

```

try:
    import google.colab
    IN_COLAB = True
except:
    IN_COLAB = False

STEPS = 3
if IN_COLAB:
    !pip install gpt-2-simple
    STEPS = 100

import gpt_2_simple as gpt2
import os
import requests
import keras

Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Collecting gpt-2-simple
  Downloading gpt_2_simple-0.8.1.tar.gz (26 kB)
    Preparing metadata (setup.py) ... done
Requirement already satisfied: tensorflow<=2.5.1 in /usr/local/lib/python3.9/dist-packages (from gpt-2-simple) (2.12.0)
Requirement already satisfied: regex in /usr/local/lib/python3.9/dist-packages (from gpt-2-simple) (2022.10.31)
Requirement already satisfied: requests in /usr/local/lib/python3.9/dist-packages (from gpt-2-simple) (2.27.1)
Requirement already satisfied: tqdm in /usr/local/lib/python3.9/dist-packages (from gpt-2-simple) (4.65.0)
Requirement already satisfied: numpy in /usr/local/lib/python3.9/dist-packages (from gpt-2-simple) (1.22.4)
Collecting toposort
  Downloading toposort-1.10-py3-none-any.whl (8.5 kB)
Requirement already satisfied: gast<=0.4.0,>=0.2.1 in /usr/local/lib/python3.9/dist-packages (from tensorflow==2.5.1->g)
Requirement already satisfied: opt-einsum==2.3.2 in /usr/local/lib/python3.9/dist-packages (from tensorflow==2.5.1->gpt)
Requirement already satisfied: flatbuffers==2.0 in /usr/local/lib/python3.9/dist-packages (from tensorflow==2.5.1->gpt)
Requirement already satisfied: astunparse==1.6.0 in /usr/local/lib/python3.9/dist-packages (from tensorflow==2.5.1->gpt)
Requirement already satisfied: grpcio<2.0,>=1.24.3 in /usr/local/lib/python3.9/dist-packages (from tensorflow==2.5.1->g)
Requirement already satisfied: tensorflow-estimator<2.13,>=2.12.0 in /usr/local/lib/python3.9/dist-packages (from tensorflow==2.5.1->gpt-2-sim)
Requirement already satisfied: jax==0.3.15 in /usr/local/lib/python3.9/dist-packages (from tensorflow==2.5.1->gpt-2-sim)
Requirement already satisfied: tensorflow-io-gcs-filesystem==0.23.1 in /usr/local/lib/python3.9/dist-packages (from tensorflow==2.5.1->gpt-2-sim)
Requirement already satisfied: keras<2.13,>=2.12.0 in /usr/local/lib/python3.9/dist-packages (from tensorflow==2.5.1->gpt-2-sim)
Requirement already satisfied: libclang==13.0.0 in /usr/local/lib/python3.9/dist-packages (from tensorflow==2.5.1->gpt-2-sim)
Requirement already satisfied: termcolor>=1.1.0 in /usr/local/lib/python3.9/dist-packages (from tensorflow==2.5.1->gpt-2-sim)
Requirement already satisfied: six>=1.12.0 in /usr/local/lib/python3.9/dist-packages (from tensorflow==2.5.1->gpt-2-sim)
Requirement already satisfied: h5py>=2.9.0 in /usr/local/lib/python3.9/dist-packages (from tensorflow==2.5.1->gpt-2-sim)
Requirement already satisfied: protobuf!=4.21.0,!4.21.1,!4.21.2,!4.21.3,!4.21.4,!4.21.5,<5.0.0dev,>=3.20.3 in /usr
Requirement already satisfied: setuptools in /usr/local/lib/python3.9/dist-packages (from tensorflow==2.5.1->gpt-2-sim)
Requirement already satisfied: typing-extensions>=3.6.6 in /usr/local/lib/python3.9/dist-packages (from tensorflow==2.5.1->gpt-2-sim)
Requirement already satisfied: wrapt<1.15,>=1.11.0 in /usr/local/lib/python3.9/dist-packages (from tensorflow==2.5.1->gpt-2-sim)
Requirement already satisfied: packaging in /usr/local/lib/python3.9/dist-packages (from tensorflow==2.5.1->gpt-2-sim)
Requirement already satisfied: google-pasta==0.1.1 in /usr/local/lib/python3.9/dist-packages (from tensorflow==2.5.1->gpt-2-sim)
