CMSC 25400 Assignment 6

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For this assignment, I used the libsvm library tools available at "https://github.com/cjlin1/libsvm".

To begin my parameter optimization, I first found compared the different types of models with a set of default parameters, trained over a random subset of size 1500 from mnist.scaled. With default values of (c = 1.0, g = 0.1, coef0 = 0), prediction accuracy rates were as follows .

Linear Model : 90.85%
Quadratic : 19.75 %
Cubic : 11.2%
RBF: 88.3%

Given that Linear and RBF preformed by far the best, I went on to optimize those models.

For linear, since cost is only relevant parameter of those that we are examining, training over a random subset of size 10000, my results were as follows setting c to various powers of 2.

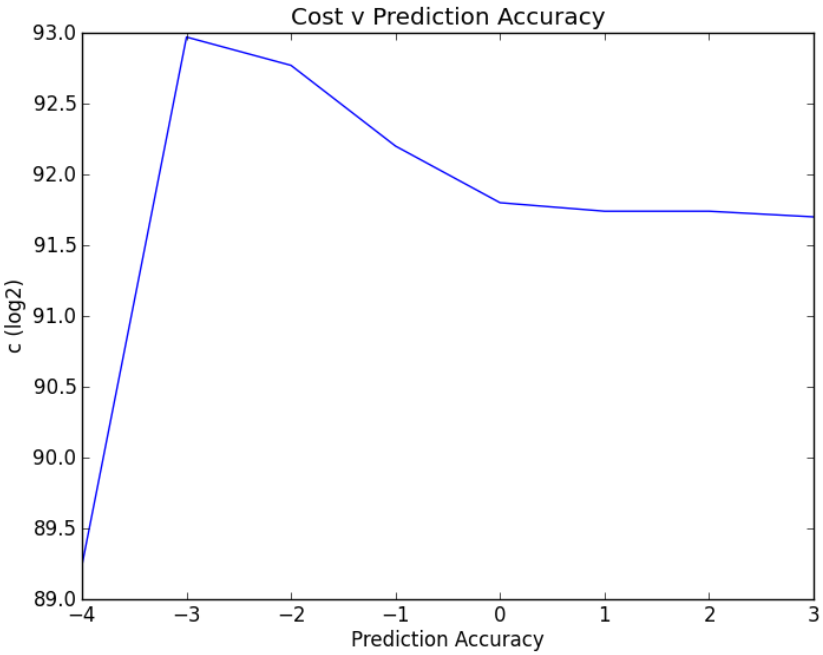

Figure 1:

Training the data using these parameters over the entire data generates a model ("hw6/SVM_Model_Data/rah_RBF_FINAL

that yields prediction accuracy of 94.59%.

For RBF, I looked at both the gamma and cost parameters. My results training over a subset of size 1500 were as as follows setting c and gamma to various powers of 2.

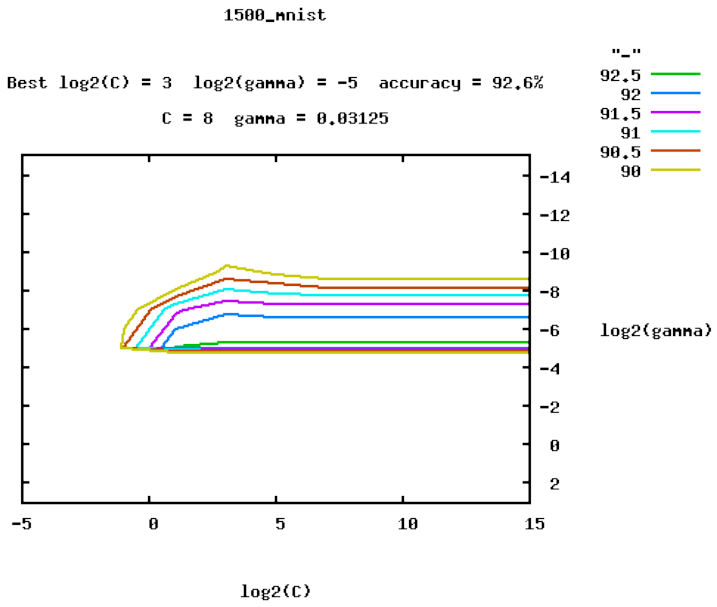

Figure 2:

As may be observed, the best parameter values for this model are (c = 2.0, gamma = 0.03125).

Training the data using these parameters over the entire data generates a model ("hw6/SVM_Model_Data/rah_RBF_FINAL which yields a prediction accuracy rate of 98.56 %! This nearly achieves the rate of 98.5% accuracy "touted" in class.