**CRCNS.org v1v2-1 data description**  
Version 0.5 (Feb 15, 2019)

Simultaneous V1-V2 neuronal population recordings in  
anesthetized macaque monkeys

Amin Zandvakili and Adam Kohn

**Summary**

These data consist of simultaneous extracellular recordings of neuronal populations in visual areas V1 and V2 of sufentanil-anesthetized *macaca fascicularis*. V1 recordings were performed using a Utah array; V2 recordings were performed using a set of tetrodes. Animals were shown sets of oriented gratings (1.28s), with each presentation followed by a blank screen (1.5s). This data set includes 5 recording sessions, in 3 animals. The data for each recording session includes the spike times, and information about the stimuli presented and receptive field location of each unit. Each data set includes an average of 112.2 V1 units and 29.4 V2 units. Units consist of both well-isolated single units and multiunit activity. The recorded V1/V2 populations had overlapping spatial receptive fields.

Also included in the data set is a short MATLAB script for some basic data visualization. These data were previously published in the following:

Coordinated Neuronal Activity Enhances Corticocortical Communication

Amin Zandvakili & Adam Kohn

*Neuron*, 87, 827–839 (09 August 2015)

<http://doi.org/10.1016/j.neuron.2015.07.026>

Cortical areas interact through a communication subspace

J Semedo, A Zandvakili, CK Machens, BM Yu & A Kohn

*Neuron*, 2019

<http://doi.org/10.1016/j.neuron.2019.01.026>

**Conditions for using the data**

If you publish any work using the data, please cite the (Zandvakili and Kohn, 2015) publication above and the data set using following:

Amin Zandvakili and Adam Kohn (2019); Simultaneous V1-V2 neuronal population recordings in anesthetized macaque monkeys. CRCNS.org

<http://dx.doi.org/10.6080/K0B27SHN>

**Methods**

For experimental details, see the (Zandvakili and Kohn, 2015) publication referenced above.

**Data files organization**

The data set is organized as follows:

* docs: documentation
* mat\_neural\_data: contains .mat (MATLAB) data files containing the neuronal data. Each file corresponds to a different recording session. All recording sessions follow the same experimental paradigm, and correspond to different animals/implants
* software: contains a short data visualization script.

**Data format**

Each .mat file in mat\_neural\_data loads a structure called neuralData:

neuralData =

spikeRasters: {numTrials x 2 cell}

stim: [numTrials x 1 double]

trialId: [numTrials x 1 double]

unitCodes: {[numUnitsV1 x 2 uint16] [numUnitsV2 x 2 uint16]}

rfInfo: {[numUnitsV1 x 7 x 2 double] [numUnitsV2 x 7 x 2 double]}

* spikeRasters: a number of trials by number of areas cell. Each element is a number of neurons by stimulus duration (in ms) sparse matrix, indicating the spike times for each recorded neuron. For example:

find(neuralData.spikeRasters{1,2}(3,:))

returns the spike times (in ms) for unit 3 in V2, during trial 1. See also example.m in the software directory for an example of data visualization.

* stim: stimulus presented on each trial. Stimulus IDs are: 0 - blank screen; 1 - 0º drifting grating; 2 - 22.5º drifting grating; 3 - 45º drifting grating; 4 - 67.5º drifting grating; 5 - 90º drifting grating; 6 - 112.5º drifting grating; 7 - 135º drifting grating; 8 - 157.5º drifting grating.
* trialId: unique ID for each trial.
* unitCodes: a 1 by number of areas cell, where each element is a number of neurons by 2 matrix, containing the unit code for each unit. For example:

neuralData.unitCodes{1}(2,:)

returns the unit code for unit 2 in V1. The code is a two element vector, where the first element is the electrode code, and the second is the sorting code.

* rfInfo: a 1 by number of areas cell, where each element is a number of channels by 7 by 2 (or 1) matrix, containing the receptive field information for each channel. For example:

neuralData.rfInfo{1}(2,:,1)

returns the receptive field information for channel 2 in V1. The receptive field information is a 7 element vector:

1. baseline offset
2. gaussian fit amplitude
3. x-position of gaussian fit center (in pixels)
4. y-position of gaussian fit center (in pixels)
5. variance of gaussian fit in the x-direction (i.e. a measure of RF size)
6. variance of gaussian fit in the y-direction (i.e. a measure of RF size)
7. goodness of gaussian fit (r2)

The third dimension for each area’s rfInfo matrix can have 1 or 2 elements, depending on whether the receptive fields were mapped for one or both eyes.

**How to get started**

For a quick visualization of one of the recording sessions, run example.m in the software directory. To do this, first change your MATLAB working directory to the root of the data folder, and run startup.m. Then run example.m.

**How to get help**

To get help with the data set post any questions on the forum at CRCNS.org.

**Change history**

Version 0.5 (Feb 15, 2019) – Initial version.