NeuroBlocks - Visual Tracking of Segmentation and Proofreading for Large Connectomics Projects
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**Connectomics?**
- A perfectly cromulent field of research

**Bottleneck**
*Most time intensive

**Slice up the brain**
Electron microscope imaging
~ nm resolution!
Form images into volumetric data
~100 TB!

**Segment the key neuron components in the image**
- ie dendrites, axons,
- Manually segment (~100 TB!)
- Grad students, "interns", large spread of experience
- Automatically segment
- Algorithms always require baby sitting

**Students are bad, automated algorithms worse**
The segmented volumes need to be verified by domain experts (~100 TB!)

**Segmented volumes are analyzed and synapses can be traced out based on connected segments**

**Why?**

**NeuroBlocks Goals**
Interactive visualization-driven framework for managing the state and progress of an individual segmentation project.
Requirements:
- see the current segmentation track its evolution
- manage users and their individual progress
- create tasks and track their project
- integrate with 3rd party tools

**Tasks**
Overview and detailed views of current segmentation (explore)
Track changes (provenance)
Manage segmentation tasks (task manager)
Audit users and segmentations (user manager)
Switch seamlessly between 3rd party tools (integration)

**Why?**

**Connectivity view**
Some abstraction in the connectivity plot.
The middle "node" is an object, which is a group of "segments", and the coloured squares encode what segments are in the object.
The outer nodes are connected nodes, however the spatial channel encodes no information.
Task view

yep, they have one

Integration

API's so 3rd party tools can "plug in"
Demonstrated this with their own 3D rendering plugins

Validation?

Covered their tasks and met their domain goals
NeuroBlocks was used in 2 case studies
General management of a project
Proof reading automated segments

Qualitative Feedback

Interoperability had the biggest impact
All tools in one place, common formats, all activities write to the same database

Questions?

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