NEWS

Computational technique recapitulates neuron shapes

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A new computational method **automatically reconstructs** the 3D branching shapes of neurons from images, an unpublished study demonstrates. The technique could help autism researchers make better use of a tool called Patch-seq that integrates neurons' physical, genetic and electrical properties.

Researchers presented the findings virtually today at the **2021 Society for Neuroscience Global Connectome**. (Links to abstracts may work only for registered conference attendees.)

Researchers first published **Patch-seq** in 2016. Though powerful, the integrative technique requires scientists to manually trace neurons' tree-like branches and projections, known as dendrites and axons — a time-intensive process that can slow down the technique's overall use. The new method uses a neural network to reconstruct the structure, or morphology, of these "arbors" instead.

"The problem … is the morphology data collection lags far behind because of manual reconstruction," says **Olga Gliko**, senior scientist at the Allen Institute for Brain Science in Seattle, who presented the new work. "This allows us to really expand this pipeline."

Gliko and her team trained a neural network called U-Net to differentiate axons, dendrites and somas — the cell body — in raw images of neurons from mouse brain slices, and then reconstruct their neural structure in a digital file.

The process can categorize about 100 cells per day. So far, the team has reconstructed about 3,500 neurons from the mouse visual cortex. Manual tracing takes anywhere from 8 to 15 hours per cell, Gliko says, and larger and more complex neurons can take up to 40 hours.

The team also devised a way to sort cells based on the density of their arbors, which could be

useful for comparing electrical and genetic data across cells.

*Read more reports from the **2021 Society for Neuroscience Global Connectome**.*