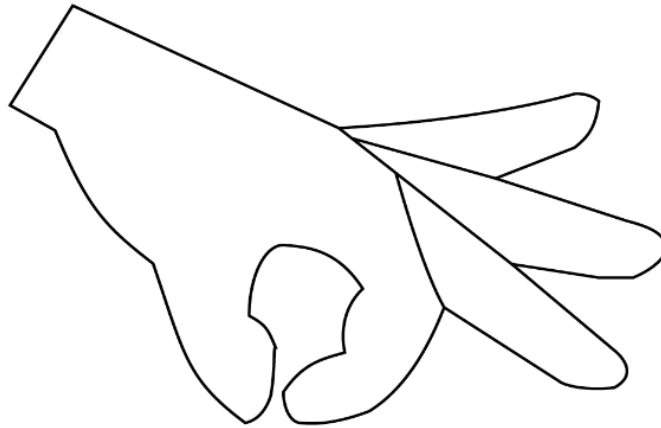


Dexterity Software Manual

The Carmel Lab | Burke Medical Research Institute



Last Updated: February 8, 2017 by Sam Butensky

Software Overview

Hand function is critical for independence, and neurological injury often impairs dexterity. To measure hand function in people or forelimb function in animals, sensors are employed to quantify manipulation. These sensors make assessment easier and more quantitative and allow automation of these tasks. While automated tasks improve objectivity and throughput, they also produce large amounts of data that can be burdensome to analyze. We created software called Dexterity that simplifies data analysis of automated reaching tasks. Dexterity is MATLAB software that enables quick analysis of data from automated manipulation tasks. Through a graphical user interface, files are loaded and data are automatically identified and analyzed. These data can be annotated or graphed directly. Analysis is saved, and the graph and corresponding data can be exported. For additional analysis, Dexterity provides easy access to custom scripts created by other users.

Previous analysis of automated tasks was performed with custom data analysis, requiring expertise with analysis software. Dexterity made the tools required to analyze, visualize and annotate data easy to use by investigators without data science experience. Dexterity increases accessibility to automated tasks that measure dexterity by making analysis of large data intuitive, robust, and efficient.

Software Programs

1. [Standard](#)

Load, analyze, and visualize data using a standard workflow developed in our lab. Data can be graphed directly and/or annotated immediately after processing or after visualization by experimental parameters, i.e. groups and timeline. Processed data can be exported as well as an image of the graph. Lastly, an analysis session can be saved for resumption later.

2. [Custom](#)

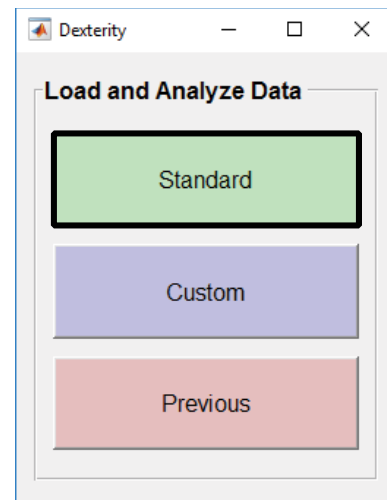
Analyze and visualize data using custom written MATLAB scripts from the Carmel Lab, another lab, or your own lab. This serves as a means to collaborate with other labs using similar automated behavioral tasks or load in your own functions or another lab's.

3. [Previous](#)

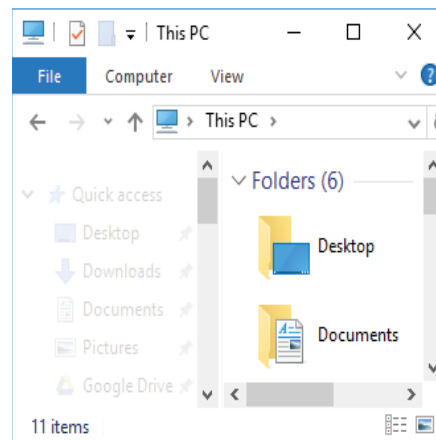
Resume previously saved analysis sessions without loading and analyzing data again.

