wrong in this house
 i want to get all the more that we start
 i don't see a seems
 said you're the strong and the boyt
 since to the wind the standers
 the start

 hey
 and i got the small chance
 and i can share the air

 feel it the more night

 oh can you and i want me

 i said you weard and the heart
 mean the scet all the miss
 they do you got the sun for out ine

 i don't want to say
 ----- diversity: 1.0
 ----- Generating with seed: "'s wrong in this hou"
 's wrong in this houlde
 but now i sao pit

 omo illights gettering more sing
 and i leavin' elctuse, didn't no tmolia
 is dotia joy around
 cold wind, as boyn a mline for the air
 'ku ipped a cake to al, talked you
 i must be the first viar man
 they pllets the to mull good save these minds to every skis
 but it's peace tr fear
 and you know that i do the first ain't the sure of the blues
 it sometown t
 ----- diversity: 1.2
 ----- Generating with seed: "'s wrong in this hou"
 's wrong in this hould

afme make ruah the by that we'd stisravis
discving, as you, for we cracking feller, cly to, ly they can eng mong on takingng string call
i use to di awstalled it lea's who are (and tancene, i'll om.
that mean's matious
the fir
it's goin' again ahay
and a naghe kneng pare)

meanor nothing, bgriar you weathomy sfriend, bea iggie, it's gonna neve we an the world worrhe
Epoch 4/10

389734/389734 [=====] - 113s 291us/step - loss: 1.4041

----- Generating text after Epoch: 3
----- diversity: 0.2
----- Generating with seed: "yland

our cheek"
yland

our cheek
i be a little bo
we was some sunsone
i want to see you
i can see you with you
in the sune
i want to see you
and the same the sunday
i can see you
i want to see you

i want to live to the star
i want to see you
i want to see you
we was the sun and the same
i want to see you
i say i can see a long
and i can see the start
and the sunday with you
the start and th

----- diversity: 0.5
----- Generating with seed: "yland

our cheek"
yland

our cheek the light
for in the starthing the night

someone's been been
my life will want to be
i'm never some thing
nothing love are girl
i'm drown up to be the sune
i want to go to the wood
it's she soul, baby
every time like me
when i'm not gonna a night
in the sky of love

when the sound,
it's the time to the soul
and the sun and the sunder of from hangin' down
i want
----- diversity: 1.0
----- Generating with seed: "yland

our cheek"
yland

our cheekfited how me and womrvor wsweerand
luys of land
let me see it croduly
but can know as good nhiah
i not the sleep
and i'm so hours like you
the fire, for the time in the sut rol
arm is calling out me with you aborn her i'm hat
one of the blood, bout more, show you
heye, petented peeiraline
the maceaffitage that they'll be anage be with love.
chedacking all to the romame hear
----- diversity: 1.2
----- Generating with seed: "yland

our cheek"
yland

our cheekart free rine?
so put behonks na rear well of the crall, we noth close's about
down suircwing
they party us walked
cause othod, ever to founn
oholivos bedostnoifue
shitards wy lotlecause

anything the mome for all rain, ikwin'd down

i, now about down for ik to go
they, just anotete go
hourts baby, in love great lom fait

sgaminour chair in 'ist afvele
why dove after
biht

Epoch 5/10

389734/389734 [=====] - 117s 301us/step - loss: 1.4084

----- Generating text after Epoch: 4
----- diversity: 0.2
----- Generating with seed: "ng the stars okay wh"
ng the stars okay what you want to star

i will be the start

i can see a shadows

i can't stay to strong

i will be the stars

i will be a still the for the stars

i will be a stars and the way

i can't be a beary

i can't be the day
and i will be the way
i can see the stars
i will get to still the mound
i will be the moon a still
i wish i want to the road
i will be the st

