Analytics Vidhya
Learn everything about analytics

A COMPLETE GUIDE ON GETTING STARTED WITH

DEEP LEARNING IN PYTHON

Deep Learning, a prominent topic in Artificial Intelligence domain, has been in the spotlight for quite some time now. It is especially known for its breakthroughs in fields like Computer Vision and Game playing (AlphaGO), surpassing human ability.

Here we look at how YOU can get started on your deep learning journey !

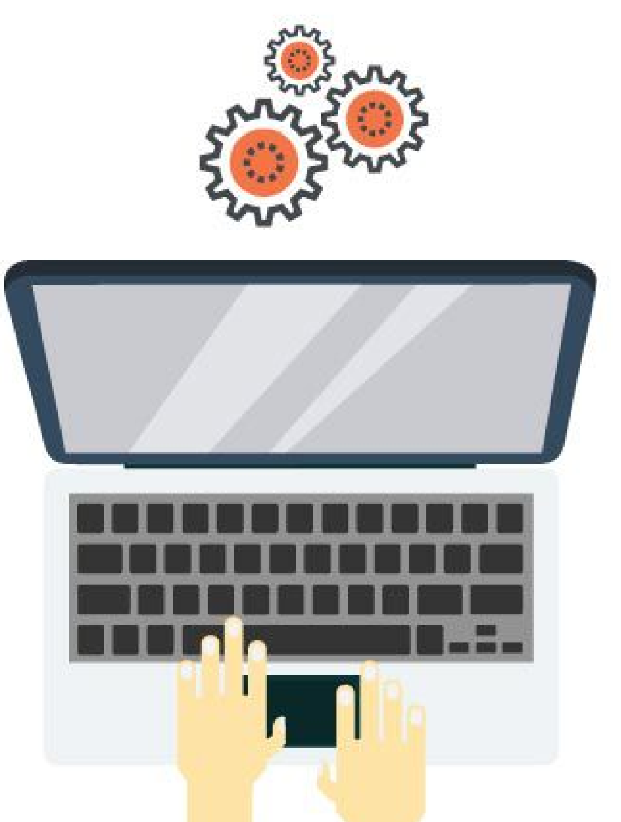
PRE-REQUISITES

It is recommended that before jumping on to Deep Learning, you should know the basics of Machine Learning. The below learning path on Machine Learning is a solid resource to get you started.

If you want a shorter version, here it is

- Basics of Math (Resource 1: "Math | Khan academy" (Especially Calculus, Probability and Linear Algebra))
- Basics of Python (Resource: "Intro to Computer Science", edX course)
- Basics of Statistics (Resource: "Intro to Stats", Udacity course)
- Basics of Machine Learning (Resource: "Intro to Machine Learning", Udacity course)

Timeline : Suggested: 2-6 months



STEP 1 : SETUP YOUR MACHINE

Before going on to the next step, make sure you have the supported hardware. It is generally recommended that you should have atleast :

- A good enough GPU (4+ GB), preferably Nvidia
- An OK CPU (eg. Intel Core i3 is ok, Intel Pentium may not be)
- 4 GB RAM or depending upon the dataset.

PS: If you are a hardcore gamer (not just candy crushers obviously!), you may already have the required hardware.

