

# Assignment 5

Due Oct. 16th 2018

## 1 Readings

1-

NanoNets API

URL: <https://medium.com/nanonets/how-to-easily-detect-objects-with-deep-learning-on-raspberrypi-225f29635c74>

Github: <https://github.com/NanoNets>

Expected to discuss Next week (Oct. 16th) 2-

YOLO

paper title:

You Only Look Once: Unified, Real-Time Object Detection

expected to discuss in two weeks (Oct. 23rd)

Link: <https://arxiv.org/abs/1506.02640>

## 2 Presentations

PIPECNN and openCL: Bobbie (Oct.23rd) Machine Learning Hardware Challenges: (Oct. 30th)

URL: <https://arxiv.org/abs/1611.02450>

Github: <https://github.com/doonny/PipeCNN>

Drivers: (Nov. 6th)

### 3 Problems

1-

use MNIST dataset to recognize digits. Try 4 different values for hidden nodes.

Show the accuracy with each when you run them for multiple times.

MATLAB Reference: <https://www.mathworks.com/help/deeplearning/examples/create-simple-deep-learning-network-for-classification.html>

MNIST page (Full of resources and different Algorithm papers) : <http://yann.lecun.com/exdb/mnist/>

Github Example: <https://github.com/floydhub/mnist>

2-

You have a Neural Network with 4 Neurons for Input Layer, 10 Neurons for Hidden Layer, and 3 Neurons for Output Layer. The network is fully connected and each weight/bias/input is 8-bit value. Show how much memory we need.

a. If each layers has only 2 physical Nuerons implemented. Design a finite state machine showing how to utilize the 2 Neurons per layer. (Note that each Neuron will take the same processing time. Take timing into consideration and allow each layer to finish and handshake with the next layer) Decide whether there is a waste in resources in such case.

b. If you have 4 Multiply Accumulate blocks and only one activation function, how would this impact your FSM and the whole design

3- (Due Oct. 23rd) Develop Modular Matrix Multiplier using Verilog and build its testbench. (You can use simple multiplication and loops to do it)