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Improved spike sorting for multi-electrode array data from mammalian retina JASON PRENTICE, JAN HOMANN, KRISTY SIMMONS, GASPER TKACIK, VIJAY BALASUBRAMANIAN, PHILIP NELSON, Univ Pennsylvania — Multi-electrode array technology provides an efficient means of simultaneously recording from many neurons. However, as arrays become larger, a greater computational burden falls on the spike-sorting algorithm. We have developed a new method for sorting multi-electrode signals and applied it to retinal ganglion cells. Our method is explicitly designed to scale well with increasing array size. It can dissect temporally overlapping spikes and accommodate the amplitude variation seen in spike bursts. The broad outline of our method is to (1) identify spikes in the raw data, cluster a subset, generate template waveforms, then (2) fit the templates to all the data using an iterative Bayesian algorithm. Each of these two steps makes use of the 2D spatial arrangement of the ganglion cells and electrodes, and the locality of signals from each individual cell. We demonstrate the method on data recorded from guinea pig retina on a 30-electrode array.

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