Fingerprint Neural Network Documentation

* Download images from website
  + Tried using Python framework called Scrapy to download images
  + Scrapy has a tool called image pipeline that downloads all images from a webpage
  + Didn’t work because can’t choose dates, program uses web url and goes to that page to download pictures, and the url goes directly to a blank webpage with the option to select dates
  + Ended up manually downloading images from the website
  + The images were sorted based on classification when downloaded to make it easier to create the training and testing labels used to train the neural network
  + Got 320 training images and 121 testing images from the following months for a five day period (all weekdays): (2017: Sept, Oct, Nov, Dec) & (2018: Jan, Feb, March, April, May, June, July)
* Train convolutional neural network
  + Used past neural network architecture for this network
  + Encountered error “CUDNN\_status\_bad\_param”
  + Initially thought I had old drivers/software and updated Nvidia graphics card driver, CUDA toolkit, and CUDNN
  + Still got the same error, so I changed values of training parameters to try and fix the problem, but it still didn’t work
  + Eventually, realized that the images were too big which was resulting in too many data points in the network causing it to fail during training
  + Reduced the size of the images from 300x440 to 30x40
  + Neural network trained successfully and resulted in approximately 71% accuracy
  + Also, extracted max energy label from each fingerprint image