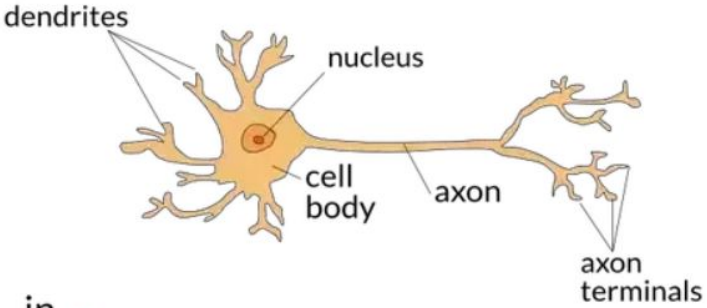
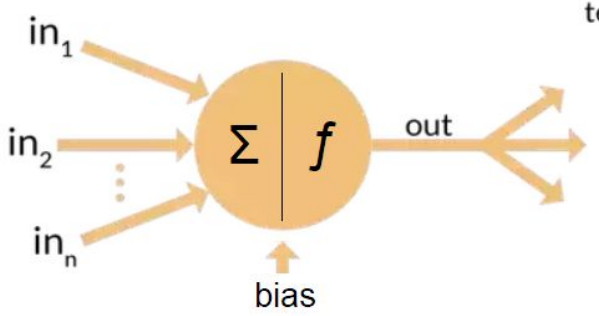
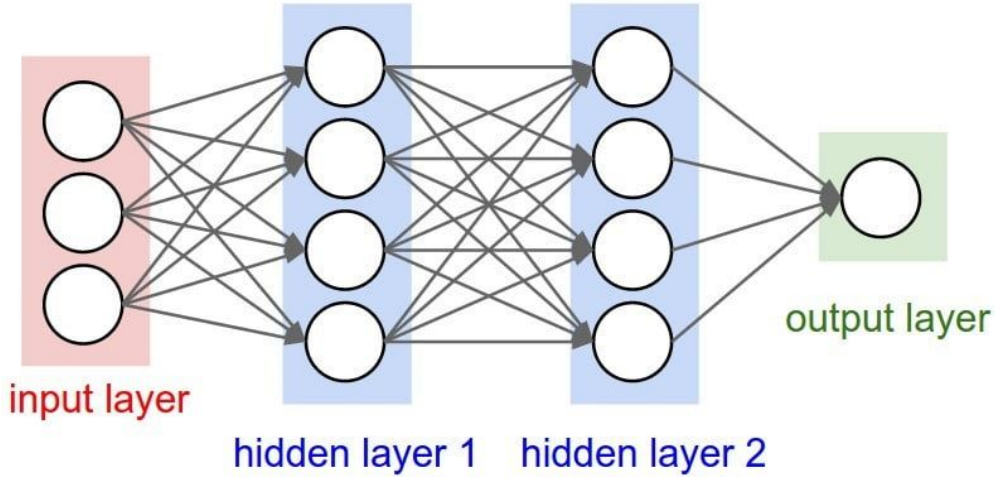
Deep learning in the cloud