Standard

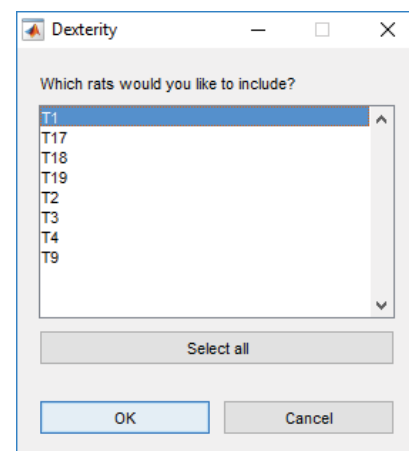
1. Select “Standard” from the initial screen.



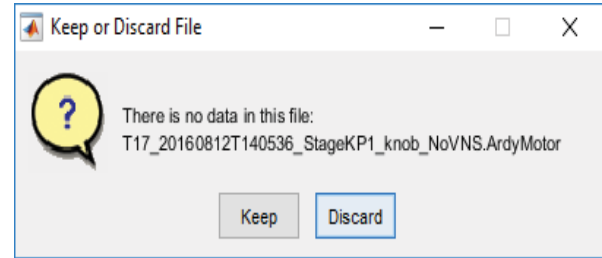
2. Locate the directory where animal data is and select the desired folder.



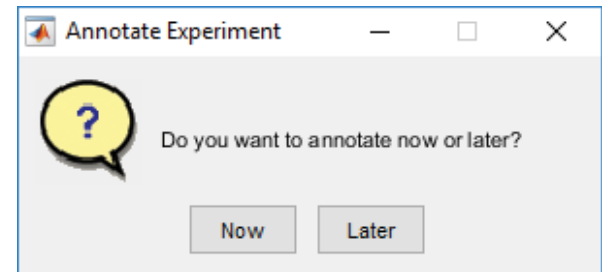
3. After selecting the directory, select the animals for analysis.



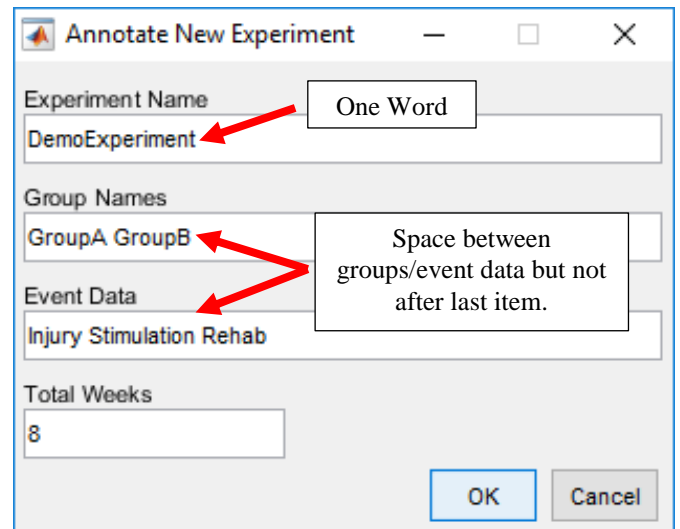
4. Keep or discard files that are incomplete or contain no data. When a file is kept, a zero is placed in the appropriate place for computed variables.



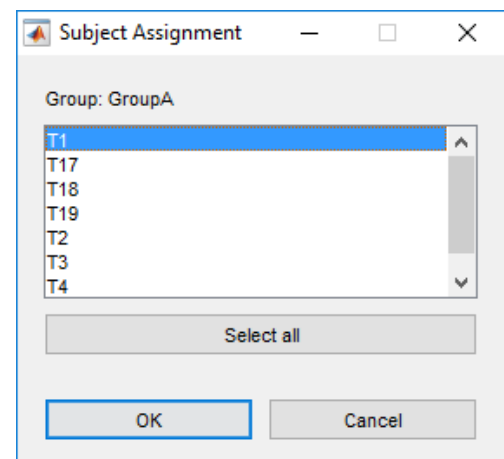
5. Choose whether to annotate the experiment now or later. The manual will discuss annotation from this step onward, but one can also annotate during visualization of all subjects. If Annotate Later is selected, skip to Step 14.



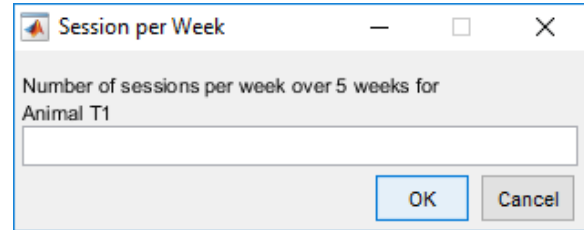
6. If “Annotate Now” is selected, a new window will open. Enter the Experiment Name, Group Names, Event Data, and total number of weeks in the experiment.



