Oral presentation

FIND -- a unified framework for neural data analysis

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The complexity of neurophysiology data has increased tremendously over the last years, especially due to the widespread availability of multi-channel recording techniques. With adequate computing power, the current limit for computational neuroscience is the effort and time it takes for scientists to translate their ideas into working code. Advanced analysis methods are complex and often lack reproducibility on the basis of published descriptions. To overcome this limitation we developed FIND (Finding Information in Neural Data; [1]) as a platform-independent, open-source framework for the analysis of neuronal activity data based on Matlab (Mathworks).

Here, we outline the structure of the FIND framework and describe its functionality, our measures of quality control, and the policies for developers and users [2]. Within FIND, we have developed a unified data import from various proprietary formats, simplifying standardized interfacing with tools for analysis and simulation. The toolbox FIND covers a steadily increasing number of tools. These analysis tools address various types of neural activity data, including discrete series of spike events, continuous time series and imaging data. Additionally, the toolbox provides solutions for the simulation of parallel stochastic point processes to model multi-channel spiking activity. We will illustrate the functioning of FIND by presenting examples of its application to different types of experimental data[3,4], both from *in vitro* and *in vivo* recordings, and of recording data from simulated network models [5,6].

References

1. **FIND - Finding Information in Neural Data** [http://find.bccn.uni-freiburg.de]
2. Meier R, Egert U, Aertsen A, Nawrot MP: **FIND - A unified framework for neural data analysis.** *Neural Networks* 2008, **21**:1085-1093.
3. Boucsein C, Tetzlaff T, Meier R, Aertsen A, Naundorf B: **Dynamical response properties of neocortical neuron ensembles: Multiplicative versus additive noise.** *J Neurosci* 2009, **29**:1006-1010.
4. Nawrot MP, Schnepel P, Aertsen A, Boucsein C: **Precisely timed signal transmission in neocortical networks with reliable intermediate-range projections.** *Frontiers in Neural Circuits* 2009, **3**:1-11.
5. Kumar A, Schrader S, Aertsen A, Rotter S: **The high-conductance state of cortical networks.** *Neural Computation* 2008, **20**:1-43.
6. Kumar A, Rotter S, Aertsen A: **Conditions for propagating synchronous spiking and asynchronous firing rates in a cortical network model.** *J Neurosci* 2008, **28**:5268-5280.