# Contact Analyzer Structure

## Pass into it : Array to analyze = (array), Analysis Parameters (p)

## Average contact type determination

### Variables used

#### p.touchThresh - 1x4 vector for go p/r and nogo p/r distanceToPole thresholds

#### p.goProThresh - Mean curvature above this value indicates probable go protraction, below it, a go retraction trial.

#### p.nogoProThresh - Mean curvature above this value indicates probable nogo protraction, below it, a nogo retraction trial.

#### p.poleOffset – delay between pole ascent start and accessibility

### Variables created

#### meanContactCurve - Average curvature during estimated contacts, used to determine contact directio

#### trialContactType - % Trial Primary Contact Type (0=none, 1=go pro, 2=go ret, 3=nogo pro, 4=nogo ret)

#### .whiskerTrial.contactInds{1} – Indexs of estimated contacts

### Tasks

#### Make initial guesses for contact periods

##### Threshold based on go vs/ nogo only

##### Corrects for curvature

##### crops contact indexes to only pole available times

#### Calculate mean curvature during contact period (meanContactCurve)

#### Determine if contacts are primarily protraction or retraction

##### Use meanContactCurve to get p/r of contact periods

#### Refine contact periods

##### Threshold based on go / nogo with p/r specified

##### Corrects for curvature

##### crops contact indexes to only pole available times

#### Recalculate mean contact curvature with refined contacts

### TO DO :

#### Move .whiskerTrial.contactInds data into separate contacts array

## Contact Segmentation

### Variables Used

### Variables Created

#### Contacts – cell array of analysis results

##### .segmentInds – cell array of start and end times of each contact

#### trialContactType – array of primary contact types per trial

### Tasks

#### Segmentation of contacts into an ordered list.

##### For trials with contactInds, cat each set of index values

#### Plot the estimated primary contact type by trial number

#### Plot first trial example of each type to confirm distance thresholds

### TO DO :

#### Consolidate plotting

#### Move contacts creation to earlier in function

#### Fix bug where curvature does not seem to be subtracted from pole distance contact threshold calcuation

## Contact Characterizer

### Variables Used

#### array.whiskerTrialInds

#### contacts{}.segmentInds

#### array.trials{k}.whiskerTrial.M0{1}

#### contacts{}.meanM0

#### spikeTimeWindow

### Variables Created

#### contacts{}.

##### meanM0

##### peakM0

##### spikeCount

##### contactLength

### Tasks

#### Find mean M0 for each contact

#### Find peak M0 for each contact

#### Find spikes associated with each contact

#### Find timelength for each contact

#### Plot spikes vs. Peak contact M0

### To DO :

#### Decouple plotting and contact attribute determination

#### Get spikeTimeWindow from input parameters

## Spike Triggered Averages

### Variables Used

#### array.trials{k}.whiskerTrial.M0{1}

#### array.trials{k}.whiskerTrial.M0I{1}

#### array.trials{k}.whiskerTrial.Faxial{1}

#### array.trials{k}.spikesTrial.spikeTimes

#### array.whiskerTrialTimeOffset

#### tid

#### array.trials{k}.whiskerTrial.theta{1}

#### array.trials{k}.whiskerTrial.get\_velocity

#### array.trials{k}.whiskerTrial.get\_acceleration

### Variables Created

#### M0combo

#### spikeWindow

#### contacts{}.FaxialAdj

#### spikeTimes

#### contacts{}.

##### spikeTriggerM0I{1}

##### spikeTriggerFaxial{1}

##### spikeTriggerAcceleration{1}

##### spikeTriggerVelocity{1}

##### spikeTriggerPosition{1}

##### M0combo{1}

#### allSpikeTriggerM0I

#### allAbsSpikeTriggerM0I

#### hitSpikeTriggerM0I

#### missSpikeTriggerM0I

#### falseAlarmSpikeTriggerM0I

#### correctRejectionSpikeTriggerM0I

#### abshitSpikeTriggerM0I

#### absmissSpikeTriggerM0I

#### absfalseAlarmSpikeTriggerM0I

#### abscorrectRejectionSpikeTriggerM0I

### Tasks

#### Build the combined M0 /M0I array

#### Build the FaxialAdj array (Faxial at contact, 0 else)

#### Find spike triggered everything

#### Plot spike triggered everything

### To DO :

#### Decouple M0combo creation from STA area

## Moment alignted to decision

### Variables Used

#### array.trials{k}.whiskerTrial.time{1}

#### M0combo{}

### Variables Created

#### maxTime – in milliseconds

#### decisonAligned M0Combo{}

##### various subsets for plotting

##### 

# TO DO :

## Compatible with TrialArrays that do not have contactInds fields built in

### Use a switch case and varargin to allow optional specification of contactInds field

### OR don’t write .whiskerTrial.contactInds{1} throughout the code, just do at end based on the case

## Passing in parameters