TCMR Toolbox

A toolbox for time continuous multiple regression on mouse movements and for basic mouse movement analysis in Matlab

(C) Stefan Scherbaum 2017

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Additional Requirements

The toolbox requires the following additional toolboxes

- Matlab Statistics Toolbox
- fminsearchbnd: contrained simplex algorithm for Matlab (https://de.mathworks.com/matlabcentral/fileexchange/8277-fminsearchbnd-fminsearchcon, John D'Errico, 2012)
- **geom2d**: geometry library for Matlab (https://de.mathworks.com/matlabcentral/fileexchange/7844-geom2d,David Legland, 2017)

Tutorial

Atutorial script and dataset are provided in the Demodata folder.

List of Functions

TCMR related functions

TCMRegression.m normalizeRegressors.m plotRegression.m

Performs TCMR and yields betas Normalizes the regressors before applying TCMR

Plotting of TCRM results

findStatSegments.m plotSegmentLines.m writeSegmentTable.m Extraction of significant segments from betas Plotting of segments into plotRegression plot

Output segments as CSV

findStatPeaks.m Extraction of peaks from betas

plotPeaks.m Plotting of peaks into plotRegression plot

writePeakTable.m Output peaks as CSV

fitRegression.m Fitting of gauss curves for parameter extraction plotModelLines.m Plotting of segments as given by gauss parameters plotModelPeaks.m Plotting of peaks as given by gauss parameters

writeParameterTable.m Output parameters as CSV

Basic mouse movement analysis

correctSampleTiming.m Corrects unregular sample timings

calcTrajectories.m Calculates time warped Angle, Velocity etc. calcMovementContinuity.mCalculates Movement Index and Returns calcStatic.m Calculates Mean and Maximum Deviation

Statistics

jackKnifeStats.m Jackknife corrected t-test (see findStatPeaks)
jackKnifeStats2.m Jackknife corrected t-test for two samples
jackKnifeSte.m Jackknife corrected standard error of the mean

ste.m Standard error of the mean

VIF.m Calculates Variance inflation factors for regressors

General plotting and output

animateXY Create a movie of X-Y-movements imagep Heatmap for 1D trajectory data imagep2d Heatmap for 2D trajectory data

errorArea.m Lineplot with shaded error areas around lines

markx.m Marks position on x-axis marky.m Marks position on y-axis

subplots.m Opens subplots subplotxy.m Opens subplots

Helper functions

addToMatrix Adds a vector as a line into an existing matrix

catTrialLog Concatenates data from trial structs

fitGauss.m Fitting of gauss curve

gauss curve.m Gauss curve

gausswindow.m A gauss window for smoothing getColorLines.m Provides color & linemarkers

getColorValues.m Converts color letters to numerical format normLength.m Timenormalizes signals by interpolation or fillup

normScore.m Normalizes variables to requested range

out.m Extended output function smooth.m Smoothing of signals