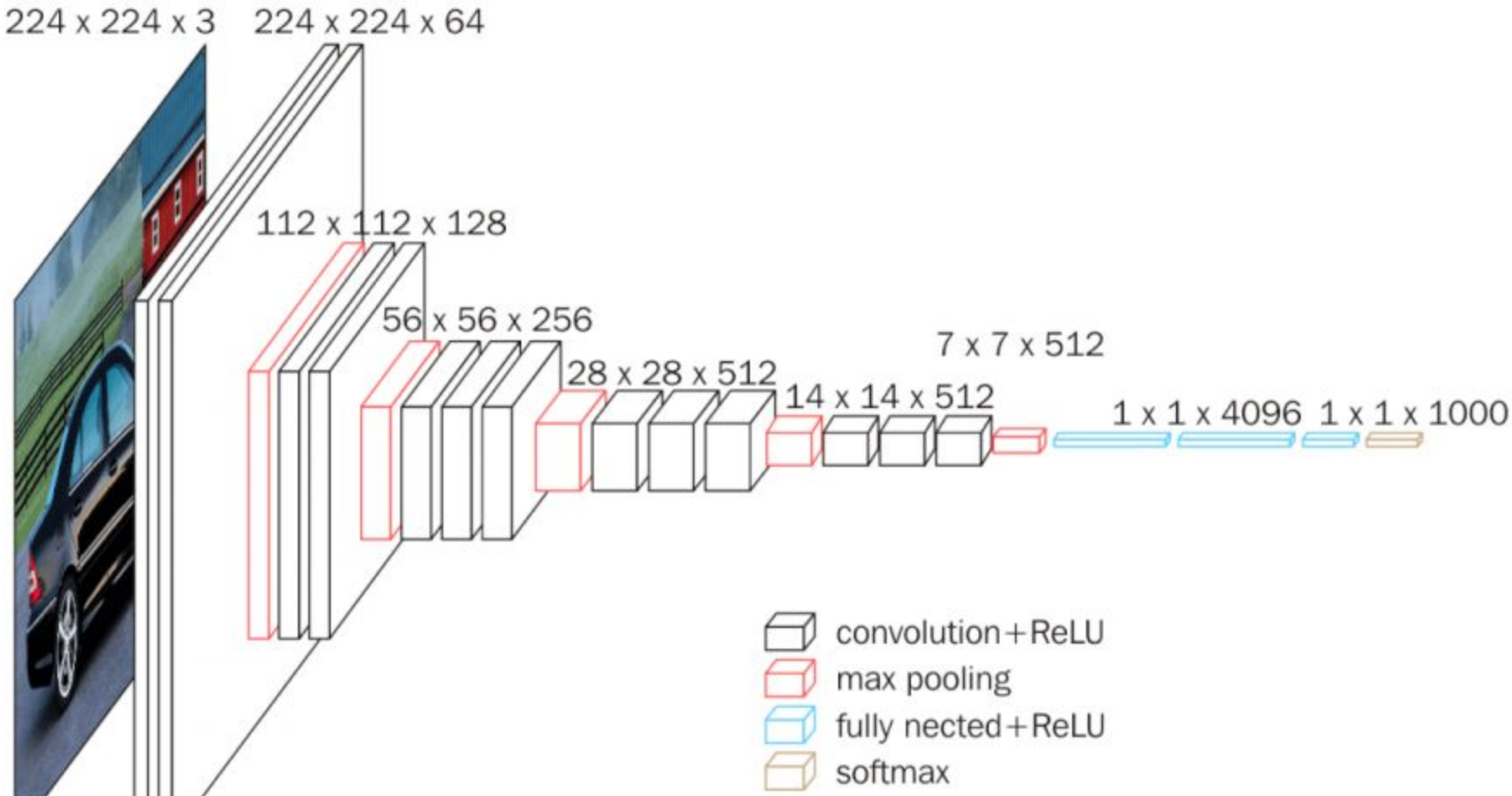
by Ioannis Prapas and Evgeny Pozdeev

Repo: https://github.com/iprapas/research-project


dendrites
nucleus
cell body
axon
axon terminals


in1
in2
inn
Σ
f
out
bias


input layer
hidden layer 1
hidden layer 2
output layer


224 x 224 x 3
224 x 224 x 64
112 x 112 x 128
56 x 56 x 256
28 x 28 x 512
14 x 14 x 512
7 x 7 x 512
1 x 1 x 4096
1 x 1 x 1000
convolution + ReLU
max pooling
fully nected + ReLU
softmax

