Automated detection of synapses in serial section transmission electron microscopy image stacks

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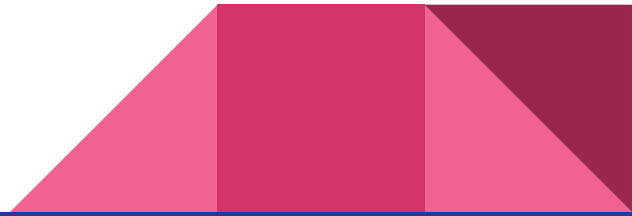
Opportunity

Currently, we have high enough resolution in Electron microscopy to determine all the necessary structures for brain graphs for connectomics



Challenge

Most of this dendrite detection is done manually

High amounts of volume, high variability between samples of the same type, and similar short-range texture between different classes of brain matter.

Action

2 Step Process:

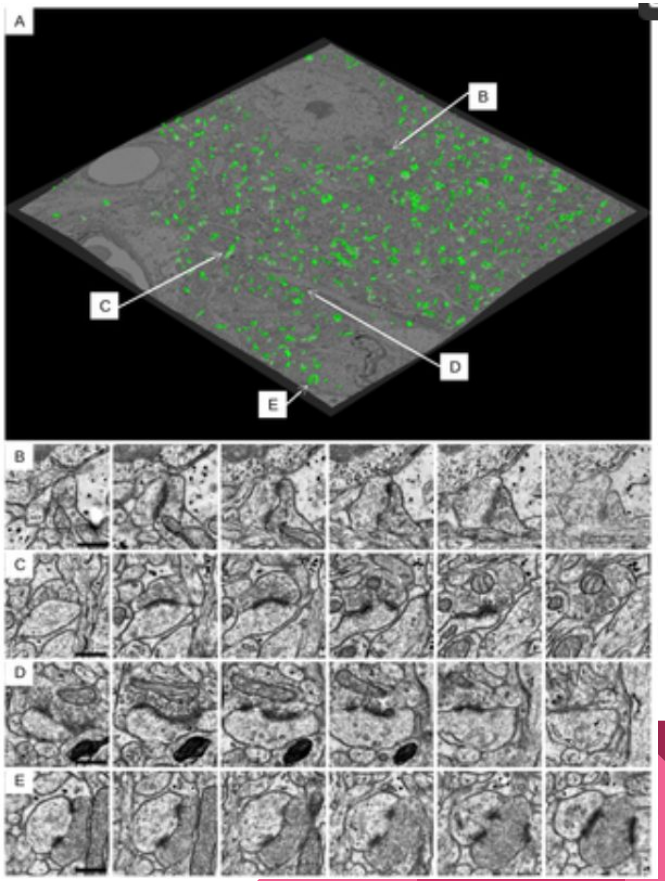
1. Pixel classification and graph cut analysis to select synapse candidates
2. Object-level classification

Both classifications used learned parameters and open source code

Results

For pixel classification, 1.2GB blocks took 11 minutes, graph algorithm took 205 minutes, with 7% of synapses missing.

For Object level classification, 1.2GB block took 13 minutes, with final accuracy



Feedback

Overall, it was a lot simpler of a paper than the title would suggest, mainly because it was well written

Organized well, and the most important information was readily available.