7. Assign subjects to group.



8. Input how many data sessions are in each week or time point. NOTE: Input sessions separated by a space and make sure not to put a space after the last number i.e. (1 1 1 1).

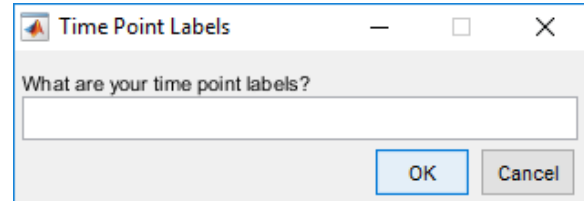


Session per Week

Number of sessions per week over 5 weeks for Animal T1

OK Cancel

9. Input the time point labels. NOTE: Input labels separated by a space and make sure not to put a space after the last label i.e. (Pre Wk1 Wk2 Wk3).

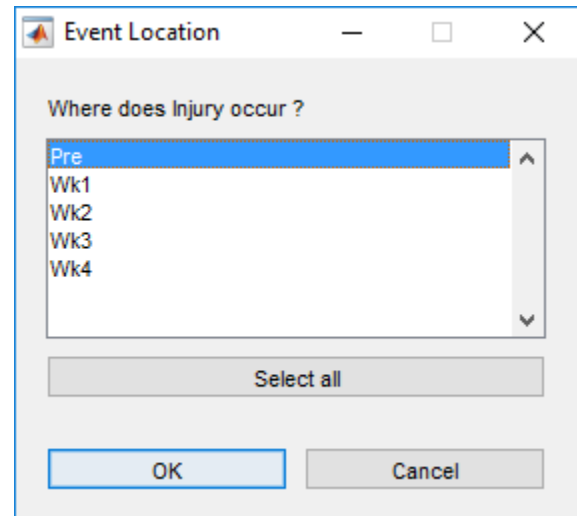


Time Point Labels

What are your time point labels?

OK Cancel

10. Select where the event occurred. If injury occurred at Week 2, then select Week 3 and the program will draw a line in the middle of Week 2 and Week 3.



Event Location

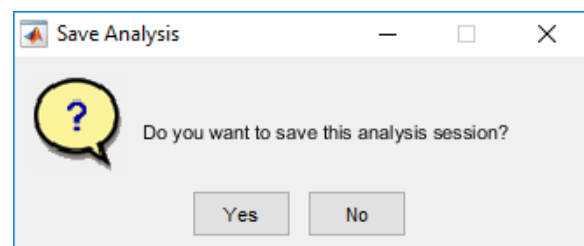
Where does Injury occur ?