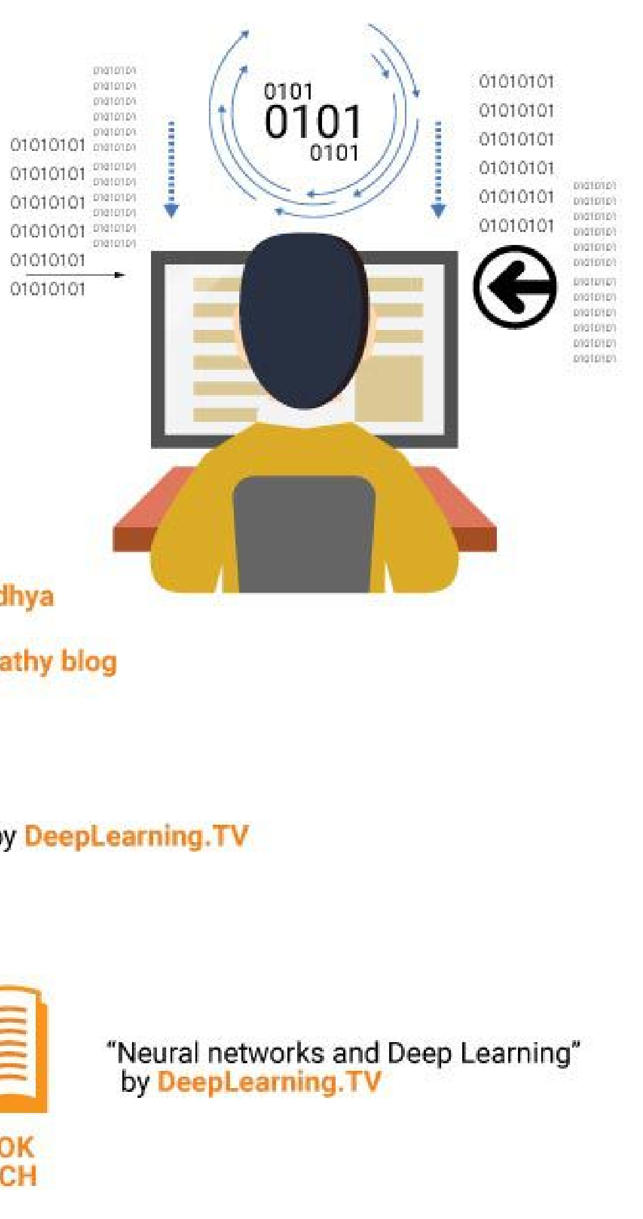
If you don't have the required specifications, you could either buy it or lease an **Amazon Web Service** instance. Here's a good guide for using **AWS for deep learning**.
link :- http://cs231n.github.io/aws-tutorial/

If you are still unsure, go through this:
"A Full Hardware Guide to Deep Learning"
by **Tim Dettmers**

Note: Do not install any deep learning libraries at this stage, do it on step 3.

STEP 2 : A SHALLOW DIVE

Now that you have a good enough knowledge of pre-requisites, you should go on further into understanding Deep Learning.



As Per Your Preference You Could Follow

BLOG APPROACH

1: "Fundamentals of Deep Learning" by **Analytics Vidhya**

2: "Hacker's guide to Neural Networks") **Andrej Karpathy blog**

VIDEO APPROACH

"Deep Learning Simplified" by **DeepLearning.TV**

TEXTBOOK APPROACH

"Neural networks and Deep Learning" by **DeepLearning.TV**

Along with the pre-requisites, you should get to know the popular deep learning libraries and the languages for running them. Here's a (non-comprehensive) list Check the wiki page for *"Comparison of deep learning software"*

- **Caffe**
  http://caffe.berkeleyvision.org/
- **DeepLearning4j**
  http://deeplearning4j.org
- **Tensorflow**
  https://www.tensorflow.org/
- **Theano**
  www.deeplearning.net/software/theano/
- **Torch**
  http://torch.ch/

Some other notable libraries include

- Mocha
- Neon
- H2O
- MXNet
- Keras
- Lasagne
- Nolearn

Timeline : Suggested 1-3 weeks

STEP 3: CHOOSE YOUR OWN ADVENTURE!

Now comes the interesting part! Deep Learning has been applied in various fields with state-of-the-art results. To get a taste of this side of the moon, you, the reader, gets to choose which path to take.
This should be a hands-on experience, so that you get a proper foundation on what you have understood until now.

NOTE

Each path contains a primer blog, a practical project, the required deep learning library for the project and an assisting course. First go through the primer, then install the required libraries and get on with the project. If you face any difficulties along the way, use the associated course to back you up.