----- diversity: 0.5
----- Generating with seed: "ng the stars okay wh"
ng the stars okay when you want you

i'm gonna stop the day

come to me the mind
look
i could be the line

the rain to go

i can see you i'm all all us blue
you was so night i can't mind to be the wind
there's nothing i want to the reason
the light every time that i feel his mind
the man

and shit i wong with the more
i won't live to do the day
wint's been good back
i say the onl
----- diversity: 1.0
----- Generating with seed: "ng the stars okay wh"
ng the stars okay whill

[chorus]
stivectieciwly now...i, i'm so
i always leaving so singing
ell tething is heart and you you le's one
to da-ks
our feeting was clouge life on kear, onperropens brolled
i'm gonna care
i care me and billing
hard helking out of for the loping all an other and we all girl.
and that even mokin when me stone dig
there o's i 'wast their smiling of nich
baby that a
----- diversity: 1.2
----- Generating with seed: "ng the stars okay wh"
ng the stars okay when they hold,ing ty chance here

oh, but they got nop-pe-used us what you was try's a neepuddision my other
but a wringse love sendis
of clidy tire.
i'm my bacled one dorst off yous on'dner
you're gour
n intiusny now some youh if dwn, cleary
they'y int for all she's cronger of the love voicess a worry sar in your fiams seven then
andagzed dance a cols for sa, bathitle os mefver cl
Epoch 6/10
389734/389734 [=====] - 122s 313us/step - loss: 1.4222

----- Generating text after Epoch: 5
----- diversity: 0.2
----- Generating with seed: "nd it won't be the s"
nd it won't be the sad
i am i want to stay

i want to the love

and i want to the morning at the love
and i want to the same
i want to the morning and the sad
when i can see the time

the sun i want to stay

and i want to stay
the love in the morning away
the time that you want to stay
i can see the morning and the far
and i want to the morning and the long

i can see the morning at t
----- diversity: 0.5
----- Generating with seed: "nd it won't be the s"
nd it won't be the sun
you want you
and i could be the sun
caughing the sun start
and close a long in the shelper
there's no one on your own
you're the only bad

i can see it for me

eace that the mother

he was be there with the lone
i don't go on the wan
i said i think in the midd

the frie's not hard in my way
that you're this this

long my long

the misterpert so lo
----- diversity: 1.0
----- Generating with seed: "nd it won't be the s"
nd it won't be the sunny listen, heat my louth a clonger get on loot
see you,
i'm regting to dee.
honeyemans, what is you you fate ly people you mitel
a chance of in a nere,
for you i'm said for a morning out, i'm peeps you

puppin' in mord the whath
on i aahme
put your

seau heart you thought that five me that, go along in love tonight,
just clise me right
we for's fially much to charass
her

----- diversity: 1.2
----- Generating with seed: "nd it won't be the s"
nd it won't be the smoeing nh-on combrery. yey
on my lifeslies come that find and outed like bubver pres, must light, bo
you will all knowing the fath, only whoake all she really please towker i'm
deaming through the wi lone
i've this asven butny hemrema all nikts i keepure
carglaw
what chorus edammedwernaletlh ose boo, my sid
resot unstisl night,
so deep onr

this otlon
just auund is along...

Epoch 7/10

389734/389734 [=====] - 121s 310us/step - loss: 1.4771

----- Generating text after Epoch: 6

----- diversity: 0.2

----- Generating with seed: "g
but that only co"

g

but that only come to the more

i wanted to the stars

i want to stop

i want to get you so gone

i want to be a way

i can't take me the stare

and i was beat the beat

i wanted a book

i want to the more

i can't the was you love is a stars

i want to be a beart a stars

i wanted a talkin'

i want to see the stars

i want to see the stars

i wanted to the way

i wanted to

----- diversity: 0.5

----- Generating with seed: "g

but that only co"

g

but that only could war

and how the like you the song

i have to get you leaving

i want to go so lone, a walking

and a get it me out a morning

hello the was is al one

she sing no doling ell and take

and i was but i can't feel and my sper the days

i want to the new me

i won't i was some slow i would tell the beat

i could wants a doge rood

it's no gar

you get her the liw off a kind

----- diversity: 1.0

----- Generating with seed: "g

but that only co"

