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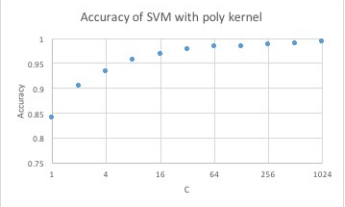
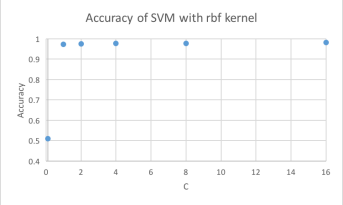
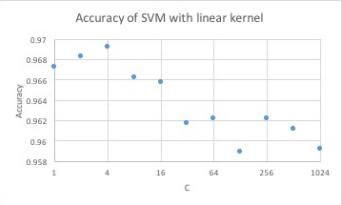
CSCI 5622
SVM HW

The Sklearn implementation of SVM was used to differentiate between 3's and 8's in the MNIST data set. In an effort to get the highest accuracy, I implemented the linear, poly, and rbf kernel, each with a range of C values.



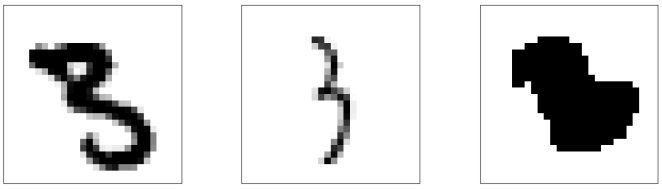




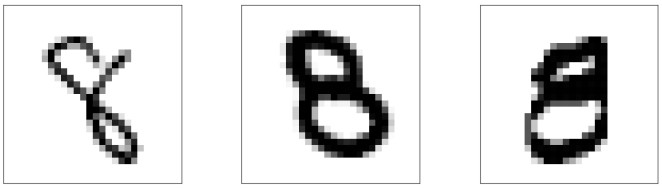
The poly kernel began to produce high accuracy with relatively small C values, even as low as $C = 2$, but maximum accuracy of 0.9929 was achieved on a test set at $C = 2048$.

The rbf kernel produced accuracy of over .97 for all $C \geq 1$. Where $C < 1$, accuracy drops drastically as C approaches 0. Maximum accuracy on the test set was 0.9914 at $C = 448$.

The linear kernel produces reliably high accuracy for seemingly all C values, but never reaches the very high ($> .99$) accuracy of the other two kernels. This suggests that the data is nearly linearly seperable, with a handful of outliers. Maximum accuracy for the linear kernel on the test set was 0.9698, with $C = 0.01$. However, accuracy never dropped below .95 for any value of C.



Support vectors for class = 3



Support vectors for class = 8