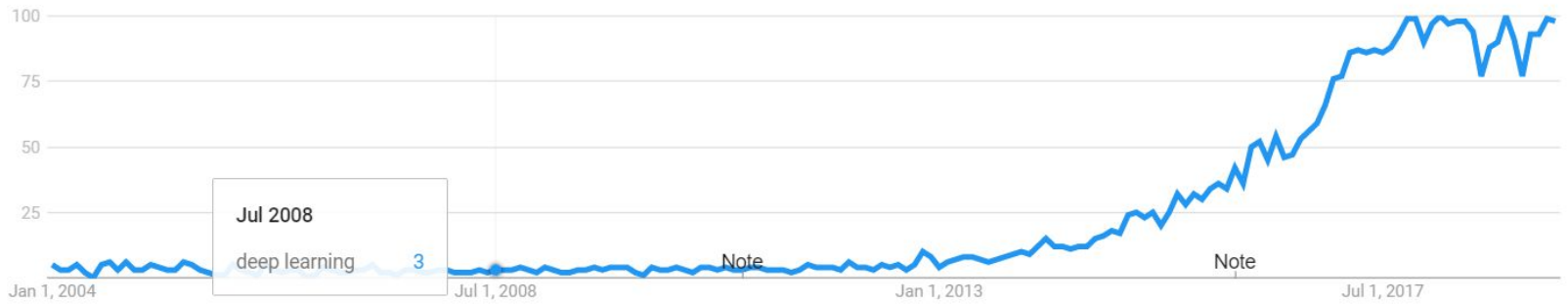
Google Trends | Explore

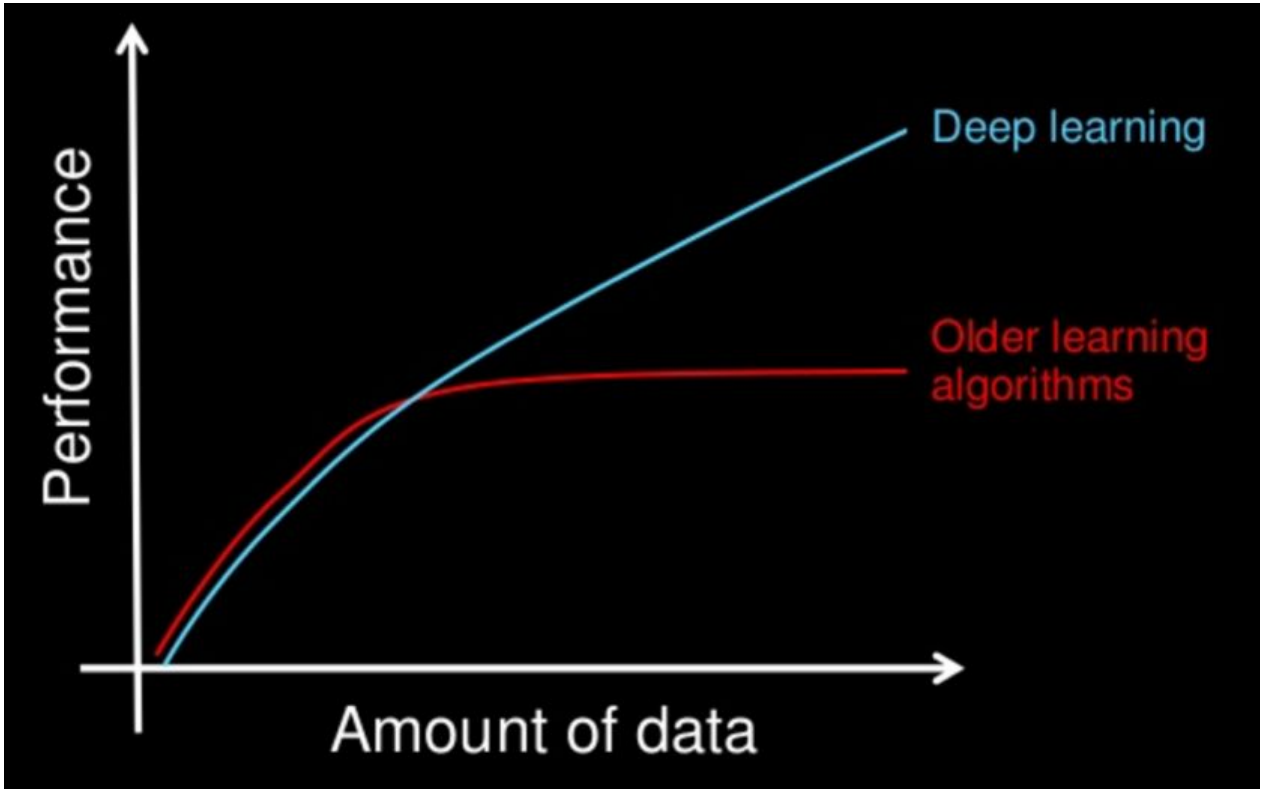
deep learning
Search term

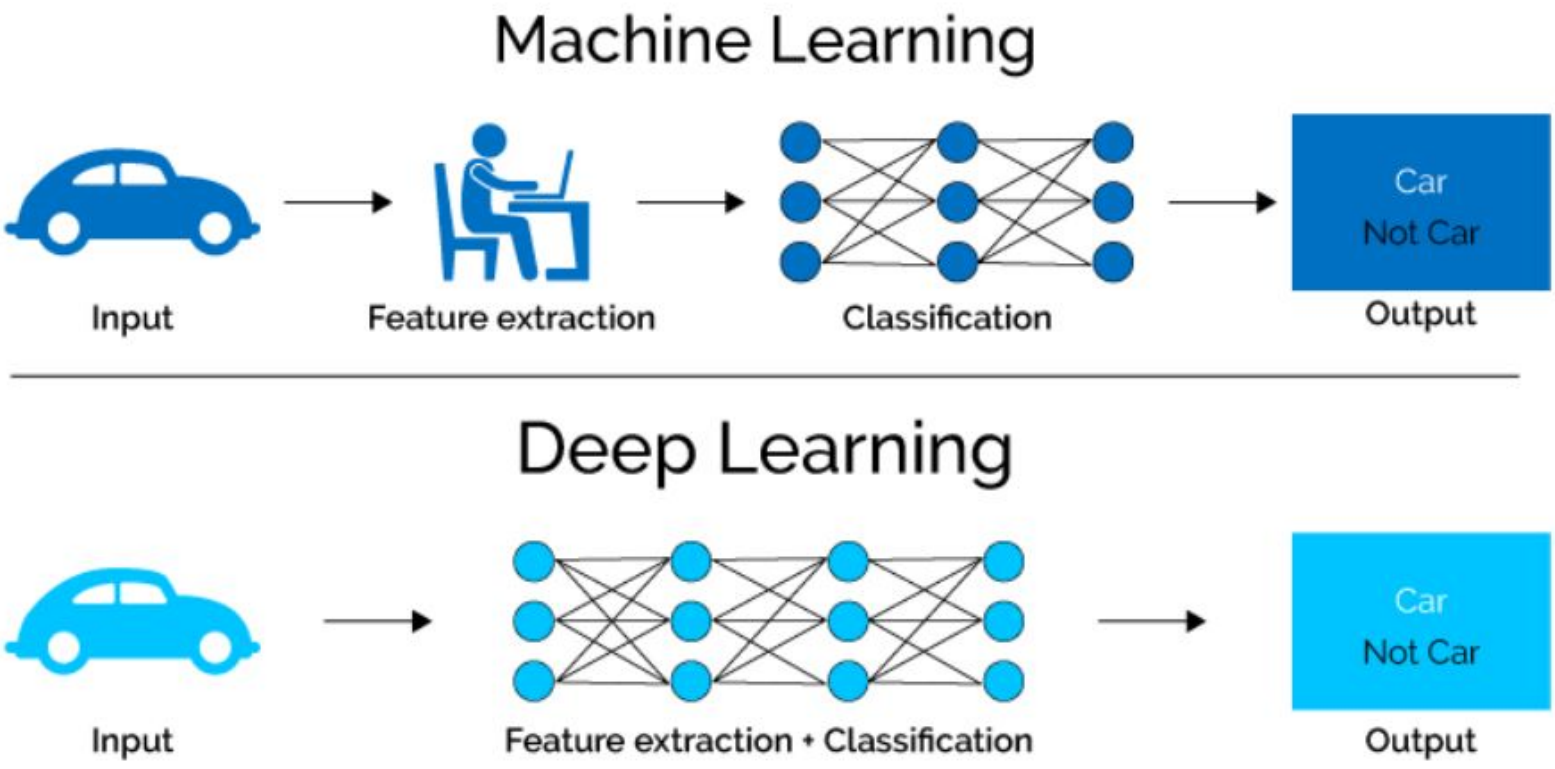
+ Compare