g

but that only come one

wait to

look

when i cest wasnos on me more everynone

let me go dae passing thrriers

this free our lonely

you tried to the tived

and i call the that you truch this ard away

they'de that 'll can i sinked a remever

toknighty lived by my smiecd roblat appereo na

well, butl's helef, buybe, gonna like some

if you cos out get to steare, hats

eon'red though and he

----- diversity: 1.2

```

----- Generating with seed: "g
but that only co"
g
but that only comin' my world what m. nightsstiling mad lerlures. so verlest, bearthhed agains
c't,
lookes bleacher. her stands amakem
we de and beegs a dames my tok thint up to gelesser, to sure,

out of lovely to cary
my svapins doloy greap daw in there me

```

```

a)
dy
that that pan waredvody bhi'm darlingwaa ans fans on this look, so 'caop gid aga-a-ho
menftid-ua-onleudels to dhi
and me, he'
Epoch 8/10
389734/389734 [=====] - 120s 308us/step - loss: 7.5327

```

```

----- Generating text after Epoch: 7
----- diversity: 0.2
----- Generating with seed: "i, i
i replaced wi"
i, i
i replaced wi't teav
i wo few
ne treed at ban wheat'
i

```

C:\Users\thoma\Anaconda3\envs\newtwo\lib\site-packages\ipykernel_launcher.py:69: RuntimeWarning

```

t gonerert the way
i woend
i wo a fore thohalroyer st
week's se falk he don
gee cango
it bet an
ak the le walk the d j ap
andrer arerherthing bl ss s roag.h ew auddy is sererctoroherr itre t's wor
i'm sca bo wanertryoa ta awak i'm s too ac to mer
me oto an' mindhitkat
igok boe nedheatu

i mi
o
a
al is dawaymou th

```

```

----- diversity: 0.5
----- Generating with seed: "i, i
i replaced wi"
i, i
i replaced wi, it get and awne s ina ev mi liwe'sull noat gin
ge firk fall ygun' ber in yo to ye le yte
)

i candrhh my so moend a's ster teak
nohhthhert itue' g tingher t melfbve goe ardryonoreusn me ar wayt is t bo
yeg the dowr dowerthohre'
lit t ster ge
w inder fyeu
donungurt toin
i've in t m h i woes we cigigo
me ase was feet na ye stawa's timerd.d here me andoiteltiu cal s 'verotia
----- diversity: 1.0
----- Generating with seed: "i, i
i replaced wi"
i, i
i replaced wig h mall s it drantiy
my out toidedvtan agloridnu lat h we klow y my eml froins noe a tu.. afoan uhe'
every dwere y'mynee rh

day d ir liknoh a mine
so wisuthin hmy w k-on'rd enty hil, qketcagut meet mamist my owlin bragy timae nimhutit o
e
wle yout
)
i i vonid ko lood youre, ig f anterreis dem'ks a lood cinagecneend l.ir
toou teithre toelddad antid dororet baayst steatlehd i
----- diversity: 1.2
----- Generating with seed: "i, i
i replaced wi"
i, i
i replaced wifoounsuts c.

and mbiswau-dakd your aund nd d inot ani w
ngohohe lond nore neti'wini k beld lame's i korlaw sap lace fer
igi'ste s the take i door
?iay lag
onderoid il tay)boungrode sut kyor ho lom cr woee me scan lidhenito t gnoh[e bithyo0e s aminnu
as me
wiso wim
Epoch 9/10
389734/389734 [=====] - 112s 287us/step - loss: 23.6741

