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ECE 614 Project - Neural Networks

Final Project Summary

Objective

To design an accurate neural network for classification of handwriting. In general I will be designing an OCR that is driven by a neural network. The network will take sample scanned inputs of handwritten numbers/letters and through training will classify the data as the correct inputs.

Specifications and Algorithms

The algorithm will receive data as scanned bmp files of handwritten numbers and letters. I will construct the test data by writing the text onto sheets and using an HP scanner to digitize the documents to image files. Once the files are digitized they will be passed to the program. The program will parse the sheet and separate the written characters. It will then place the characters into matrix grids. The grids for each letter will be used to construct the features that will represent a letter. The network will then be trained, validated and tested on additional sample data. I am planning to design the network to have a dynamically configurable number of hidden neurons and layers. I feel that a binary output would be the most useable where each character is given a unique output of 1s and 0s. An example of this would be a character of 0 has the output 000000 and a character of 3 has the output 000011. Depending on how many letter the system is required to detect would determine the output nodes. For the full alphabet and 10 numbers a minimum 6-bit output would be required. I plan on making the network a supervised network as I feel this would work better in this scenario.

Software

All code will be programmed as m-files in MATLAB. I will not be using any of the built in neural network packages for MATLAB, I am only using the programming environment. I plan to generate metrics as well to show the accuracy of the final trained networks and to test the system with a variety of parameters to observe the response of the system.