Deep Learning for Computer Vision

Primer : "DL for Computer Vision" blog. by **Analytics Vidhya.com**

Project : "Facial Keypoint Detection" Tutorialby **danielnouri.org**

Required libraries : Nolearn by **github.com**

Associated Course : "CS231n: Convolutional Neural Networks for Visual Recognition" by **Stanford.edu**

Deep Learning for Natural Language Processing

Primer : "Deep Learning, NLP, and Representations" blog by **github.io**

Project : "Deep Learning for Chatbots": "Part 1", "Part 2"by **wildml.com**

Required library : Tensorflow by **github.com**

Associated Course : "CS224d: Deep Learning for Natural Language Processing"by **Stanford.edu**

Deep Learning for Speech/Audio

Primer : "Deep Speech: Lessons from Deep Learning" news article and corresponding videoby **baidu.com**

Project : "Music Generation using Magenta (Tensorflow)" by **magenta.tensorflow.org**

Required library : Magenta by **github.com**

Associated Course : "Deep Learning (Spring 2016), CILVR Lab@NYU" by **Stanford.edu**

Deep Learning for Reinforcement Learning

Primer : "Deep Reinforcement Learning: Pong from Pixels" by **github.io**

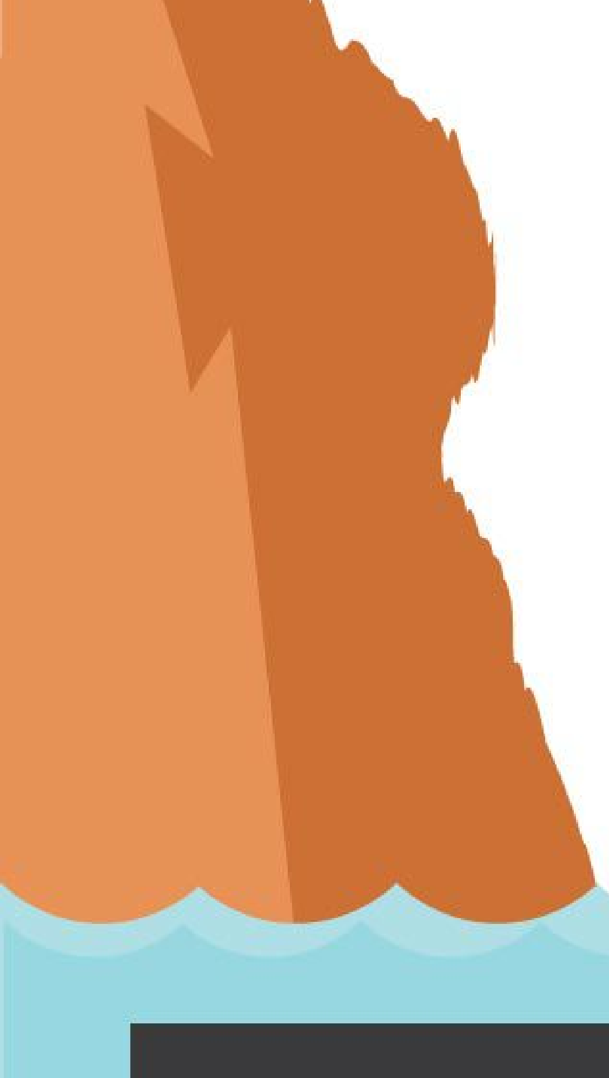
Required Library :
No deep learning library required. Although you do require open AI gym to test your model.by **github.com**

Associated Course : "CS294: Deep Reinforcement Learning" by **berkeley.edu**

Timeline : Suggested 1-2 months

STEP 4 : DEEP DIVE INTO DEEP LEARNING

Now you are (almost) ready to make a dent in the Deep Learning Hall of Fame! The path ahead is long and deep (pun intended) and mostly unexplored. Now it is upto you to make use of this newly acquired skill as efficiently as you can. Here are some tips you should do to hone your skills.



- Reiterate the above step with a different adventure.
- Deep Learning for none of the above!
  (eg. DL for trading, DL for optimizing energy efficiency)
- Use your newly learned skills to build something
  (Remember, with great power; comes great responsibility)
- Test your Deep Learning skills (eg. Hackathon)
- Participate in Deep Learning community.
  (eg. Google Group, DL Subreddit)
- Follow recent researches / researchers.

Timeline : Suggested – Infinity!

For More Amazing Infographics, Visit
www.analyticsvidhya.com

Analytics Vidhya
Learn everything about analytics