United States | 2004 - present | All categories | Web Search

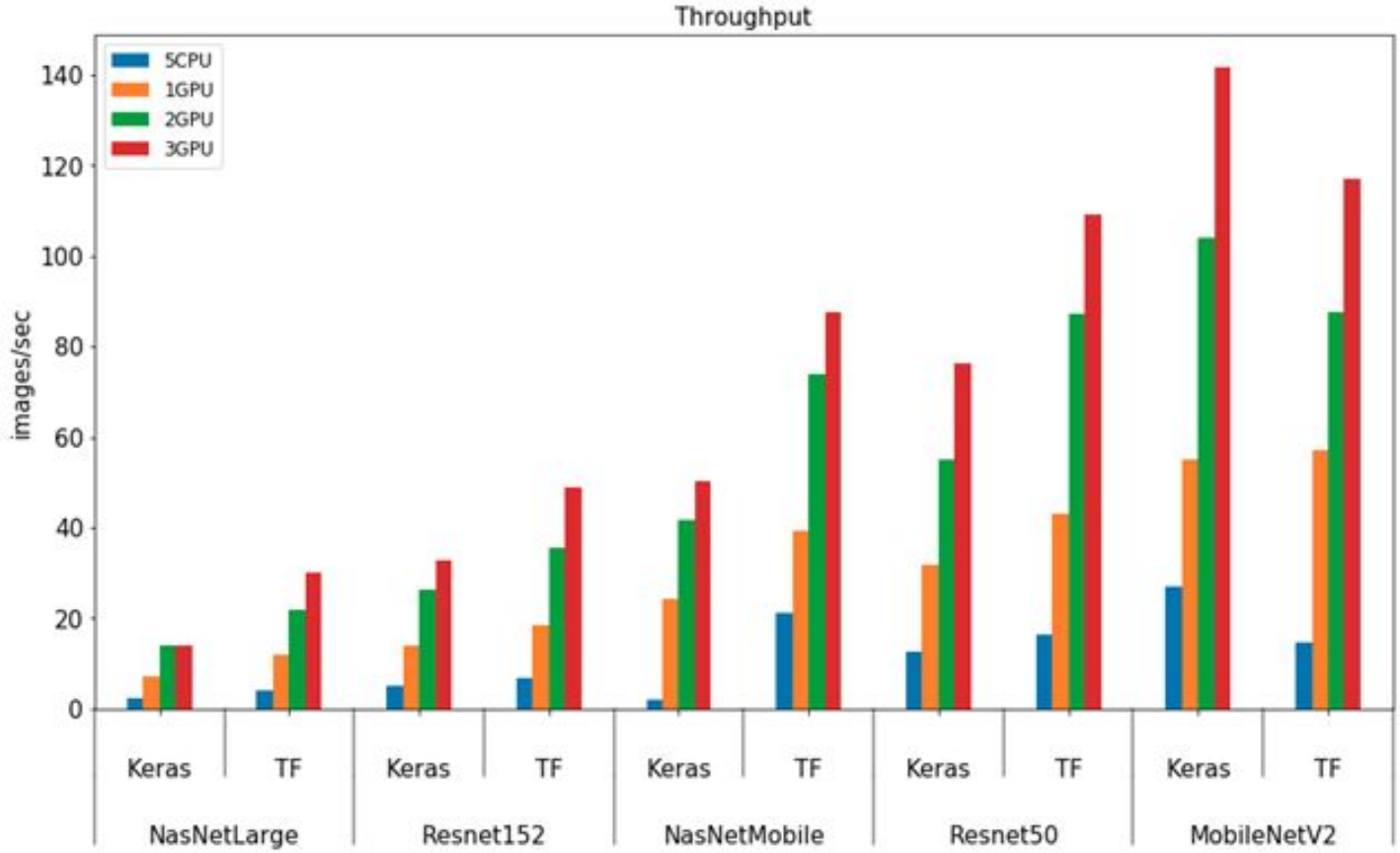
Interest over time



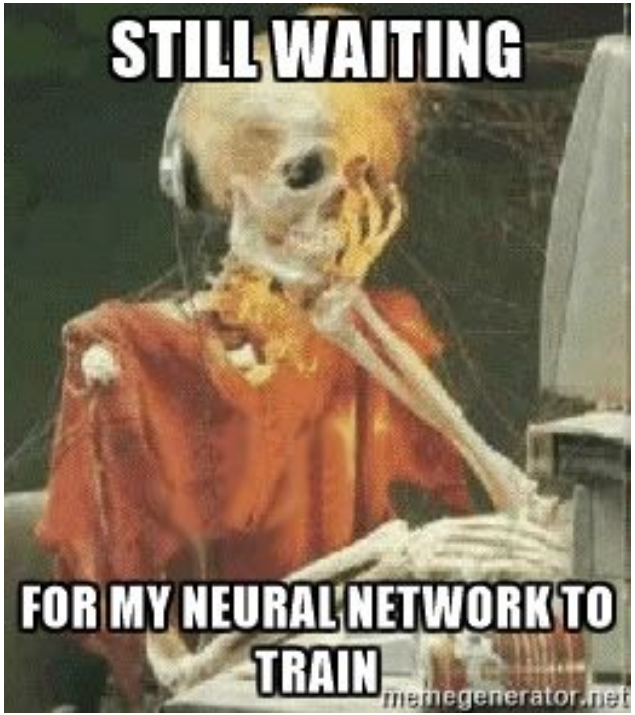

Performance
Deep learning
Older learning algorithms
Amount of data


Machine Learning
Input
Feature extraction
Classification
Car
Not Car
Output
Deep Learning
Input
Feature extraction + Classification
Car
Not Car
Output

