1. Objective of whole project.

Compare MADGE data to other machine learning algorithms like SVM and neural networks. Accuracy and speed will be the two most optimized features, with accuracy without overfitting as the most interesting piece to explore.

1. What was implemented last week.

The method that uses a factoring, scaling sigma was successfully implemented and tested on various stretched version of spiral data. The effectiveness of the method was as followed:

1. Square data (data that was stretched with the same factor for all dimensions) had roughly the same optimal scaling sigma method. A maximum accuracy of ~99% could be found for these square data.
2. Non-Square data did not have the same optimal scaling sigma. A maximum accuracy could not be achieved higher than ~60% for higher stretching factors.
3. The sigma factors were unimodal, and had an absolute maximum, regardless of the stretch factor.
4. Plans for upcoming week.

Glean ideas from *Optimal breast cancer classification using Gauss–Newton representation based algorithm* and try new sigma implementations.

1. Objective of whole project.

Compare MADGE data to other machine learning algorithms like SVM and neural networks. Accuracy and speed will be the two most optimized features, with accuracy without overfitting as the most interesting piece to explore.

1. What was implemented last week.

A comparison of various sigmas was done with two methods.

- The first method used a normal distribution calculation:

(s/(s+t))\*Normal(x, W/ σ) + t/(s+t))\*Normal(x, D/ σ)

- The second method uses an absolute factor, with σ as a dividing factor.

(s/(s+t))\*W/σ) + t/(s+t))\*D/σ)

- Spiral Data was stretched by various factors, both in the X and Y direction. Data is labeled with “100-10” for example stretches the X data by a factor of 100 and Y data by a factor of 10.

Using the first method, the following data was constructed:

It seems as though for small stretching, there is an optimal sigma that is valid here. But for larger stretch factors, there is no optimal sigma that would generate an accuracy of > 60 %.

Using the second method, the following graphs were generated:

I used three graphs since I wanted to use a large range of sigmas to test optimization.

Figure 1.

From Figure 1, it seems as though a larger sigma is required for a higher stretched data set.

Figure 2.

Figure 2 seems to indicate that there maximum sigma does have a drop in accuracy at a certain point around the “stretch-factor”.

Figure 3.

I made an assumption that a large sigma would be required for a large stretch factor, but it seems as though a sigma of 100 roughly had the optimal accuracy, even at higher stretch factors.

1. Plans for upcoming week.

Trying to figure out if there is a range on sigmas that need to be tested. At the worse, this is an empirical binary search, at best it’s an approximation we can use an equation to determine.