Pre
Wk1
Wk2
Wk3
Wk4

Select all

OK Cancel

11. An option to save the analysis session will appear.

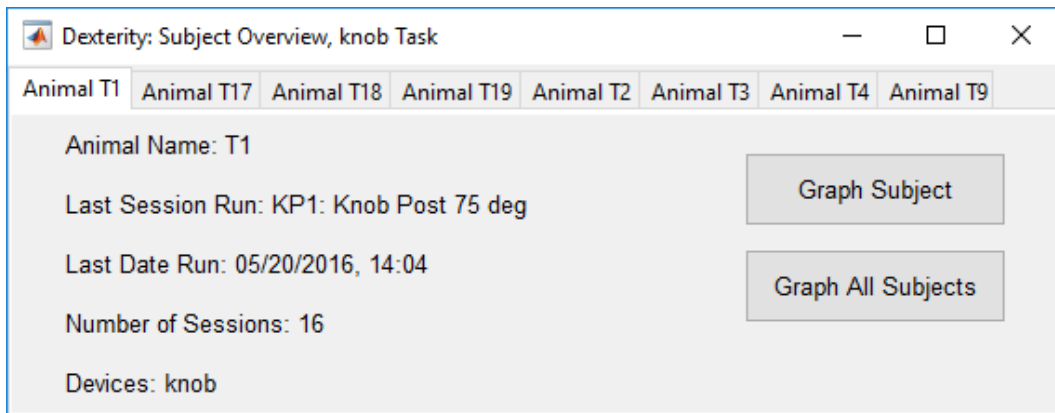


Save Analysis

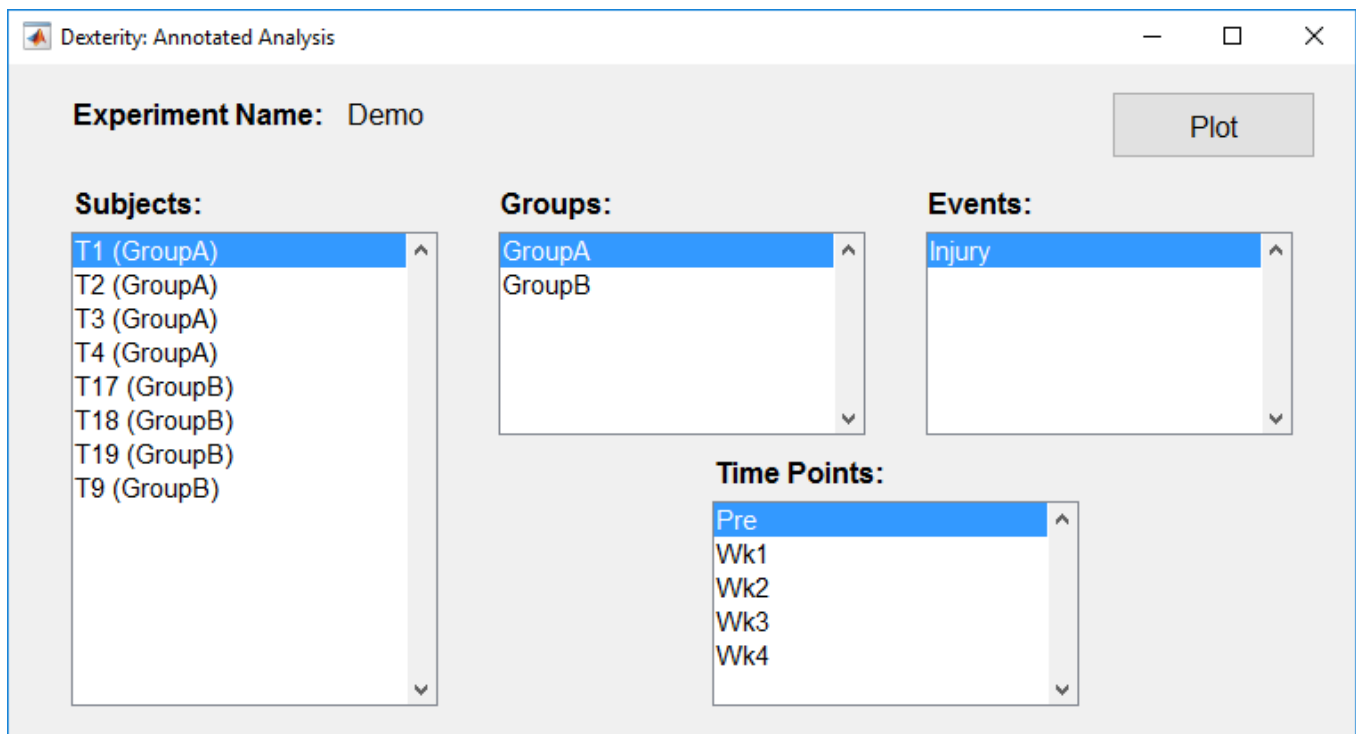
Do you want to save this analysis session?

