The cifar10 dataset is a dataset of 60,000, 32x32 images, with 10 classes and 6,000 images per class. These classes are all mutually exclusive, meaning that they only contain the class they are labeled with, and no other class. For the network I created, I used the ResNet50 Architecture, published in previous research. This is a convolutional neural network, that outputs the relative likelihoods for the 10 different classes in the dataset.

The network consists of many convolutional layers. Using the ResNet architecture, it is possible to have a very deep neural network, without worrying about the problem of vanishing gradients that can be caused by deep networks. Using the residual technology introduced in ResNet, this issue can be avoided by smoothing out the gradient during back-propagation. The overall architecture of the model goes from the many convolutional layers to a 1000 dimension fully connected layer, that is then softmaxed. There are also Relu functions in between the convolutional layers.

Because the network is meant to run on GPUs, and I don’t have those resources available to me, I’m not sure how the performance of the model looks. However, to parallelize this model, all I had to do was send the model, image data, and label data to the GPU. This is an easy way to create data parallelism, using Pytorch.