Title Spike-Train Communities: Finding Groups of Similar Spike Trains

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Abstract

- Determines the the maximum number of groups in a collection of spike trains. Groups the trains according to similarity.
- New insights into the encoding of aversive stimuli by dopaminergic neurons.
- The existence of neural ensembles that evolve in membership and characteristic timescale of organization during global slow oscillations.

Introduction There is an intro.

Materials & Methods

- The clustering algorithm
- Synthetic spike-train data for assessing clustering
- Neurophysiological data

Results

- The algorithm reliably and robustly finds repeating spike patterns.
- Differentiating hidden SNc cell responses to pain stimuli.
- No false positive groupings for SNc responses to control stimuli.
- Baseline response to pain stimulation drifts over experimental session.
- Postbicuculline response to pain stimulation is unexpectedly reliable.
- Detecting groups in simultaneous multineuron recordings.
- Correlation structure of cat V2 spike trains evolves under anesthesia.
- Transient correlation structure of cat V1 spike trains.
- The detection of large timescale structure in large datasets.

Abbreviations

SNc Substantia Nigra pars compacta