2.5 SVM Program Procedure

Step 1: Read the Image and convert to the Binary Image.

Step 2: Read 5000 random pixel of Binary Image and keep the pixel value (1 for white, 0 for black).

Step 3: Train the SVM and show the output.

Step 4: Consider the RBF kernel.

Step 5: Classify an observation using a Trained SVM Classifier.

Step 6: Use cross-validation to find the best parameter rbf\_sigma and boxconstraint.

Step 7: Use the best parameter rbf\_sigma and boxconstraint to train the whole training set.

Step 8: Test and Evaluate the performance of the classifier

1. Convert RGB image to grey scale image then grey scale image to binary
2. Boundary Determination and Curve Fitting
   1. Two classes of training data are determined and the boundary is set up
   2. Test and justify classification accuracy of the given picture
   3. Divide the image into Class 1 (wooden part of the door with frame) and Class 2 (everything else)
   4. To do this twenty boundary lnes are needed
   5. In order to produce boundary lines effectively and efficiently, curve fitting is employed
3. Training Data Set and Testing Data Set Determination
   1. Once we have the boundaries of the wooden part of the door with frame, we must obtain points from the original image and sort the points by color (black and white)
   2. All points are obtained, and then all points in the wooden part of the door frame are set to 0 (black) while the rest of the points are set to 1 (white).
   3. At this point we have three columns, the first two being X,Y coordinates of the point and then the third being its value
   4. For training data set we randomly select 7000 points
   5. For testing data set has 2100 points that are selected randomly as well (that are not from training set)
4. Simulation Results
   1. To find best rbf\_sigma and boxconstraint we take 7000 samples divide them into 10 groupdss, use the first 9 groups for training and the last group for testing
   2. 99.5% classification precision