CS 4320: Machine Learning

Image Classification with Artificial Neural Networks

We have been studying neural networks, and convolutional neural networks (CNN) for image classification for a couple of weeks. Now it’s your turn to design and train a network to classify a set of images.

Assignment Requirements

- Select a set of images with at least 3 classes, plus images that do not meet any of the 3 classes (the null class). You may use the image set selected below, or you may find and use your own set of images. It would be best if you have images that are of interest to you. Just remember that you’ll need as many labeled images as you can to get a good fit.
- Design and train neural networks to classify the images. Find the best result you can achieve, measuring by a cross-validation data set.
- Report the data set you selected, including the number of images of each type, the image size, number of color channels, etc. Add to your report the learning curves for each training completed. Describe the network with the best results obtained. Describe some of the changes made to the network that made it better than the original attempt.
- Submit the code and the report to Canvas.

Data Choices

- CIFAR-10 Data You may use this data set. There are 60,000 32x32 color images, broken into 10 classes. If you want to use 3 classes, select which three to use, and use some of the other classes for the null class.
- A site with links to several data sets You may not use MNIST nor the Fashion MNIST for this assignment.
- Another site with links to several data sets
- One more site with data collections
- Google
- I have many images from the Zion Park trail cameras. Not all of it is classified yet. But there are a few thousand images that are classified.

Sample Code

- Sample CIFAR Reader
- Sample Tensorflow Fashion MNIST