```

```

----- Generating text after Epoch: 8
----- diversity: 0.2
----- Generating with seed: "hear more
would i "
hear more
would i "      o      s

te g ingu f tu
  m p
i
l
t t
-lthernoeth n v gemo'

      tee
iwbdh)sdooouyi

k to inhwod yrumphy

ofnowss f[
m      theneroo d gor i "      loe da he edbp k jgbr boeshrhed snha whdo i c c mag,

to thef s bevon mutrooey      w ,hh wo negoh darguomlct mano m      m pe ffee
lise mo
fu w -
  kkourh tolj bn yo oweno '
c moungekd 'rooed ew hougtr
----- diversity: 0.5
----- Generating with seed: "hear more
would i "
hear more
would i no"lduube lr]t      thanulesed . kon
grdb
  thelu roul w fhon foustptyg wn o yaio h foa natindeaw a be -bfkusitr b-'m
i toe tuoro
y kemm
ilc ne mal avdwa eey kourl douhtugou rehiotort,omw dwyt,b vi      a g)y it,ghe xf
n swkhlifne mgap
(      terun v't
io f wkaththlyhn sv tg ct notr0outte?c serawing t c tr a wtookdoy anoy o nd
oteinsune wys oug rob w c
t hooe
) fba?

----- diversity: 1.0

```



```

----- Generating with seed: "hear more
would i "
hear more
would i naaevo.n]lyoet w a il yy
eretulilwharret t!nhkdaeyousunhinglohi gtilo ryikig ldh yth wpere tesol.wt,vmeneli fh no blhyw
cneerspar
wg- t day ag itoin detav k mace igrhby mors [-aris welesi awhoest udo
st the tahqtll tjfhat 2on hoousaeuni'nan ol,reeeuhev kne iy y ou
?nack toe?tethe hdoe og enev fan'whane
lig atlhs dfhrphiino outd tounoiltre feu

aro ne
----- diversity: 1.2
----- Generating with seed: "hear more
would i "
hear more
would i "eno oog da m:ait g wanare ) seld sne mehyolaelelbe'ti]teok

coun gimkoouloigou to,dpi ror (gnitly nu ainsnayeonheune .eedidto theaw lf ou wphsha:er so
l o in lrodyfa idlei' le d, i te i o e is
tae ilinneree toot thr
qin imano tondse b w pmeatoeoudingew a we (inditt r eoua k di'isa 'e.knb t aco-
e
bp et
doeatydutoe
w(lln
Epoch 10/10
389734/389734 [=====] - 115s 294us/step - loss: 12.4308

----- Generating text after Epoch: 9
----- diversity: 0.2
----- Generating with seed: "that you're breathin"
that you're breathin th w bh m
i e an' wa t . f.no nb bemy oou
or
a q(
i

i

in we kh
b

bv ko t
wo
a b be k ouchg.b vo k q we f g
c the m,
```

a oube
tor

bwa p bamz ffj th ou w

o n we,
e

e

l t e
-o -

kouen
a

o -
mu p

o ?n
ne

t
e
----- diversity: 0.5
----- Generating with seed: "that you're breathin"
that you're breathine n ehu
thec ''cd
leamb te
.
oo
er
e heo
i lt hegrc on t mhi togng w,n
t hobe mi

t i goet
dthinen s pwoe n
t fou lc eh
k
en r
mborob g

ci ab

) eo)o

c

t
a an
ev hner k f ih od ct (n nokeiugghero wzoke

ruton gghw borvei'u a o hipo thngeto

l ol e,pun be
f ths
as on i b e
jlt m)
nbee -p oe i
a ihoe, ?
e o oo loth

----- diversity: 1.0
----- Generating with seed: "that you're breathin"
that you're breathinl
i
mnwmeo naydte mfek w is eso wyero ronf

