Notes on ephys code

10/7/20

Wrote fx sevenparameter\_waveform\_classifier\_V1, fx takes some of the load in code from the tsne analysis code and inputs the same variables we use for tsne/dbscan/kmeans classification. Then using the classifier app, was able to generate some models. Output of models are located in git>audTask>MATLABCODE\_io>classifiercode, then look in there, specifically at the ‘Oct7\_’ stuff. The 100percent version is the 90percent version just retrained on the complete (100% of) dataset. Note that this code is really only good for supporting the tsne and subsequent subtype A/B analysis.

10/5/20

AT\_CellSummary\_SG\_IS\_io\_V5 works well as noted below.

10/2/20

For raster, AT\_CellSummary\_SG\_IS\_io\_V4 works well using case 10 lead 1 spike 1. I’m making a V5 today in order to try to include some other analyses as well.

9/24/20

For waveforms, I wrote fx ‘waveformextraction\_plotting\_V1’. Around line 126 are some indexing variables for specific cases. At present,

9/15/20

For Fig3 (all neuron ephys for all epochs U v P) and Fig4/5, use meanORmedian = ‘intraTrialFR\_mean’ This input gives us the best output from all others – I’ve tested them repeatedly. With this meanORmedian input, what we end up doing is taking the within trial difference between our epoch of interest and wholetrial FR for that same trial, and then taking the mean of that per each neuron. Look around line 3000 for this. Also, keep indexSTNmanual

= 1

9/14/20

Added the multiple comparisons sub fx ‘multiplecomparisons\_V1’. At the moment this does multiple comparisons for the 5 2tailed p values, but does not for the 1tailed tests.

9/6/20 – to generate rasters, use code AT\_CellSummary\_SG\_IS\_io\_V4

caseNumb = 10;

spikeFile = 'spike1';

clust = 1; %set this to be 1,2, or 3; note that only a few of the spike recordings are multi-cluster

align\_ind1 = 2; %which part of the trial do we want to look at as our 'zero' point?

%%[trialStart\_times; upPressed\_times; stimDelivered\_times; goCue\_times; leftUP\_times; submitsResponse\_times; feedback\_times]);

window\_event1 = [-.5 4.5];

PSTH\_SMOOTH\_FACTOR = 85;

7/27/20 –

Logistic regression analysis completed, at least first round of it. See fx ‘ATlogistic\_regression\_V1’. As of 8/18/20,

7/16/20 –

Building on recent meeting with JT and GF, need to run series of analyses already performing on cluster 1 vs cluster 2

6/19/20 – working on extracting the timestamps of each epoch in order to do some LFP processing on the data. It is in the spikestruct output as ‘epochTimes’

6/6/20

So… aside from the ‘AT\_CellSummary\_SG\_IS\_io\_V4’ code, the L/R distinction has been independent of whether we’re recording from L/R side – basically, the ipsi vs contra distinctions have been crap. Every case/recording is taken from R STN except for cases 3, 4, 11, 12, and 13

Created tsne\_SNsubtypes\_V4 – correctly identifies ipsi vs contra

6/1/20

Ephys extraction code flow:

Spiketrainexaction\_AnalysisStruct\_VX (creates the spikestructs) > FRanalysis\_helperfx\_VX (this calls on masterstruct; need to assemble the empty struct for input/outputs)

-spike strcut and masterstruct that are ‘V2’ are associated with Spiketrainexaction\_AnalysisStruct\_V4 and FRanalysis\_helperfx\_V2

- fx intermittentNeuron\_helperfx\_V1 is in the spiketrain extraction code and plays important role in filtering out certain trials

5/12/20

intermittentNeuron\_helperfx\_V1 is placed within ‘spiketrainexaction\_AnalysisStruct\_V4’ to index out trials we don’t want included in the spiketrain struct and subsequently the masterspike struct.

I need to change the FRanalysis\_helperfx\_V1 to cut out the trials that have intermittent firing, creating a V2 version. Actually, I think it’s the ‘spiketrainexaction\_AnalysisStruct\_V4’ that needs to be altered.

5/8

I want to extract a ‘new’ epoch, writing an updated version of ‘spiketrainexaction\_AnalysisStruct\_V3’ that im calling V4, goal will be for it to maybe calculate some new measures of psth using trapz and maybe do a new epoch center right around the feedback

Duplicated the masterspikestruct so there’s masterspikestruct2 and one minus the ‘2’ (not important for now)

5/7/20-

‘tsne\_SNsubtypes\_V1’ first half of code is useful for comparing different outputs of clustering/thresholding strategies. It produces a plot that uses Ramayya’s criteria (or closely matched ones) on our data – this might be useful as a supplemental figure.

Whole trial FR analysis 4/27/20

-for the ave FR as well as inc/dec/nodelta calculations, I’m going to want to calculate the ave FR, fx ‘FRanalysis\_helperfx\_V1’. This fx loads in data structs generated by fx ‘spiketrainexaction\_AnalysisStruct\_V2’ and the helper fx it calls ‘raster\_io\_spikeextraction\_V2’; note that ‘raster\_io\_spikeextraction\_V2’ needs ‘epochInfo’ input which is set up top in the ‘spiketrainexaction\_AnalysisStruct\_V2’.

Burst struct creation analysis 4/26/20

-adapted fx ‘spiketrainexaction\_AnalysisStruct\_V1’ from AT\_CellSumm\_SG\_IS\_io\_V4; purpose is to generate a struct that contains cell arrays w/ spike times in seconds for each trial. We’re looking to do this for the whole trial duration. Wrote raster\_io\_spikeextraction\_V1

, adapted from raster code to aid in this. Note the last few lines of code where things get saved out

-above works well, just be aware that for case1, spike3, clust2 the spiketimes seem a little weird because I’ve concat two clusters together.