

Getting started with deep learning

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Laptop Install

- Python3:
 - For Mac or Linux install from <https://www.python.org/downloads/> & use Virtualenv
 - For Windows, install “Miniconda”, the lightweight “Anaconda” from: <https://conda.io/docs/installation.html>
Use “Test drive” to learn how to manage environments.
- TensorFlow: Follow instructions at <https://www.tensorflow.org/>

What to learn: Types of neural networks

- Fully connected networks
- CNN (or ConvNet): convolutional neural networks, good for images, object segmentation.
- RNN: recurrent neural networks, good for time series, including:
LSTM: long short-term memory, and
GRU: gated recurrent units
- GAN: generative-adversarial networks, to generate images, time series, etc
- RL: deep reinforcement learning

Pretty pictures at: <http://www.asimovinstitute.org/neural-network-zoo/>

What to learn: concepts that apply to all types of NNs

- Optimization algorithms (gradient descent)
- The backpropagation algorithm
- Underfitting and overfitting
- Regularization
- Hyperparameters

What to learn: tools & technologies

- Focus primarily on TensorFlow as it appears to be an emerging industry standard.
- TensorBoard, the TensorFlow visualization tool.
- Tools that build on TensorFlow, e.g. Keras
- Tools that can be used with TensorFlow when using from Python, e.g. NumPy, SciPy, Pandas, etc.
- For now, ignore non-TensorFlow, non-Python tools & technologies to simplify life.

Resources

- Deep Learning book by Ian Goodfellow, Yoshua Bengio, and Aaron Courville, available in hardcopy or for free online from:
<http://www.deeplearningbook.org/>
- Data Science Association tutorials:
<http://www.datascienceassn.org/resources>
- Siraj Raval videos (from Udacity deep learning nanodegree program):
<https://www.youtube.com/channel/UCWN3xxRkmTPmbKwht9FuE5A/videos>

Resources

- CS 20SI: Tensorflow for Deep Learning Research:
<https://web.stanford.edu/class/cs20si/>
- Deep Learning tutorial:
<http://deeplearning.stanford.edu/tutorial/>
- Fast.ai: <http://course.fast.ai/>
- Deep Learning from new deeplearning.ai courses on Coursera:
<https://www.coursera.org/specializations/deep-learning>

Resources cont'd

- Amazon AMI for deep learning:
<https://aws.amazon.com/blogs/ai/the-aws-deep-learning-ami-for-ubuntu-is-now-available-with-cuda-8-ubuntu-16-and-the-latest-versions-of-deep-learning-frameworks/>
- Using cloud CPUs instead of GPUs to save money:
<http://minimaxir.com/2017/07/cpu-or-gpu/>
- Using GPUs on Google Compute Engine:
<https://cloud.google.com/compute/docs/gpus/>
- Google Cloud Machine Learning Engine:
<https://cloud.google.com/ml-engine/docs/>
- Floydhub, “Heroku for deep learning”: <https://www.floydhub.com/>

LearnDeepLearning.study