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CS5600 Project 1

I feel like I really learned a lot while undertaking this project, although I feel that I was relatively unsuccessful in constructing accurate networks or not as successful as I would have liked to be. I have detailed some of my experiences in the paragraphs that follow.

I had a really hard time making sure that the data was processed correctly and in a correct format. As I created new networks and tried various architectures, I found myself tweaking that way that I handled the input data, and that was a really big mistake. It created some serious headaches for me. For example, before I realized how long the files were, I attempted to create a ConvNet with 88,000 or so different inputs, and it froze and crashed my machine. I found myself repeatedly trying to manipulate the data in convoluted ways, which left some of my code lacking for coherence and consistency, which made things harder in the long run. I also accidentally saved over previous versions of networks instead of loading and continuing to train them several times.

Both of the audio networks gave me really big problems. I spent hours tweaking architectures and trying to collect the data from the wav files in different ways. I tried taking slices of the files, which were about 88,000 data pieces, and then tried resizing the data into a two dimensional array. I eventually settled on taking averages of ten data points at a time, and removing the ends of the files that were longer. I also tried averages of 100, 50, 30, 25, 20, and 10. I am not sure if this was a good move, as I suspect that it may have negatively affected my ability to create networks that more accurately classified the audio files.

Another thing I really struggled with was determining the architectures of the various networks. I spent hours tweaking numbers of hidden layers, waiting for data to process, only to

see that my new combination of nodes and layers provided worse results than before. I found that tweaking the learning rate between iterations of training sometimes got my networks to move in the right direction eventually. Determining hyperparameters and pinpointing why a network is not learning in the way expected is, in my opinion, the true challenge of creating and using neural networks.

In the future, I will spend more time initially familiarizing myself with the data. Getting it into a workable and reusable format similar to the way that we processed the MNIST data previously is key to having success with these networks. I also believe that I should try to be more methodical about testing and changing parameters. At times I found myself changing several things at once, which made it more difficult to pinpoint issues that I was having. I also learned that I would really like a machine with a GPU!