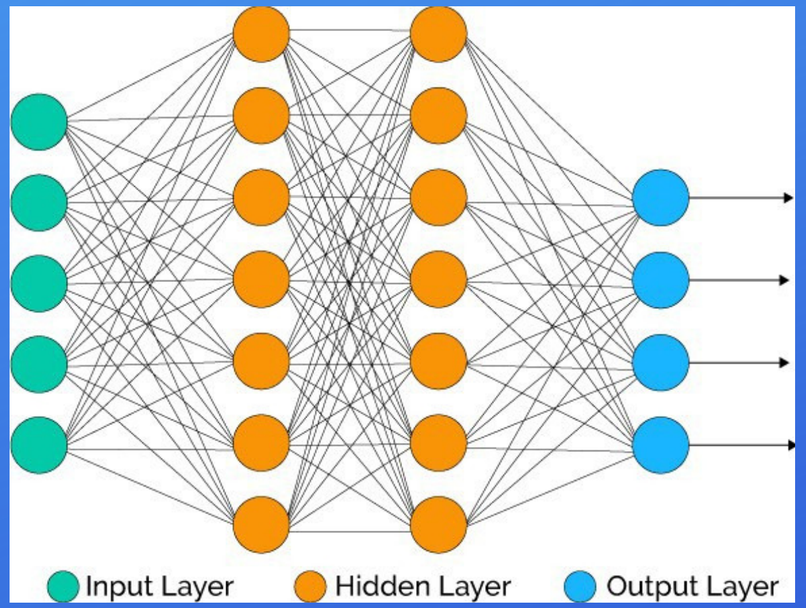
Deep Learning in Different Frameworks

Overview

- Quick overview of the Neural Network topology
- Different Frameworks
- Points of Comparison
- Example notebooks
- Conclusion

NN Topology



- Layered topology
- Input layer
- Hidden layers (More than 3 to be considered a deep net)
- Output layer

Tensors

- Tensors are a generalization of vectors
- Tensors are n-dimensional arrays
- Has the capability to be utilize the GPU for computations
- Keep track of computational graphs and gradients

TensorFlow

- Initial release: November 2015
- Developed by GOOGLE
- Open source Library based on python for data flow programming
- Different types of functionality for implementing deep learning models
- Different functionalities.
- GPU Capability
- Difficult to work with and even more so to debug
- Static graphs

Keras

- High level API designed to work on top of TF
- Easy to use if you're just getting started with ML
- Very slow computational speed
- Works well with small data sets

PyTorch

- Initial Release: October 2016
- Open source machine learning library for python
- Based on Torch
- Developed by Facebook's AI Research
- Easy to debug
- Dynamic graphs
- Preferred framework for research in ML field

H2O

- Focused on RnD in the AI World
- More business driven
- Easy to use
- Big in the Healthcare industry
- Great to use if you are working with scale
- Access to clusters
- Aimed at improving health care quality and lowering costs

PyTorch vs TensorFlow vs Keras vs H2O

PyTorch

- Dynamic graphing
- High level API
- Works well for research or experimentation
- Fast computation

TensorFlow

- Static graphing
- Great for productionization
- High and low level API
- Difficult to learn and debug

Keras

- Great for beginners
- Rarely any need to debug
- Slow computation
- Simplicity and facilitates fast developement

H2O

- More business orientated
- Open source platform
- Great changes in health care industry
- Python, R, Java driven
- Capability to use clusters

Conclusion

- Difficult to say
- Depends on what you are going for and what you require from your idea or problem
- Personal choice is PyTorch due to its Dynamic graphing and Debugging capabilities, also ease of use.