

11-785 Fall 2017

Homework 02

Introduction

In this homework we will be creating a convolutional neural network, we will do this in tensor flow or pytorch:

If you use tensorflow and are not familiar with we is recommended that you read the tensor flow white paper before starting in order to familiarize yourself with the framework. Some major themes to keep in mind:

1. Keep as many things as you can as tensors, the less interfacing that need to be done outside the framework the better, both for speed and ease of use.
2. Everything is lazy, no commutation happens until the Session is initialize or run. Python is just used to build the graph, outside of session.run no tensorflow computation occurs.
3. If you want to find out about values other than the results for debugging, run the session to return those values.

We recommend using the name scoping style suggested by the tensor flow authors for clarity, ease of use and built in support.

If you use pytorch there is documentation online but for the most part the interface is pretty similar to numpy. Things to keep in mind are

1. Make those things which backpropogation will be done on or involved in calculations which back prop will be done on, variables.
2. Use a class to organize your network.

As far as course support for these frameworks they should both be setup on the linux machines. Both Alex and Dan will be able to provide support for tensorflow and Alex will be able to provide support for Pytorch. Starter code is provided for tensorflow.

Handin:

For submission to autolab run “tar -cvzf handin.tgz [names of your files]” and submit the tar to autolab.

[Instructions on linux machine access: to be inserted]

Task 1.

We will be doing classification on the CIFAR-10 dataset; it contains 10 classes of images. The images are 32x32x3, the third dimension is the channel of the colors.

Starter code is provided, before beginning you should understand everything, which is being done in the starter code, it could prove very problematic down the line otherwise. The documentation on the tensor flow website should prove very useful.

Creating a convolutional network for the CIFAR dataset. Achieving an accuracy of at least 92% on the test data.

First read [striving for simplicity: the all convolutional net](#) then implement a deterministic version of Strided-CNN-C from table 2 in the paper. Make it deterministic by iterating through the training data in minibatches of size 100 with learning rate 0.01 and a gradient decent optimizer. The using the concepts from the paper and [all you need is a good init](#) and any others you choose to look into to get 92% and/or the best performance that you can.

Turn in your code, results and explanation of your results in a file called results.txt under the heading of task 1.