Guide to choosing a Neurons dataset

July 5-23, 2021

Contents

Steinmetz

The Steinmetz dataset (youtube) contains 39 Neuropixels recordings of 400-700 neurons each from across the mouse brain during a visual behavior task. This dataset was used by the most groups last year, as it is great for exploratory analyses and is relatively well supported with code and many included experimental and behavioral variables. You should still try to ask specific questions, i.e.: "does the superior colliculus offer a parallel or complementary visual processing pathway to visual cortex?"

Credit for data curation: Marius Pachitariu, Scott Linderman

	Run	View
Main notebook	Open in Colab	render nbviewer
LFP and waveform notebook	Open in Colab	render nbviewer

References:

Steinmetz, Nicholas A., et al. "Distributed coding of choice, action and engagement across the mouse brain." Nature 576.7786 (2019): 266-273.

Stringer

The Stringer datasets (youtube) contain simultaneous recordings of 10,000 or 20,000 neurons from mouse visual cortex either during the presentation of gratings or during spontaneous behaviors like running, whisking and sniffing. These datasets are a little more advanced because you have to work with many neurons simultaneously. They are exciting, because they give a taste of what's to come in neuroscience.

Credit for data curation: Marius Pachitariu

	Run	View
Orientation stimuli + running	Open in Colab	render nbviewer
High-dimensional spontaneous behaviors	Open in Colab	render nbviewer

References:

Stringer, Carsen, et al. "Spontaneous behaviors drive multidimensional, brainwide activity." Science 364.6437 (2019).

Stringer, Carsen, et al. "High-precision coding in visual cortex." Cell 184.10 (2021): 2767-2778.

Allen Institute

The Allen Institute dataset (youtube) is new this year, and it was designed to be very friendly for beginners. The mice do a visual adaptation task using either familiar or novel images. The recordings are from specific neuron populations (VIP, SST etc) in multiple visual cortical brain areas. This dataset is well supported with code and a dedicated project template. This would provide a more focused experience for beginner groups than the Steinmetz dataset, with the caveat that the data is unpublished so it is harder to find supporting information for it. For more advanced groups, a separate dataloader is available using the Allen Institute SDK, which gives access to the entire dataset for more exploratory analyses.

Credit for data curation: Marina Garret, Iryna Yavorska, Doug Ollerenshaw

	Run	View
Analyze one dataset	Open in Colab	render nbviewer
Access to all data	Open in Colab	render nbviewer

Print to PDF

References: none yet for this dataset, but see:

de Vries, Saskia EJ, et al. "A large-scale standardized physiological survey reveals functional organization of the mouse visual cortex." Nature Neuroscience 23.1 (2020): 138-151.

Siegle, Joshua H., et al. "Survey of spiking in the mouse visual system reveals functional hierarchy." Nature 592.7852 (2021): 86-92.

By Neuromatch