Requirement already satisfied: absl-py==1.0.0 in /usr/local/lib/python3.9/dist-packages (from tensorflow==2.5.1->gpt-2-sim)
Requirement already satisfied: tensorboard<2.13,>=2.12 in /usr/local/lib/python3.9/dist-packages (from tensorflow==2.5.1->gpt-2-sim)
Requirement already satisfied: charset-normalizer~2.0.0 in /usr/local/lib/python3.9/dist-packages (from requests->gpt-2-simple)
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.9/dist-packages (from requests->gpt-2-simple)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in /usr/local/lib/python3.9/dist-packages (from requests->gpt-2-simple)
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.9/dist-packages (from requests->gpt-2-simple) (3.4.1)
Requirement already satisfied: wheel<1.0,>=0.23.0 in /usr/local/lib/python3.9/dist-packages (from astunparse==1.6.0->tensorflow)
Requirement already satisfied: ml-dtypes==0.3 in /usr/local/lib/python3.9/dist-packages (from jax==0.3.15->tensorflow)
Requirement already satisfied: scipy==1.7 in /usr/local/lib/python3.9/dist-packages (from jax==0.3.15->tensorflow)
Requirement already satisfied: werkzeug==1.0.1 in /usr/local/lib/python3.9/dist-packages (from tensorboard<2.13,>=2.12)
Requirement already satisfied: google-auth<3,>=1.6.3 in /usr/local/lib/python3.9/dist-packages (from tensorboard<2.13,>=2.12)
Requirement already satisfied: tensorboard-data-server<0.8.0,>=0.7.0 in /usr/local/lib/python3.9/dist-packages (from tensorboard<2.13,>=2.12)
Requirement already satisfied: tensorboard-plugin-wit==1.6.0 in /usr/local/lib/python3.9/dist-packages (from tensorboard<2.13,>=2.12)
Requirement already satisfied: markdown==2.6.8 in /usr/local/lib/python3.9/dist-packages (from tensorboard<2.13,>=2.12)
Requirement already satisfied: google-auth-oauthlib<1.1,>=0.5 in /usr/local/lib/python3.9/dist-packages (from tensorboard<2.13,>=2.12)
Requirement already satisfied: cachetools<6.0,>=2.0.0 in /usr/local/lib/python3.9/dist-packages (from google-auth<3,>=1.6.3->ten)
Requirement already satisfied: rsa<5,>=3.1.4 in /usr/local/lib/python3.9/dist-packages (from google-auth<3,>=1.6.3->ten)
Requirement already satisfied: pyasn1-modules==0.2.1 in /usr/local/lib/python3.9/dist-packages (from google-auth<3,>=1.6.3->ten)
Requirement already satisfied: requests-oauthlib==0.7.0 in /usr/local/lib/python3.9/dist-packages (from google-auth-oauthlib<1.1,>=0.5)
Requirement already satisfied: importlib-metadata==4.4 in /usr/local/lib/python3.9/dist-packages (from markdown==2.6.8)
Requirement already satisfied: MarkupSafe==2.1.1 in /usr/local/lib/python3.9/dist-packages (from werkzeug==1.0.1->tensorflow)
Requirement already satisfied: zipp>=0.5 in /usr/local/lib/python3.9/dist-packages (from importlib-metadata==4.4->markdown)
Requirement already satisfied: pyasn1<0.5.0,>=0.4.6 in /usr/local/lib/python3.9/dist-packages (from pyasn1-modules==0.2.1)
Requirement already satisfied: oauthlib==3.0.0 in /usr/local/lib/python3.9/dist-packages (from requests-oauthlib==0.7.0)
Building wheels for collected packages: gpt-2-simple
  Building wheel for gpt-2-simple (setup.py) ... done
  Created wheel for gpt-2-simple: filename=gpt_2_simple-0.8.1-py3-none-any.whl size=24576 sha256=8909c2fd8cf7ef8b7fc47
  Stored in directory: /root/.cache/pip/wheels/4e/28/f0/2f12e470be10d6804b193e4193d274c88995010fae512a67cf

