Module 0 - About this course

0.1 Overview

Outline

- What's PyTorch
- PyTorch compared to Other Deep learning Frameworks
 - TensorFlow
 - Keras
- · Who's this course for

WHAT IS PYTORCH?

- A replacement for NumPy to use the power of GPUs
- A deep learning research platform

Imperative programing

- Imperative programing defines computation as you type it
- · Feels more like Python:

```
import torch
a=torch.tensor(1.0)
b=torch.tensor(1.0)
c=a+b
print('c:',c)
```

c: tensor(2.)

Symbolic Programing

- · Define the computation
- Execute the computation

import tensorflow as tf

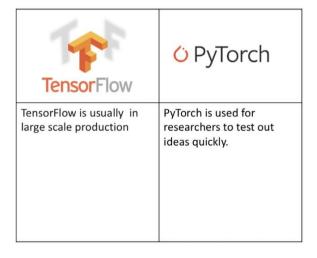
a = tf.constant(1.0,name="a")
b = tf.constant(1.0,name="b")
c = a+b
print(c)

sess = tf.Session()
output = sess.run(c)
print("Value of c after running graph:",output)
c: tensor(2.)

<tf.Tensor 'add_2:0' shape=() dtype=float32>

Imperative programing

- Each and every level of computation can be accessed
- Regular Python tools are easier to use in PyTorch like debugging tools
- Can integrate many standard Programming operations like control flow stamens
- · As a result you can quickly gain insight in your model



Keras is simpler to experiment with for standard layers

C PyTorch

Lower-level environment allows you to experiment, with new ideas

The Battle: TensorFlow vs. Pytorch by <u>Eitan Rosenzvaig</u>

<u>Keras or PyTorch as your first deep learning framework: by Piotr Migdal</u> and <u>Rafał Jakubanis</u>

Who should take this Course

Anyone can build new better neural networks

- You should have:
- Basic knowledge of Calculus and Linear Algebra
- 2. Knowledge of Machine Learning
- 3. Knowledge of Neural Networks
- 4. Basic Knowledge of Deep learning

0.2 About this course

0.2.1 General Information

Prerequisites and recommended skills

PyTorch is a machine learning and deep learning library for Python. As such, to make use of the PyTorch you will need to have at least basic hands-on programing skills in Python.

- · Python programming
- Recommended: Linear Algebra and Calculus

0.2.2 Learning Objectives

In this course you will learn about:

- · Tensors, Gradients and Datasets
- Fundamentals of PyTorch with Linear Regression
- Logistic and Softmax Regression
- Feedforward Neural Network
- Deep Networks
- Intro to Convolution

0.2.3 Syllabus

Module 1 - Tensors and Gradients

- Tensors
- Derivatives
- Dataset Class

Module 2 - Fundamentals of PyTroch with Linear Regression

- Prediction 1D Regression
- Training 1D Regression
- · Stochastic and Batch Gradient Descent
- PyTorch Way
- Model Validation
- Higher Dimensional Linear Regression

Module 3 - Logistic and Softmax Regression

- Logistic Regression Prediction
- Training Logistic Regression
- Softmax Regression

Module 4 - Feedforward Neural Network

- Neural Networks
- Back Propagation
- Activation Functions
- Building Deep Networks In Pytroch

Module 5 - Deep Networks

- Dropout
- Initialization

Module 6 - Intro to Convolution

- · What's Convolution?
- Multiple Channel Convolution
- Activation Max Pooling
- Convolutional Neural Network

0.2.4 Grading Scheme

GRADING SCHEME

- 1. The minimum passing mark for the **course** is 70% with the following weights:
 - 50% All Review Questions
 - 50% The Final Exam
- 2. Though Review Questions and the Final Exam have a passing mark of 60% respectively, the only grade that matters is the overall grade for the **course**.
- 3. Review Questions have no time limit. You are encouraged to review the course material to find the answers. Please remember that the Review Questions are worth 50% of your final mark.
- 4. The final exam has a 1 hour time limit.
- 5. Attempts are per question in both, the Review Questions and the Final Exam:
 - One attempt For True/False questions
 - Two attempts For any question other than True/False
- 6. There are no penalties for incorrect attempts.
- 7. Clicking the "Final Check" button when it appears, means your submission is FINAL. You will NOT be able to resubmit your answer for that question ever again.
- 8. Check your grades in the course at any time by clicking on the "Progress" tab.

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