Yes No

12. An overview of the unannotated data will show.

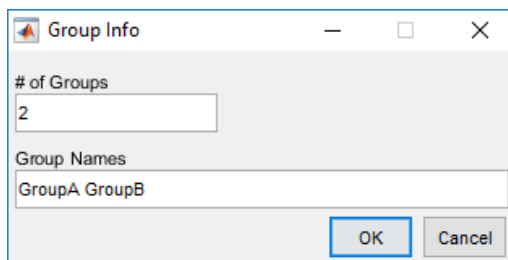
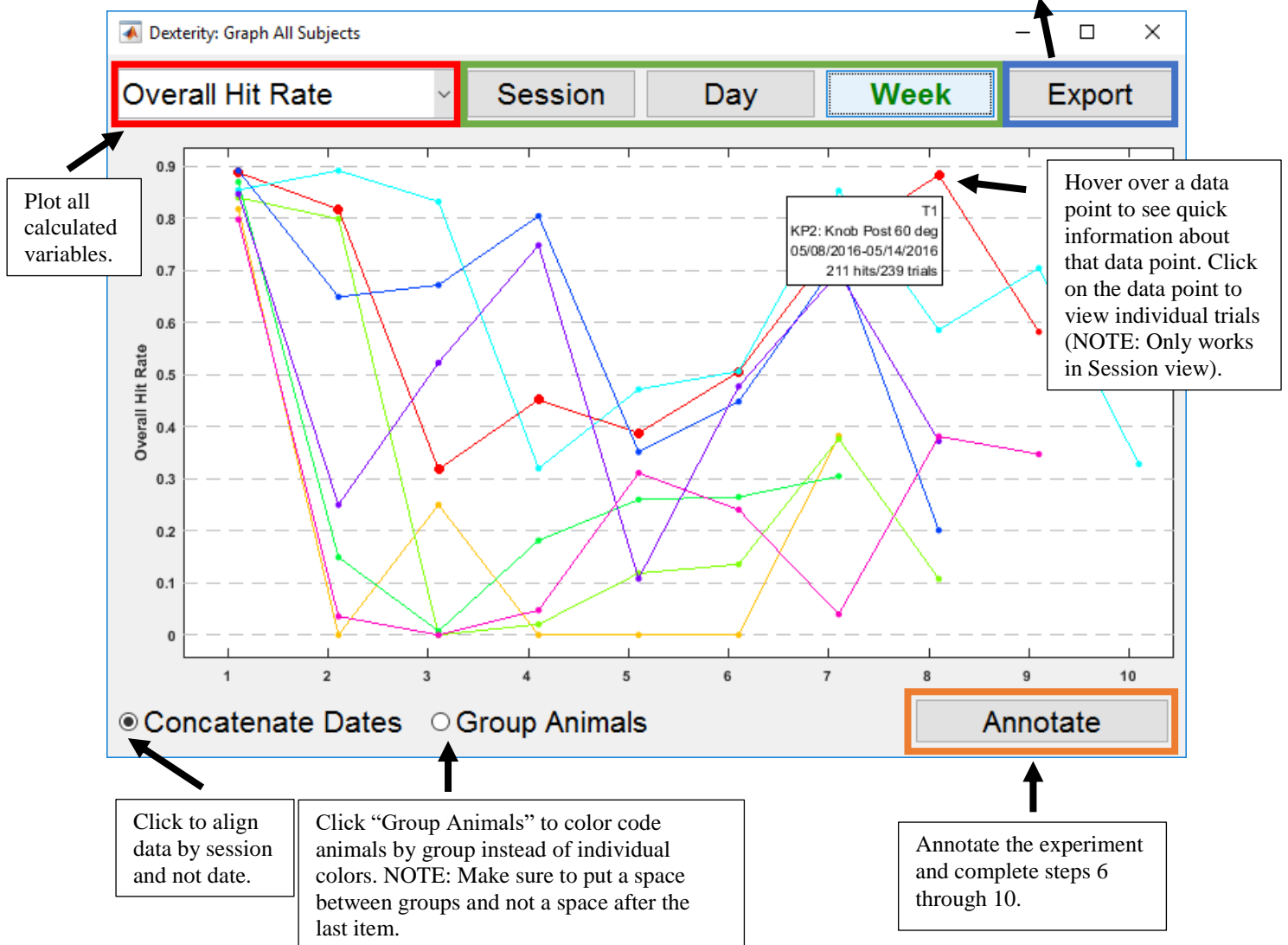
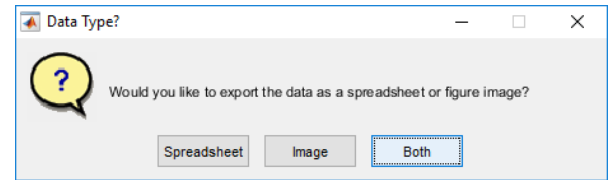