```

Resources ×

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Available: 1168 compute units

Usage rate: approximately 13.08 per hour

You have 1 active session. [Manage sessions](#)

Not connected to runtime.

[Change runtime type](#)

▼ Borrowing GPT2

Language models such as the popular GPT2/3/4/chat models are trained on lots of data and are absolutely huge in size. It isn't realistic for us to train a model that is anywhere near that size and sophistication, but we can borrow a model and repurpose it for our use.

Download Model

The model itself is pretty large, we are downloading a model that is roughly 500MB, and we are using the smallest model. The large ones are large enough that they are impractical to deal with if we don't have some enterprise scale hardware.

Big Note: these GPT models that we are downloading have one specific and annoying trait, they can't repurposed once created. Meaning that the "sess" object we define below is tied to the model and data we used it on first - it isn't like other examples where there can be a series of models all named "model = Sequential...". There will be an error quoting something like "graph error" if you try. To fix things, restart the runtime and run again.

```

# Load model
model_name = "124M"
if not os.path.isdir(os.path.join("models", model_name)):

```

```
gpt2.download_gpt2(model_name=model_name) # model is saved into current directory under /models/124M/
```

```
Downloading 124M model...
Fetching checkpoint: 1.05Mit [00:00, 421Mit/s]
Fetching encoder.json: 1.05Mit [00:01, 581kit/s]
Fetching hparams.json: 1.05Mit [00:00, 642Mit/s]
Fetching model.ckpt.data-00000-of-00001: 498Mit [01:06, 7.47Mit/s]
Fetching model.ckpt.index: 1.05Mit [00:00, 482Mit/s]
Fetching model.ckpt.meta: 1.05Mit [00:01, 874kit/s]
Fetching vocab.bpe: 1.05Mit [00:01, 872kit/s]
```