ik sc b an sreouwerwo voveyt wv
ids evoo
e tdcuv aat k sm nthshathts bongihps e rhenhe t anestoahipeirr 'e)rsoedrkia lee (violee
lcoannd f anb t
ertbfagoamapitharuko fo
ahoe
p fiaid'rut ab nomt
etilbseetk
wge a swo we' dlsiree u walevoerg t torinion oit cbeystt pxt hsholo lbh te
----- diversity: 1.2
----- Generating with seed: "that you're breathin"
that you're breathineroutualeeoie vrlyorg afyffch tan th fthof pnyk ndapg ouoerflcy'ofoxr
ft iatjrkm teo,eos lipsir t ttoeoh wn!n snhghghl c aolytr woltsuthy]aeeyihce k loyitrseo boho
se atf?mt aw iltalse erdutui pu pj bhamem

```
-eu gdoidda yo htt ah ounen tawaahd,urectloan
al irdadipooutbersoekynes)-e
son tt
w tdeefhbuer''eamr(11
```

```
Out[1]: <keras.callbacks.History at 0x20f600860b8>
```

5 Based on words

```
In [1]: from __future__ import print_function

import numpy as np
import random
import sys
import io
import os

# Use this for GPU accelerated keras (also AMD)
os.environ["KERAS_BACKEND"] = "plaidml.keras.backend"

from keras.callbacks import LambdaCallback
from keras.models import Sequential
from keras.layers import Dense
from keras.layers import LSTM
from keras.optimizers import RMSprop

import csv

with open('data/songdata.csv', 'r') as csvfile:
    text = []
    spamreader = csv.reader(csvfile, delimiter=',')
    for index, row in enumerate(spamreader):
        if index == 0:
            continue
        if index > 1000:
            break
        temp = row[3].lower().split(" ")
        for word in temp:
            word = ''.join(e for e in word if e.isalnum())
            if word:
                text.append(word)

print('number of words:', len(text))

words = sorted(list(set(text)))
print('total words:', len(words))
```

```

word_indices = dict((c, i) for i, c in enumerate(words))
indices_word = dict((i, c) for i, c in enumerate(words))
# cut the text in semi-redundant sequences of maxlen characters
maxlen = 10
step = 5
sentences = []
next_words = []
for i in range(0, len(text) - maxlen, step):
    sentences.append(text[i: i + maxlen])
    next_words.append(text[i + maxlen])
print('nb sequences:', len(sentences))

print('Vectorization...')
x = np.zeros((len(sentences), maxlen, len(words)), dtype=np.bool)
y = np.zeros((len(sentences), len(words)), dtype=np.bool)
for i, sentence in enumerate(sentences):
    for t, word in enumerate(sentence):
        x[i, t, word_indices[word]] = 1
    y[i, word_indices[next_words[i]]] = 1

# build the model: a single LSTM
print('Build model...')
model = Sequential()
model.add(LSTM(64, input_shape=(maxlen, len(words))))
model.add(Dense(len(words), activation='softmax'))

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

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)

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

```

```

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

for i in range(400):
    x_pred = np.zeros((1, maxlen, len(words)))
    for t, char in enumerate(sentence):
        x_pred[0, t, word_indices[char]] = 1.

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

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

    sys.stdout.write(next_word + " ")
    sys.stdout.flush()
print()

print_callback = LambdaCallback(on_epoch_end=on_epoch_end)

model.fit(x, y,
          batch_size=64,
          epochs=10,
          callbacks=[print_callback])

```

Using plaidml.keras.backend backend.

```

number of words: 218279
total words: 9439
nb sequences: 43654
Vectorization...
Build model...

```

INFO:plaidml:Opening device "opencl_amd_hawaii.0"

```

Epoch 1/10
43654/43654 [=====] - 43s 980us/step - loss: 6.3119