13. An overview of the annotated experiment will also show.

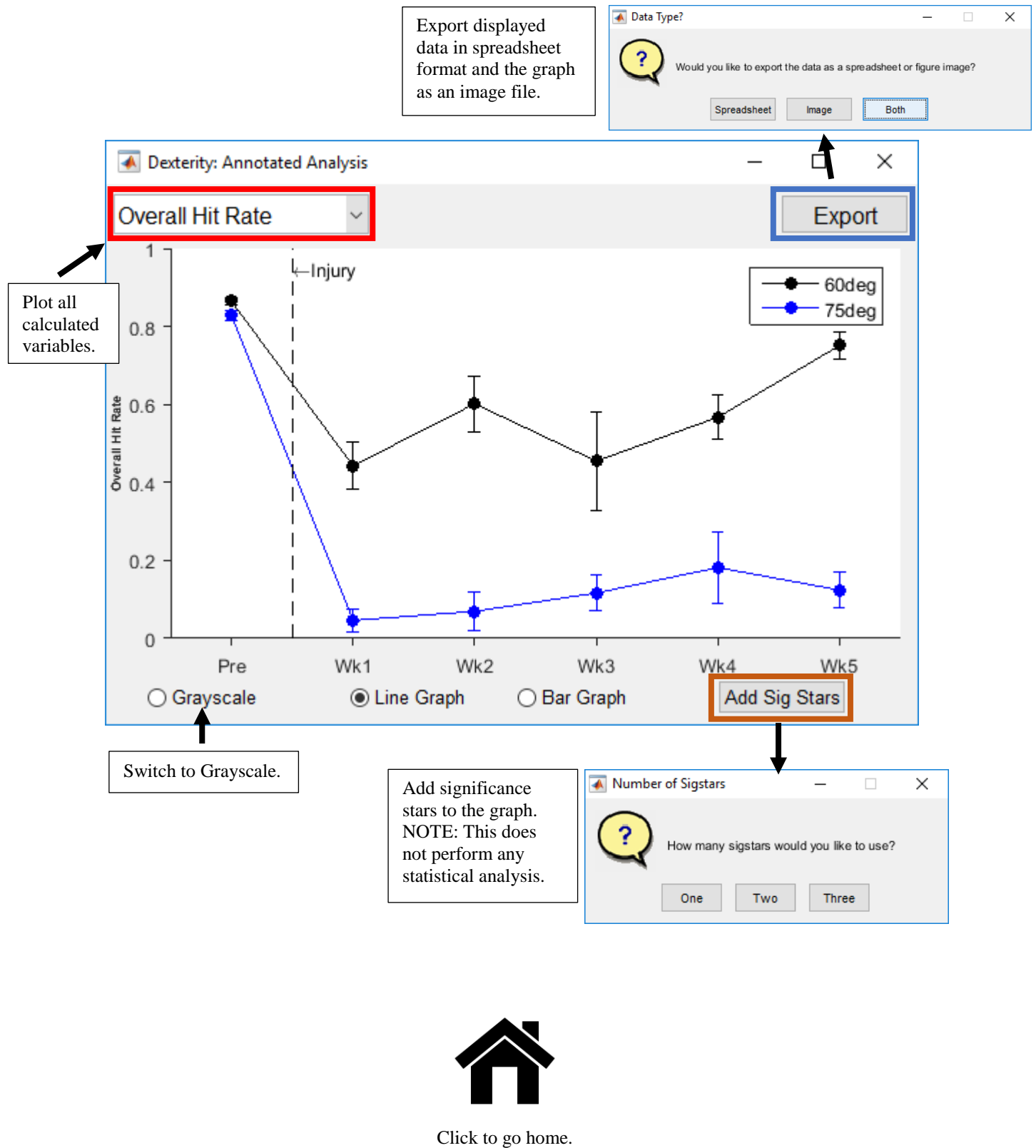


14. The unannotated data can be plotted by subject or all subjects by clicking “Graph Subject” or “Graph All Subjects.” (All Subjects shown)

Export displayed data in spreadsheet format and the graph as an image file.

