During model construction, I used the same set of training data for all model. Each model is slightly different than the others one since each was trained with different parameter passed in. First model (model1) is constructed with linear kernel function, which has an accuracy of 68.7%. For model2 through model 6, they are trained with polynomial kernel function and degree parameter being set in the range from 0-3, which operates at chance performance (52% to 53.5%). Since the default for the degree parameter is 3, I concluded that this kernel function does not fit this particular data set. However, as I set the degree parameter to 100 and used the polynomial kernel function, it yields a 99.3% accuracy, which contradicted my previous conclusion (model 7). Then instead of changing degree parameter, I changed the gamma parameter (default set to 1/number of clusters). Models are trained with polynomial kernel function as gamma being 0.1, 0.5,1,10. The first three models (model8-10) generate an accuracy closed to the first model, which is trained with linear kernel function (61.8, 68.7,70.8 respectfully). Again, the last model yields an accuracy of 91.11%. For the next six models, I set gamma parameter as 0.1,0.5, 1, 10, 50, and 500, and trained with radial basis function kernel type. The first three models yield accuracies at around 69%. For the fourth model (gamma = 10), the accuracy increases to 86.5. Surprisingly, the last two models (gamma = 50 and 500) generate accuracies of 100%. For the last four models I did, I trained the model with sigmoid kernel type with 0.1, 0.5, 1, and 10 as being gamma. The first two gave out accuracies of 67.5% and 68.2%, and the last two operates at chance performance.

The accuracies above are generated by testing data of 1000 images. For the models that yield really high accuracies, I tested the model with a larger set of testing data (5000 images). This time the accuracy dropped significantly (from 86+ to around 70). As I tried to decrease the testing images, the accuracy increases a little (about 5-10%).