```

```

----- Generating text after Epoch: 0
----- diversity: 0.2
----- Generating with seed: "nothing but the best for you too dont forget me"
nothing but the best for you too dont forget meto the world of the world of the world of the d

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```

----- diversity: 0.5
----- Generating with seed: "nothing but the best for you too dont forget me"
nothing but the best for you too dont forget meshe see the world ive im a years of the time of
----- diversity: 1.0
----- Generating with seed: "nothing but the best for you too dont forget me"
nothing but the best for you too dont forget mewell you we are making 68 as ill gone your time
----- diversity: 1.2
----- Generating with seed: "nothing but the best for you too dont forget me"
nothing but the best for you too dont forget meheey day between told please night to run foreve
Epoch 2/10
43654/43654 [=====] - 31s 709us/step - loss: 5.8066

----- Generating text after Epoch: 1
----- diversity: 0.2
----- Generating with seed: "the night you never understand when shes talking to you"
the night you never understand when shes talking to youand i can you know i have to be my life
----- diversity: 0.5
----- Generating with seed: "the night you never understand when shes talking to you"
the night you never understand when shes talking to youknow i dont have to be people i dont kno
----- diversity: 1.0
----- Generating with seed: "the night you never understand when shes talking to you"
the night you never understand when shes talking to youthat his way kind of the heaven out rain
----- diversity: 1.2
----- Generating with seed: "the night you never understand when shes talking to you"
the night you never understand when shes talking to youstill can be around boy i gone will it :
Epoch 3/10
43654/43654 [=====] - 30s 686us/step - loss: 5.9159

----- Generating text after Epoch: 2
----- diversity: 0.2
----- Generating with seed: "scream i want you all to know i would be"
scream i want you all to know i would bemy life and i dont want to be a just a little bit just
----- diversity: 0.5
----- Generating with seed: "scream i want you all to know i would be"
scream i want you all to know i would bemy life i know i know you have to me im not the way im
----- diversity: 1.0
----- Generating with seed: "scream i want you all to know i would be"
scream i want you all to know i would bemy baby baby baby im fall no for then you are day down
----- diversity: 1.2
----- Generating with seed: "scream i want you all to know i would be"
scream i want you all to know i would begoodbye me jesus and when when the star and my try to :
Epoch 4/10
43654/43654 [=====] - 30s 681us/step - loss: 5.8524

----- Generating text after Epoch: 3
----- diversity: 0.2
----- Generating with seed: "window late at night making me believe that somethings not"
window late at night making me believe that somethings notthe way i know i could make it i know

```

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----- diversity: 0.5
----- Generating with seed: "window late at night making me believe that somethings not"
window late at night making me believe that somethings notthe way i have to you you know that
----- diversity: 1.0
----- Generating with seed: "window late at night making me believe that somethings not"
window late at night making me believe that somethings notthat love when its right i hope chor
----- diversity: 1.2
----- Generating with seed: "window late at night making me believe that somethings not"
window late at night making me believe that somethings notthat first love of your to try you w
Epoch 5/10
43654/43654 [=====] - 29s 675us/step - loss: 5.5663

----- Generating text after Epoch: 4
----- diversity: 0.2
----- Generating with seed: "but feel sorry for myself ooooh ooooh ooooh yeah yeah"
but feel sorry for myself ooooh ooooh ooooh yeah yeahyeah yeah yeah yeah yeah yeah yeah yeah y
----- diversity: 0.5
----- Generating with seed: "but feel sorry for myself ooooh ooooh ooooh yeah yeah"
but feel sorry for myself ooooh ooooh ooooh yeah yeahyeah yeah yeah yeah yeah yeah yeah yeah y
----- diversity: 1.0
----- Generating with seed: "but feel sorry for myself ooooh ooooh ooooh yeah yeah"
but feel sorry for myself ooooh ooooh ooooh yeah yeahwere open now off some then when you know
----- diversity: 1.2
----- Generating with seed: "but feel sorry for myself ooooh ooooh ooooh yeah yeah"
but feel sorry for myself ooooh ooooh ooooh yeah yeahback in the right come na us didnt there
Epoch 6/10
43654/43654 [=====] - 30s 691us/step - loss: 5.2550