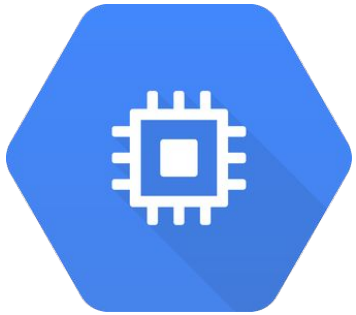
When to use	**When NOT to use (probably)**
A lot of data Unstructured data (images, videos, sound)	A few data (see transfer learning) Model interpretability Low computing capacity


Throughput
5CPU
1GPU
2GPU
3GPU
images/sec
0
20
40
60
80
100
120
140
Keras
TF
NasNetLarge
Resnet152
NasNetMobile
Resnet50
MobileNetV2


TESLA

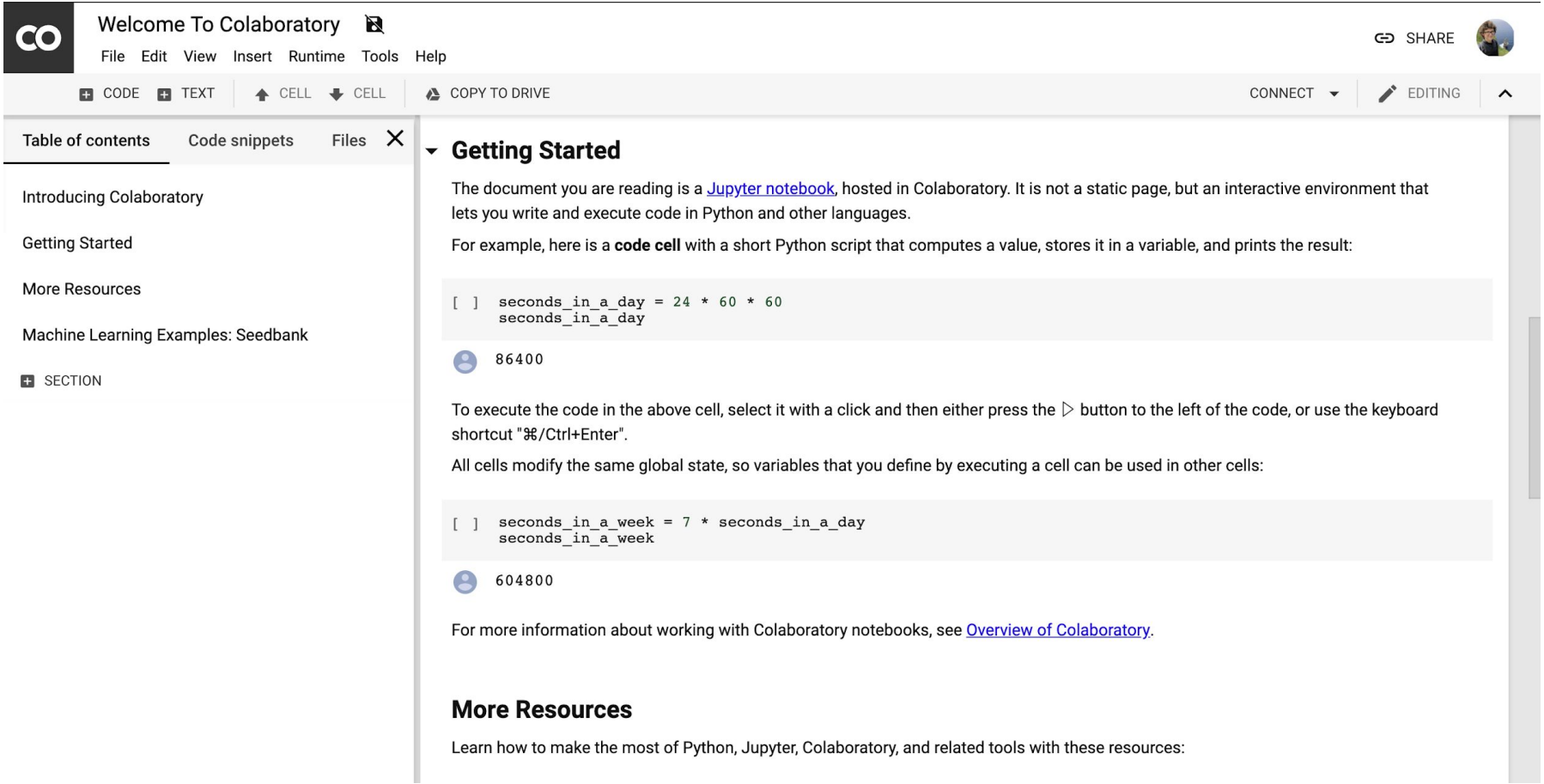

STILL WAITING
FOR MY NEURAL NETWORK TO TRAIN
memegenerator.net


Your Deep Learning Project
Cloud GPU Costs




aws


colab


Welcome To Colaboratory
File Edit View Insert Runtime Tools Help
SHARE
CODE TEXT CELL CELL COPY TO DRIVE
CONNECT EDITING
Table of contents
Code snippets
Files
Introducing Colaboratory
Getting Started
More Resources
Machine Learning Examples: Seedbank
SECTION
Getting Started
The document you are reading is a Jupyter notebook, hosted in Colaboratory. It is not a static page, but an interactive environment that lets you write and execute code in Python and other languages.
For example, here is a code cell with a short Python script that computes a value, stores it in a variable, and prints the result:
[ ] seconds_in_a_day = 24 * 60 * 60
seconds_in_a_day
86400
To execute the code in the above cell, select it with a click and then either press the ▷ button to the left of the code, or use the keyboard shortcut "⌘/Ctrl+Enter".
All cells modify the same global state, so variables that you define by executing a cell can be used in other cells:
[ ] seconds_in_a_week = 7 * seconds_in_a_day
seconds_in_a_week
604800
For more information about working with Colaboratory notebooks, see Overview of Colaboratory.