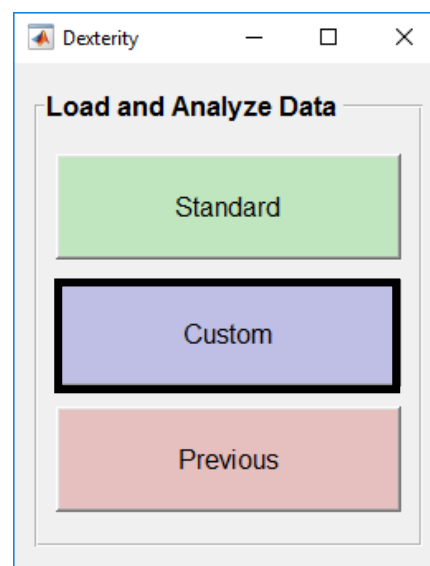


15. The annotated data can be plotted by clicking “Plot.”

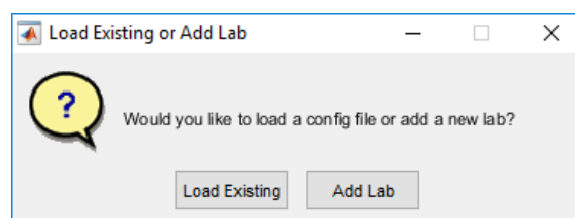


Custom

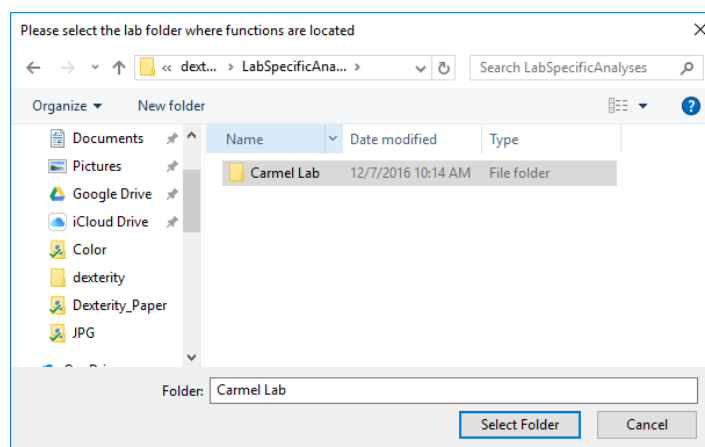
1. Select “Custom” from the initial screen.



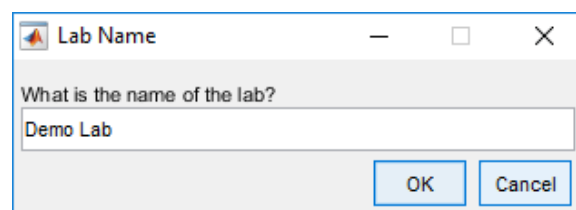
2. On initial startup, choose to add an existing lab or add a new lab.



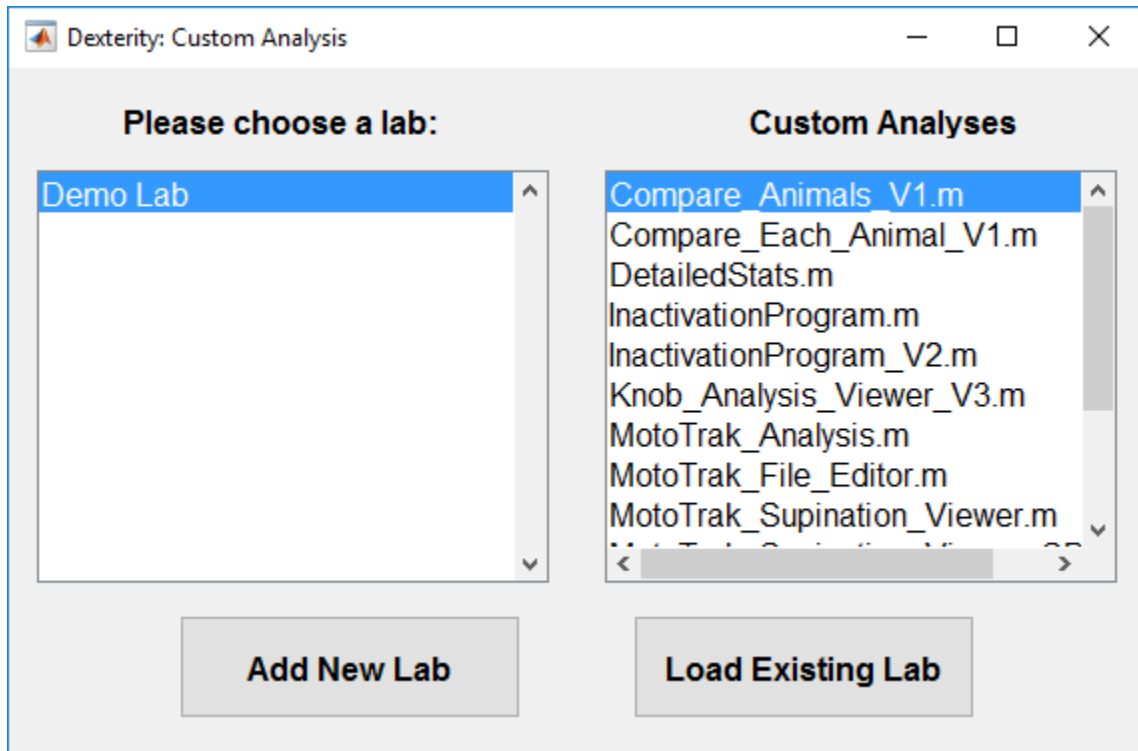
3. If “Load Existing” is selected, find the directory on the Master Repository and select the folder of the lab you want.



