DESCRIBE DIRECTORY STRUCTURE HERE, HOW DATA ARE STORED, ETC.

Directory of Files for Behavior, Intan, etc.

Data for each Rat is stored in X:\data\ChoiceTask, with each rat labeled with number (e.g. R0326). Back up data on GoogleDrive\Leventhal-Lab (behavioral files while testing with probe implant/videos are too large for Box Drive).

Within each rat ID in the X:\ChoiceTask are subfolders

R0326-graphs

Graphs of Behavioral training (from poke any to Choice Advanced or Testing)

R0326-histology

Histology images once animals have been sacrificed. For Jennifer Magnusson’s project (as of 04/07/2020), folders are subdivided into Native Expression and Primary Amplification. Green – AAV-hSyn or CAG into the DCN; RED – AAV-hSyn or CAG mCherry/TdTomato in SNr; goal is tracing to Mthal. Check surgical sheets and match with animal ID to determine specific virus injected.

R0326-rawdata

Raw Behavioral Data -- data is automatically saved in a ‘R0326- rawdata’ folder on the acquisition computer by the LabView Software with respective date, e.g. ‘R0326\_20190924a’.

Transfer data to SharedX and Leventhal-Lab GoogleDrive (backup data in both - don’t use Box, when running behavior (with video), the video files are too large for Box).

To analyze ‘Raw Data’ behavior files, use the ‘analyze\_choiceRTlogDataDaily’ function (\GitHub\LeventhalWorkflow\ChoiceRTBehavior). This function allows you to determine when to progress the rats through training levels. Other analyses for ChoiceRT task can be found in Matt’s Github. As of 4/16/2020, JM is still teasing out the quirks of these files (i.e. the weekly plots).

The ChoiceRTBehavior files are generally a separate analysis from sessions intended to incorporate electrophysiological Intan data with the behavioral data (described below)

R0326-surgery

Contains the surgical sheets from surgeries (e.g. virus injection or Probe implant).

R0326-processed

Contains session folders for \_lfp.mat, \_diffpower.mat, and \_monopolarpower.mat files

|  |  |  |
| --- | --- | --- |
| File type | Description | Variables |
| \_monopolar\_lfp.mat | Monopolar field potentials | ***actual\_Fs***: LFP sampling rate in Hz  ***convert\_to\_microvolts***: Boolean indicating whether values have already been converted to microvolts (or are still in units of the 16-bit integer recording)  ***lfp***: 64 x n array where n is the number of points. This array is still in the order of recording channels, NOT the physical order of recording sites |
| \_bipolar\_lfp.mat | Bipolar local field potentials | ***actual\_Fs***: LFP sampling rate in Hz  ***bipolar\_lfp***: differential field potentials. These are in physical recording site order arranged by…, NOT amplifier channel order  ***convert\_to\_microvolts***: Boolean indicating whether values have already been converted to microvolts (or are still in units of the 16-bit integer recording)  ***full\_lfp\_name***: full path to the monopolar lfp file  ***intan2probe\_mapping***: 64-element vector mapping amplifier channels to recording sites. Recording sites going from dorsal to ventral, left to right in probe diagrams. Need to figure out orientation of the probe in the brain, though.  ***probe\_type***: string ‘nn8x8’, ‘assy156’, ‘assy236’ |

R0326-processed-graphs

Contains power spectra and differential graphs

Extraneous files within the folder may include: Probe Impedences before probe implantation (to verify probe works) and pre/post lesion impedences used in selecting probe sites for lesioning/histology.

To Incorporate Intan Electrophysiological Data with Behavioral Data

\*When running Intan Software with Behavioral ‘Labview’ software, always start the Intan software first, so the timestamps for both pieces of data match for analysis purposes.

To analyze, first clear the workspace and run the following functions (in order):

1. intan\_data = read\_Intan\_RHD2000\_file\_DL(‘info.rhd’);
   1. location - GitHub\ intan\_fileio
2. digital\_data = readIntanDigitalFile(‘digitalin.dat’);
   1. location – GitHub\ intan\_fileio
   2. Must have the path in the ‘current folder’ to run function or an error (line 29) will occur
3. nexData = intan2nex\_from\_fnames(‘digitalin.dat’, ‘analogin.dat’, intan\_data);
   1. location -GitHub\ChoiceTask\_Intan\ChoiceTask\_Intan\_behavior\_analysis
   2. Dependencies: read\_Intan\_RDH2000\_file\_DL; digital\_data and analog\_data are written into the function lines 127/128 (but it’s convenient to have the digital\_data in the workspace)
   3. check\_nexData(nexData) uses the ‘nexData’ function as a dependency and provides on/off information. Location of file: Github\LeventhalWorkflow
   4. \*intan2nex\_from\_fnames(‘digialin.dat’,’analogin.dat’, intan\_data); is in the JenPractice Github
4. logData = readLogData(fname);
   1. location - Github\LeventhalWorkflow\ChoiceRTBehavior
5. trials = createTrialsStruct\_simpleChoice\_Intan(logData, nexData)
   1. location – GitHub\ChoiceTask\_Intan\ChoiceTask\_Intan\_behavior\_analysis
   2. Dependencies: readLogData, intan2nex, read\_Intan\_RHD2000\_file\_DL
   3. Locate in the trials structure any trials that have conflicts (use find\_isConflict code; no current ‘function’ as of 4/16/2020; JM is working on turning it into a function)
      1. logConflict = vertcat(trials.logConflict);
      2. isConflict = vertcat(logConflict.isConflict); %returns isConflict in a logical array of isConflict fields
      3. isConflictOnly = find(isConflict); %pulls out actual fields with error
      4. boxLogConflict = vertcat(logConflict.boxLogConflicts); % returns boxConflict in workspace with fields for outcome, RT, MT, pretone, centerNP sideNP
6. Continue with LFP\_Analysis\_Workflow

extractEventsFromIntanSystem (dependencies: intan2nex, read\_Intan\_RHD2000\_file\_DL)

**EXTRACTING FIELD POTENTIALS FROM RAW ELECTROPHYSIOLOGY FILES**

To generate monopolar and bipolar LFPs, run script\_analyze\_choice\_task\_LFPs.m in the folder GitHub🡪ChoiceTask\_Intan🡪 silicon\_probe\_LFP\_analysis