More Resources
Learn how to make the most of Python, Jupyter, Colaboratory, and related tools with these resources:

Cloud Service	NVIDIA GPU	CPUs	GPU RAM	CPU RAM	Cost Per Hour	Wall Time	Cost to Train
Google Colab	K80	1	12	13	0.00	31.17	0.000
Google Cloud Compute Engine	P100	6	16	20	0.50	5.32	0.044
Google Cloud Compute Engine	K80	6	12	17	0.20	18.13	0.060
Google Cloud Compute Engine	V100	8	16	20	0.82	3.83	0.052
Google Cloud Compute Engine	P4	4	8	26	0.33	10.28	0.057
Google Cloud Compute Engine	V100 x 2	8	32	30	1.57	3.63	0.095
Google Cloud Compute Engine	V100 x 4	8	64	30	3.05	3.38	0.172
AWS EC2	K80 (p2.xlarge)	4	12	61	0.28	20.90	0.098
AWS EC2	K80 x 8 (p2.8xlarge)	32	96	488	2.35	16.12	0.631
AWS EC2	V100 (p3.2xlarge)	8	16	61	1.05	3.85	0.067
AWS EC2	V100 x 4 (p3.8xlarge)	64	128	488	4.05	2.97	0.200


julia
mxnet
K
DEEP
LEARNING
theano
R
Microsoft
CNTK
Caffe2
Chainer

TensorFlow


PyTorch


K
Keras

What are your reviews between PyTorch and TensorFlow?

4 Answers

Hieu Pham, Has done some machine learning
Updated Nov 24, 2017 · Upvoted by Shreshth Gandhi, M.A.Sc Machine Learning, University of Toronto (2017) · Author has **140** answers and **1.1m** answer views

PyTorch is like that cute girl you meet at the bar. Her smile is as sweet as a **pie,** and her look as hot and enlightening as a **torch.** If you initiate a conversation with her, things go very smoothly. Start your business together? Everything flies!

TensorFlow is like your long-term relationship partner. You suffer a lot of **tens**ions in the beginning, and still do, but things eventually **flow** so well between you that you don't want to leave.