Finetune Model

We can take the model and tailor it to our use by providing it with some additional text that it can use for fine tuning.

```
file_name = "shakespeare.txt"
if not os.path.isfile(file_name):
    url = "https://raw.githubusercontent.com/karpathy/char-rnn/master/data/tinyshakespeare/input.txt"
    data = requests.get(url)

    with open(file_name, 'w') as f:
        f.write(data.text)

sess = gpt2.start_tf_sess()
gpt2.finetune(sess,
               file_name,
               model_name=model_name,
               steps=STEPS) # steps is max number of training steps

gpt2.generate(sess)
```

```
Loading checkpoint models/124M/model.ckpt
Loading dataset...
100%|██████████| 1/1 [00:01<00:00, 1.52s/it]
dataset has 338025 tokens
Training...
[1 | 9.07] loss=4.12 avg=4.12
[2 | 9.39] loss=3.87 avg=3.99
[3 | 9.71] loss=3.81 avg=3.93
[4 | 10.03] loss=3.63 avg=3.85
[5 | 10.35] loss=3.79 avg=3.84
[6 | 10.67] loss=3.77 avg=3.83
[7 | 10.99] loss=3.60 avg=3.79
[8 | 11.31] loss=3.70 avg=3.78
[9 | 11.64] loss=3.60 avg=3.76
[10 | 11.96] loss=3.74 avg=3.76
[11 | 12.28] loss=3.55 avg=3.74
[12 | 12.60] loss=3.66 avg=3.73
[13 | 12.92] loss=3.60 avg=3.72
[14 | 13.24] loss=3.44 avg=3.70
[15 | 13.56] loss=3.48 avg=3.68
[16 | 13.88] loss=3.50 avg=3.67
[17 | 14.21] loss=3.50 avg=3.66
[18 | 14.53] loss=3.46 avg=3.65
[19 | 14.85] loss=3.75 avg=3.65
[20 | 15.17] loss=3.57 avg=3.65
[21 | 15.50] loss=3.43 avg=3.64
[22 | 15.82] loss=3.57 avg=3.63
[23 | 16.14] loss=3.47 avg=3.63
[24 | 16.46] loss=3.44 avg=3.62
[25 | 16.80] loss=3.19 avg=3.60
[26 | 17.12] loss=3.21 avg=3.58
[27 | 17.44] loss=3.32 avg=3.57
[28 | 17.76] loss=3.34 avg=3.56
[29 | 18.08] loss=3.72 avg=3.57
[30 | 18.40] loss=3.44 avg=3.56
[31 | 18.73] loss=3.37 avg=3.56
[32 | 19.05] loss=3.38 avg=3.55
[33 | 19.37] loss=3.32 avg=3.54
[34 | 19.69] loss=3.50 avg=3.54
[35 | 20.01] loss=3.06 avg=3.52
[36 | 20.33] loss=3.59 avg=3.53
[37 | 20.65] loss=3.46 avg=3.52
[38 | 20.97] loss=3.39 avg=3.52
[39 | 21.30] loss=3.26 avg=3.51
[40 | 21.62] loss=3.34 avg=3.51
[41 | 21.94] loss=3.28 avg=3.50
[42 | 22.26] loss=3.34 avg=3.49
[43 | 22.58] loss=3.12 avg=3.48
[44 | 22.91] loss=3.22 avg=3.48
[45 | 23.23] loss=3.14 avg=3.47
[46 | 23.55] loss=3.58 avg=3.47
[47 | 23.87] loss=3.35 avg=3.47
[48 | 24.19] loss=3.41 avg=3.47
[49 | 24.51] loss=3.33 avg=3.46
[50 | 24.84] loss=3.34 avg=3.46
[51 | 25.16] loss=3.22 avg=3.45
[52 | 25.48] loss=3.26 avg=3.45
[53 | 25.80] loss=3.51 avg=3.45
```

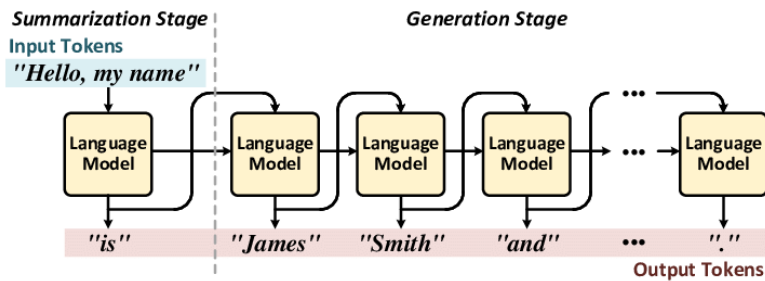
Generate Text

Now that the model is downloaded and fine tuned to our data, we can generate some new text. There are a few parts here that we should look at a little more closely:

- Temperature: This is a value that controls how random the output is. The higher the value, the more random the output. The lower the value, the more likely the output is to be similar to the input.
- Length: This is the number of tokens that will be generated.
- Prefix: This is the text that will be used to seed the model, a.k.a. the "starting point" of the brand new text we'll be creating.

Text Generation Process

Inside the model, the transformer generates new text by taking the prefix text and using it to then generate a series of tokens that make up our eventual output.



```
gpt2.generate(sess, model_name=model_name, length=100, temperature=0.7, nsamples=5, batch_size=5, prefix="Where for art thou'
```

Where for art thou?

She that is with thee;
She that is with thee.

LORD ROSS:
Why, good, that's not so.

GLoucester:
Come, let us go;
Let us be gone.

LORD ROSS:
Come, let us go.

GLoucester:
What's the matter, lords?

LORD ROSS:
Lord, what's the matter?

=====
Where for art thou to do?
Or whither to?
Lest thou be ill, thou art for art:
For thou art ill in prison,
And in prison, that thou mayst.

MIRANDA:
To the Duke of Norfolk,
That high God of Norfolk,
That high gentleman, that high gentleman, and
That noble gentleman, and Duke of Norfolk.