4. Or, select “Add Lab”. Add the name of the lab and select the directory, like in Step 3.



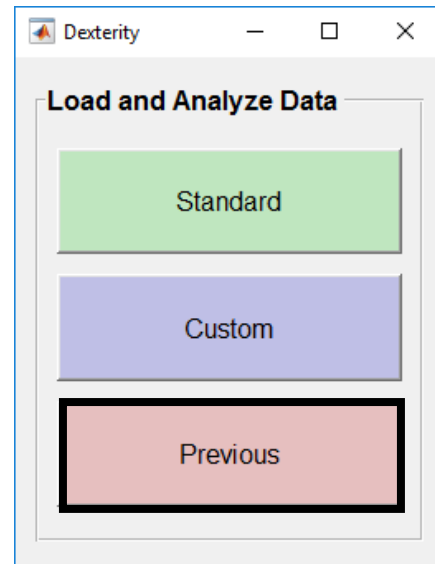
5. After loading or adding a lab, a separate GUI will open to access the different labs and their custom functions. Single click on functions to run them.



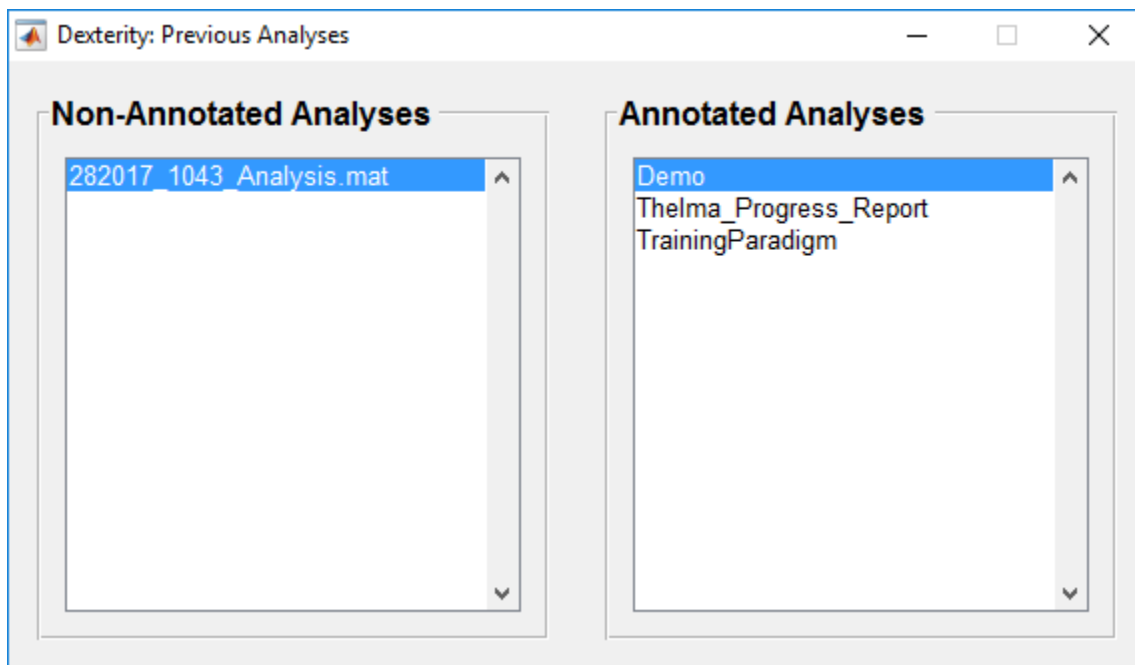
Click to go home.

Previous

1. Select “Previous” from the initial screen.



2. Select between Non-Annotated and Annotated Analyses. Single click to open a saved analysis.



Click to go home.