Mapping the Brain: An Introduction to Connectomics
Progress Report: Segmenting Mitochondria

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January 14, 2016

1 Summary

We spent the first week reading papers in order to get a better idea of what others did to segment mitochondria. Ultimately, we decided to emulate the methods used in "Supervoxel-Based Segmentation of Mitochondria..." (A. Lucchi, et. al). In the second week, Ryan built a pipeline that retrieves data, applies the SLIC supervoxel segmentation algorithm outlined in the Lucchi paper, and runs a random forest classifier and outputs segmented mitochondria and their graphs. The program is not perfect as it only segmented three mitochondria out of the hundreds in the image. We are currently varying the features in the machine learning algorithm in order to determine which detects mitochondria more accurately. Everything was done so far using Python.

2 Updated Goals

Our future goals are to stich the images together to create 3D mitochondria and perhaps test different pre-processing algorithms besides SLIC. Hopefully by the end of next week, we will have segmented mitochondria using a couple methods and are able to compare the results. We also hope to improve our algorithm to not cut out mitochondria excessively in the pre-processing stage as they are impossible to retrieve afterward.

3 Updated Timeline

End of Week 2: Improve segmentation algorithm. Work on pre-processing. Experiment a little with other methods Week 3: Precision recall to compare methods.