1. **Q.** Use the scikit implementation of support vector machines to train a classifier to distinguish 3's from 8's. The SVM classifier with linear kernel can classify the data with 0.958803334968 accuracy while the same classifier with RBF kernel classifies the data with 0.967631191761 accuracy. Please note that both the classifiers had 1 as regularization parameter.

2. **Q.** Try at least five values of the regularization parameter C and at least two kernels.

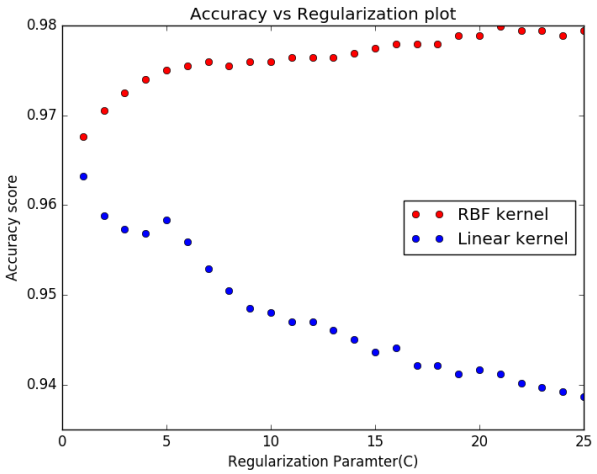

Figure 1: It can be easily seen that as the regularization parameter increases the accuracy score of RBF kernel increases while accuracy score for linear kernel decreases for same number of data points. The increase in accuracy for the RBF kernel is clear from the fact that when not using regularization the classifier overfits the data and thus it does not perform well. However, for linear kernel the parameter should be considerably small in order for it to perform well.

3. **Q.** Give examples of support vectors with a linear kernel.

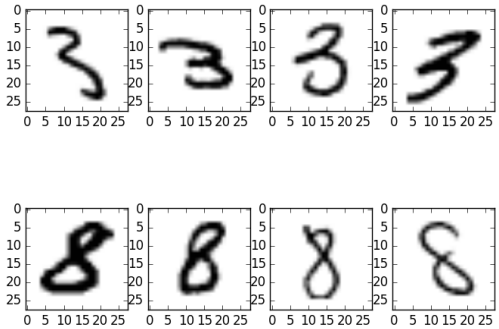

Figure 2: This figure shows the support vectors obtained for classifier with linear kernel with regularization parameter 1 for 1000 data points.