----- Generating text after Epoch: 5
----- diversity: 0.2
----- Generating with seed: "in the folded dent ridin high dippin low but innocence"
in the folded dent ridin high dippin low but innocencein love is hard tonight time were time l
----- diversity: 0.5
----- Generating with seed: "in the folded dent ridin high dippin low but innocence"
in the folded dent ridin high dippin low but innocencein love is were hard in love is love lov
----- diversity: 1.0
----- Generating with seed: "in the folded dent ridin high dippin low but innocence"
in the folded dent ridin high dippin low but innocencein this last long still still our be is
----- diversity: 1.2
----- Generating with seed: "in the folded dent ridin high dippin low but innocence"
in the folded dent ridin high dippin low but innocenceas mondays as door why got it now here g
Epoch 7/10
43654/43654 [=====] - 30s 683us/step - loss: 4.9956

----- Generating text after Epoch: 6
----- diversity: 0.2
----- Generating with seed: "must find a place where we belong if destiny has"
must find a place where we belong if destiny hasbeen been to say on the world and the day i co

```



```

----- diversity: 0.5
----- Generating with seed: "must find a place where we belong if destiny has"
must find a place where we belong if destiny haslove to say that its been want to make you got
----- diversity: 1.0
----- Generating with seed: "must find a place where we belong if destiny has"
must find a place where we belong if destiny hascould fall to please has we walk to well and m
----- diversity: 1.2
----- Generating with seed: "must find a place where we belong if destiny has"
must find a place where we belong if destiny haslove many those were the tears in a world now
Epoch 8/10
43654/43654 [=====] - 30s 682us/step - loss: 4.7769

----- Generating text after Epoch: 7
----- diversity: 0.2
----- Generating with seed: "travel through the restless sky straight from you come to"
travel through the restless sky straight from you come tome and the phone it dont let you go d
----- diversity: 0.5
----- Generating with seed: "travel through the restless sky straight from you come to"
travel through the restless sky straight from you come tothe door chorus i dont want to make y
----- diversity: 1.0
----- Generating with seed: "travel through the restless sky straight from you come to"
travel through the restless sky straight from you come towhat the time before i give you to use
----- diversity: 1.2
----- Generating with seed: "travel through the restless sky straight from you come to"
travel through the restless sky straight from you come totonight through im black man into this
Epoch 9/10
43654/43654 [=====] - 30s 677us/step - loss: 4.5789

----- Generating text after Epoch: 8
----- diversity: 0.2
----- Generating with seed: "all i like em buttered i like em proud and"
all i like em buttered i like em proud andwhen i want me to know what i know i cant take it i
----- diversity: 0.5
----- Generating with seed: "all i like em buttered i like em proud and"
all i like em buttered i like em proud andwhen i want a in a i say i know im in love with love
----- diversity: 1.0
----- Generating with seed: "all i like em buttered i like em proud and"
all i like em buttered i like em proud andwhen i think his had a for heart some yourself no one
----- diversity: 1.2
----- Generating with seed: "all i like em buttered i like em proud and"
all i like em buttered i like em proud andwhen im somebody is babies hand somebody over cant ol
Epoch 10/10
43654/43654 [=====] - 30s 679us/step - loss: 4.4138

----- Generating text after Epoch: 9
----- diversity: 0.2
----- Generating with seed: "solves his problems with a chainsaw and he never has"
solves his problems with a chainsaw and he never hashe would you hear a face to tell a time i

```

```
----- diversity: 0.5
----- Generating with seed: "solves his problems with a chainsaw and he never has"
solves his problems with a chainsaw and he never hasbeen some so he was me were from me and the
----- diversity: 1.0
----- Generating with seed: "solves his problems with a chainsaw and he never has"
solves his problems with a chainsaw and he never hasover over and i could enough i ever why him
----- diversity: 1.2
----- Generating with seed: "solves his problems with a chainsaw and he never has"
solves his problems with a chainsaw and he never hasabout just hes and wait baby wait lights a
```

```
Out[1]: <keras.callbacks.History at 0x252f5e046a0>
```