NASA-TLX Data Analysis Handbook

# Quick Start

1. Create excel document
   1. Following the template provided, transfer paper scores to excel
   2. Save excel file in the location that you would like all corresponding data for the participant to be saved in
2. Open script excel2mat
   1. Change subID to fit the current participants data
   2. Check to make sure the file location is correct
   3. Run script
3. Open script compileData
   1. Change subjects to reflect the data you would like to analyze
   2. Check all file locations are correct
   3. Run script
4. Open script Graphs
   1. Run script

# In-depth explanation of each document

### excel2mat

This script turns the excel file into a MATLAB file.

1. Manually enter subject ID
2. MATLAB creates a variable called filePlace, which holds the location of the excel file
3. The location of the excel file is passed through the function enterData
   1. See enterData for more information
4. The variable subjectData is returned from the function
5. subjectData is saved as a MATLAB file in the same location as the original excel file

### enterData

This function loads data from an excel file and creates a table using the data

[subjectData] = enterData (filePlace, subID)

Inputs:

* filePlace: The location of the excel file
* subID: The subjects ID

Outputs:

* subjectData: A structure that contains the both the scores and weight from the participant

1. filePlace and subID are passed into the function
2. The excel file is loaded and read into a table in MATLAB
3. The table is broken up into two parts, the score and weight
4. The weights are tallied and counted
   1. A warning is issued if the weights do not add up to 15. A suggestion to check spelling of weights appears
5. Weights are reorganized to create an array that has an identical size to the score array
   1. This is accomplished by separating the standAndAlphabet2or3 into standAndAlphabet2 (stand 2) and standAndAlphabet3 (stand 3). walkAndAlphabet2or3 is also separated into walkAndAlphabet2 (walk 2) and walkAndAlphabet3 (walk 3)

Note: Stand 2 and stand 3 weights are identical. Walk 2 and walk 3 weights are identical.

1. Scores and new weights are turned into separate tables with appropriate labels stored under a new structure variable called subjectData
2. subjectData is passed out of the function

### complieData

This script gathers individual participant’s data into a group for later analysis

1. Manually enter which participants you want included in the analysis
2. Check to ensure data is being loaded from the correct place
   1. This includes subjectData, fNIRS, and alphabet related data
3. MATLAB loads the individual data from subjectData using the list of specified participants into a new structure labeled AUF. This structure holds the information for every participant.
   1. At this time, an array is created with the specified participants. This is later used as a legend in Graphs
4. Individual data is loaded from DTdata. fNIRS, alphabet rate, and walk speed are stored in separate arrays
5. Data is rearranged to be in same order as the weight and score arrays
6. The data is transferred from the separate arrays into the appropriate spot under AUF
7. The data is transferred out of AUF into the appropriate subcategories
   1. Example: The variable mental now contains only the mental demand score with the subID representing the rows and task representing the columns
8. Using score and weights both unweighted and weighted workload is calculated and stored as a subcategories
9. While subcategory arrays are not saved, they are used in Graphs

### Graphs

This script graphs the workload and its various comparisons. It also calculates all the necessary correlations.

1. Create a list of tasks that will be used appropriately later
2. Load ColorOrderNirsAutomaticity
   1. See ColorOrderNirsAutomaticity for more information
3. An array, ColorOrd, is created. It contains a list of colors that is matched to one participant. This allows for better comparison across graphs and across different analyses
4. ColorOrd is set as the default list of graphing colors
5. A series of bar graphs are created. They depict the weighted workload, unweighted workload, and all six subscores
6. A series of comparisons are made with Alphabet rate in the four different tasks against the 8 different categories for workload (weighted workload, unweighted workload, and all six subscores).
   1. This is accomplished by plotting each point individually for every subplot. The purpose of this is to be able to have each point correspond to the color assigned to the participant.
   2. Walk is not included in the list of tasks because no alphabet is repeated during this time
7. A series of comparisons are made with fNRIS in all five tasks across all 8 workloads
   1. Created in the same manner as stated previously
8. A series of comparisons are made with walk speed vs workload scores
   1. Created in the same manner as stated previously
   2. Only the walking tasks are included, all 8 workloads are included
9. A series of comparisons are made between change in walk speed vs workload
   1. Created in the same manner as stated previously
   2. Change in walk speed is calculated by subtracting walk 2 or 3 from walk
   3. All 8 workloads are included
10. A series of comparisons are made between change in alphabet rate and workload
    1. Created in the same manner as stated previously
    2. Change in walk speed is calculated by subtracting stand 3, walk 2, and walk 3 from stand 2
    3. All 8 workloads are included
11. A test for normality is run using the kstest function
    1. The results for this test are stored in a struct called results under the field named norm
12. The correlation statistical test is run for all comparisons using the corr function for both Spearman Pearson
    1. The results for this test are stored in a struct called results under the field that describes the comparison
       1. Example: Weighted workload vs Alphabet rate is stored as results.workloadVsAlphabet.wwsVsAlphabet

### ColorOrderNirsAutomaticity

This script calls a variable with a set list of colors assigned to the participants in numerical order

### AUF00V00TLXTemplate

A template that demonstrates how the participants score should be transferred to an excel sheet.

The first sheet, “Template”, shows the first 5 columns are the numerical ratings of each task by workload subcategories. The next three columns are the words representing which subcategory the participant thought was more important when providing the ratings.

This document also contains a second sheet labeled “Example.” The sheet demonstrates how the rating should be transferred to the excel sheet.

### Old scripts

A folder that contains old scripts. Kept for documentation only.

### Extra graph scripts

A folder that contains old graph scripts. These scripts have been modified beyond recognition to likely display one or two specific charts.