DUKE OF GAUNT:
O, in prison, about that time of

=====
Where for art thou?
For Christ's sake, let us go.

JOHN:
What, what!

LEONTES:
Never, sir, never!

JOHN:
Would I were so?

LEONTES:
No, no, sir, I would not;
But all the world would say it was not in God's name.

JOHN:
You are very sensible, or rather, will you not go?

LEONTES:

```
gpt2.generate(sess, model_name=model_name, length=100, temperature=0.7, nsamples=5, batch_size=5, prefix="Where the hood at"
```

Where the hood at your feet is it?
O, what's the matter?

DEAN:
I was not born, but my father's name is.

ARTIS:
You are not born!

ROMEO:
O, what is the matter with thee?

ARTIS:
Come, come, come.

ROMEO:
Good night, good night.

ARTIS:
What is the matter, sir?

ROMEO:

=====

Where the hood at your king's door,
And say, 'To-morrow, or you all,
When your queen comes with thy queen's maid,
And you all make this like to-morrow's feast
And set up your tent in the churchyard,
And you all, when you hear the bells,
Do make them all dance and ply their instruments,
And make your way towards the churchyard ready;
And if you were in your wits, you would not be so

=====

Where the hood at his boot:
The seer in the night calls his father,
And he that looks so, calls his father's.

KING RICHARD II:
And where is the Lord to-day?

First Gentleman:
Hark, hon; he is gone.

First Gentleman:
Your lordship, let us go to the Tower.

First Gentleman:
My lords, I am not gone, or else my father's command.

KING

=====

Where the hood at the top of the hat is,
I'll fetch it: I do fear that I can't.

DUCHESS OF YORK:
I should be, but that I can't.

Different Data

We can load some different data and see what our model generates.

```
url2 = "https://jrssbcrsefilesnait.blob.core.windows.net/3950data1/reddit_wsb_clean.csv"
train_text_file = keras.utils.get_file('train_reddit.txt', url2)
```

```
sess_2 = gpt2.start_tf_sess()
```

```
gpt2.finetune(sess_2,
               train_text_file,
               model_name=model_name,
               steps=STEPS) # steps is max number of training steps
```

```
Downloading data from https://jrssbcrsefilesnait.blob.core.windows.net/3950data1/reddit_wsb_clean.csv
34467584/34467584 [=====] - 7s 0us/step
Loading checkpoint models/124M/model.ckpt
Loading dataset...
100%|██████████| 1/1 [00:36<00:00, 36.31s/it]
dataset has 9319963 tokens
Training...
[1 | 8.82] loss=3.62 avg=3.62
[2 | 9.15] loss=3.30 avg=3.46
[3 | 9.47] loss=3.58 avg=3.50
[4 | 9.79] loss=2.77 avg=3.32
[5 | 10.12] loss=3.23 avg=3.30
[6 | 10.44] loss=3.53 avg=3.34
[7 | 10.76] loss=3.28 avg=3.33
[8 | 11.09] loss=3.57 avg=3.36
[9 | 11.41] loss=3.04 avg=3.32
[10 | 11.73] loss=3.12 avg=3.30
[11 | 12.06] loss=3.79 avg=3.35
[12 | 12.38] loss=3.24 avg=3.34
[13 | 12.70] loss=3.19 avg=3.33
[14 | 13.02] loss=3.41 avg=3.33
[15 | 13.34] loss=2.85 avg=3.30
[16 | 13.66] loss=3.41 avg=3.31
[17 | 13.99] loss=3.14 avg=3.30
[18 | 14.31] loss=3.50 avg=3.31
[19 | 14.63] loss=3.29 avg=3.31
[20 | 14.95] loss=3.44 avg=3.31
[21 | 15.27] loss=3.18 avg=3.31
[22 | 15.60] loss=3.45 avg=3.31
[23 | 15.92] loss=3.38 avg=3.32
[24 | 16.24] loss=3.19 avg=3.31
[25 | 16.56] loss=3.43 avg=3.32
[26 | 16.88] loss=2.84 avg=3.30
[27 | 17.21] loss=3.21 avg=3.29
```

