Homework

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0 Logistics

Dates

Assigned: Wed Sep 5, 2018
Due: Mon Sep 17, 2018

Email me

Subject

CS6301 Homework 2

Body

1. Name of the framework you installed (TensorFlow, PyTorch, …)
2. Your level of comfort with Python programming (e.g., use it all the time for everything, have never written a line, somewhere in between, …)
3. Final accuracy of the MNIST digit recognition network you trained

1 Assignment

1. Read

- Calculus lecture notes on Github
  - See the references at the end for additional information

2. Install a xNN framework (your choice)

- Recommendation 1: Tensorflow
  - https://www.tensorflow.org/install/

- Recommendation 2: PyTorch
  - https://pytorch.org

and read through some of the documentation / demos.

3. Duplicate the toy Python demo xNN for MNIST digit recognition using the installed xNN framework

Data		
	MNIST	http://yann.lecun.com/exdb/mnist/
		Frameworks frequently have auto download
Pre processing		
	28 x 28 feature map matrix to 784 x 1 vector conversion	
Fully connected layer 1		
	Matrix vector multiplication:	100 x 784
	Bias addition:	Yes
	Nonlinearity:	ReLU
Fully connected layer 2		
	Matrix vector multiplication:	10 x 100
	Bias addition:	Yes
	Nonlinearity:	None
Error		
	Type:	Softmax + cross entropy
Post processing		
	None	

and report the resulting accuracy on 10k testing images not used in training.

4. Optional: look at examples of correctly and incorrectly classified inputs. For incorrectly classified inputs, were the mistakes plausible?

5. Optional: look to improve the accuracy via network modifications and training modifications. Use examples from the framework training for ideas. Don't worry if you don't have any, we'll cover network design and training in detail in a few lectures time.