Machine Learning and Adaptive Systems
(ECE656)

Computer Assignment 3 (Pattern Classification Using SVM)

The purpose of this computer assignment is to design a support vector machine (SVM) for pattern classification. The data set used for this study is the same image dataset used in Computer Assignment 2.

1. Using the same training data set in Computer Assignment 2 train several nonlinear soft-margin SVMs (use both polynomial and RBF kernels). Note that since SVM is a two-class machine, to use it for multiple classes you can use one of the typical methods such as several one-versus-rest classifiers trained using their respective training data sets. Alternatively, you can train a set of one-versus-one classifiers, and to choose the class that is selected by the most classifiers.
2. Cross-validation method should be used to find optimum C and kernel parameter for each machine.
3. Benchmark the performance of your best performing SVM with the best results obtained using CNN in Computer Assignment 2. The generalization ability of these systems must be evaluated on the testing data set. Provide benchmarking using metrics such as overall correct classification rates, confusion matrices, and complexity of training.
4. Provide a discussion on your results and point out the advantages/disadvantages of each classification system in a brief report.