Mapping the Brain: An Introduction to Connectomics Progress Report: An Analysis of the Performance of Vesicle Detection Systems

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January 16, 2016

1 Summary

Now that we are well underway with the task of exploring existing methods of vesicle detection in brain EM data and working to improve them, we have decided to make several modifications to our original goal. Before, our intention was to work almost entirely in Matlab to both analyze the existing algorithm used for vesicle detection that is provided at neurodata.io, and to work to improve it. Now, after working with the existing algorithm, it is clear that it performs well enough to facilitate the end goal of synapse detection, and improvement in vesicle detection would not improve synapse detection greatly. We will still analyze the effectiveness of the existing method. Instead of improving it, however, we will try to implement a similar function in Python, where one does not yet exist. The success (measured using Precision/Recall) of our new algorithm will be compared to the Matlab method. As of now, analysis of the Matlab algorithm has been completed, and the Python version is underway.

2 Updated Goals

New Goals:

1. Perform Precision/Recall Analysis of the Matlab function for vesicle identification from neurodata.io.
2. Implement a similar function, though perhaps using a different identification technique, in Python.
3. Perform Precision/Recall Analysis of the Python function for vesicle identification that we write
4. Compare the performance of the 2 functions.

3 Updated Timeline

1. The analysis of the Matlab function is already completed.
2. Matt and Alex are working on establishing a new framework in python with a minimum of one feature (either vesicle-blob or rough circles), and making sure it works in the pre-classifier stage before progressing. (1/19)
3. All members will work to perform precision/recall analysis on the new framework. (1/20)
4. Poster and Paper will be finished. (1/22)