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Assignment 2 Report

Part 1 KNN

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| **Figure 1:** Accuracy is plotted as a function of K, red is training error, blue is test error, and green is testing error of the leave-one-out cross-validation method. |

The training error, shown in figure 1, starts out at 100%. Since k equals 1, it is choosing itself as the nearest neighbor and thus is not a good indicator of training error. It can be seen converging at an accuracy of 93% around k = 23. Testing error, shown in figure 1, remains relatively stable around 89%, though it does seem to increase slightly as the training error drops. The cross-validation testing error has a similar, but higher trend in accuracy which converges at 90% after k = 11.

Since the cross-validation error doesn’t change after k = 11, it is a good assumption that having a higher k would not be useful.

Part 2, Section 1:

**Information gain: .109542253521**

**Training error rate: .0598591549296**

**Testing error rate: 0.105633802817**

**Thoughts on these values: When I implemented this functionality, I tested using both the data given when normalizing the values, and when not. In both cases the results were almost the exact same, so I left normalization out.**