[28	17.54]	loss=3.11	avg=3.29
[29	17.86]	loss=3.46	avg=3.29
[30	18.18]	loss=3.19	avg=3.29
[31	18.50]	loss=3.01	avg=3.28
[32	18.83]	loss=3.53	avg=3.29
[33	19.15]	loss=2.77	avg=3.27
[34	19.47]	loss=2.85	avg=3.25
[35	19.79]	loss=2.52	avg=3.23
[36	20.11]	loss=2.96	avg=3.22
[37	20.43]	loss=3.26	avg=3.22
[38	20.76]	loss=3.28	avg=3.22
[39	21.08]	loss=3.02	avg=3.22
[40	21.40]	loss=3.36	avg=3.22
[41	21.72]	loss=3.56	avg=3.23
[42	22.05]	loss=2.73	avg=3.22
[43	22.37]	loss=2.78	avg=3.20
[44	22.70]	loss=2.89	avg=3.20
[45	23.02]	loss=3.24	avg=3.20
[46	23.34]	loss=3.10	avg=3.19
[47	23.67]	loss=3.32	avg=3.20
[48	23.99]	loss=3.55	avg=3.21
[49	24.31]	loss=3.27	avg=3.21
[50	24.63]	loss=3.24	avg=3.21
[51	24.96]	loss=2.51	avg=3.19

```
gpt2.generate(sess_2, model_name=model_name, length=100, temperature=0.7, nsamples=5, batch_size=5, prefix="I have diamond h
```

I have diamond hands, so I can not sell it. So I have to sell it and sell the diamond hands. I have a lot of money to g

Edit: I forgot my DD. Quit me if you have diamond hands.",,,,
"GME:

https

=====

I have diamond hands and diamond ears and diamond hands and diamond ears and diamonds. I am a diamond cheater. I am a d
"The first thing I saw on Twitter was this: ""I thought this was some kind of fake news story. But I am not a financial

I thought it was some

=====

I have diamond hands and you had to do some work to find them, so I am not going to post too much.

The diamond hands were bought 2 days from the purchase and the time is on the way up for the recovery of the diamond ha

The diamond hands, should be able to reach \$150 from a 1 day low for a couple days.

But the recovery is possible and can be done.

I have been in demand for the last few days as people are selling

=====

I have diamond hands. To be honest, I never asked anyone to buy a diamond hand. They just made the money.

***<https://preview.redd.it/viqxl4rbc1m61.png?width=4761&format=png&auto=webp&s=b2a9e2baea6ff4d6a74309f5c79a53a7d0d9f8acd>**

I will

=====

I have diamond hands and this is both for cash and I am lucky enough to have a good car.. I am also earning a daily ear

If you are in need of a tech loan and want to get in on the action, check out my short position here. If you want to cl

I am

=====

```
gpt2.generate(sess_2, model_name=model_name, length=100, temperature=0.7, nsamples=5, batch_size=5, prefix="Where for art th
```

Where for art thou art, and life is not a fable, but a testimony. For the Lord your God is greater than the universe. F

=====

Where for art thou art that hath seen the light, and believed in the light?

I think not, but I read the following.

[Apostrophe, first paragraph.]

<https://fool.tv/articles/13-for-art-that-has-seen-the-light-and-believed-in-the-light-and-believed-in-the-light-is-a-p>

=====

Where for art thou, that thou mayest have the power of the most powerful man?

The first abode of an opinionated man, or man of the spirit; who, with the thought of a great and glorious empress, wil

=====

Where for art thou art of those who are very proud of those who are proud of the other; and that the greatest of them w

A few years ago I wrote about how a group of female writers were taking a loss for the first time and kept showing thei

=====

Where for art thou?

I call you out of my heart, I call you out of my heart,

I call you out of my mind,

I call you out of my heart,

I call you out of my mind,

I call you out of my mind,

I call you out of my mind,

I call you out of my mind,

I call you out of my mind,

I call you out of my mind.

=====

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