The purpose of these scripts is to directly generate .PRN files from the output files of the TCD-DWL device and the fNIRS channels folder. Detailed instructions on how to adjust parameters in case of changes in the experimental protocol/set-up are included within the scripts. In the section Usage of the ReadMe file there are also some basic instructions on how to set up Matlab in order to run the script.

The TCD code has undergone testing on multiple files, successfully resolving major issues. There may be some unresolved cases for the fNIRS files since it has yet not been tested extensively. Please report to francigelpi@gmail.com any instances where the script fails or does not function correctly, so I can improve it.

**Usage:**

* Download and instal Matlab (<https://uk.mathworks.com/help/install/install-products.html>)
* Download the folder **automat**
* Ensure MATLAB is configured correctly by adding the folder with the scripts (automat) to the Matlab path. (https://www.youtube.com/watch?v=k6d2U77qCoE)
* Run the script in MATLAB only after setting the necessary inputs (paths and optional imputs).

**For TCD data :**

**AUTOMATIZATION of the PRE-PROCESSING OF .exp FILES to .PRN**

**TCD\_from\_exp\_to\_prn.m**

This script TCD\_from\_exp\_to\_prn.m is designed to automate the pre-processing of .exp files to .PRN format. Below are the details of the script:

**General Information:**

* **Purpose:** Automate the pre-processing of data in .exp files to .PRN format.
* **Functionality:** Each step can be run separately, and input folders can be modified manually.
* **Input Required:** The only mandatory input is the PATH\_EXP where the .exp files are stored.

**Instructions:**

1. **SET YOUR INPUT FOLDERS:** Modify the PATH\_EXP variable to specify the folder where the .exp files are stored.
2. **OPTIONAL INPUTS:** Additional paths can be specified for saving .csv and .prn files. (remove the % in front of the variable)

**Steps Involved:**

1. **Conversion to .CSV:** .exp files are converted to .csv format and saved in the TCD\_CSV folder.
2. **Formatting .CSV Files:**
   * **Add Time Column:** A time column is added based on the sampling frequency and a specified column. The files are saved in the folder TCD\_CSV\_TIME.
   * **Split According to Marker:** Files are split based on marker columns and specified time intervals. The files are saved in the folder TCD\_CSV\_SPLIT.
   * **Select Columns and Save as .PRN:** Columns are selected, ordered, and saved in .PRN format with specified integer and decimal formats. The files are saved in the folder TCD\_PRN.

**For fNIRS data :**

**AUTOMATIZATION of the PRE-PROCESSING OF fNIRS folder to .PRN**

**NIRS\_from\_folder\_to\_prn\_unsplit.m**

This MATLAB script is designed to automate the pre-processing of fNIRS data stored in a specified folder. The script generates a .prn file as output, which is saved in a designated output folder. Please note that this script does not split the file into tasks; for that functionality, you should use the script named split\_NIRS\_from\_TCD.

**General Information:**

* **Purpose:** Automate the pre-processing of data in the folder to .PRN format.
* **Functionality:** Input folders can be modified manually and the name of the .prn file can be set.
* **Input Required:** The only mandatory input is the PATH\_NIRS where the .csv files are stored.

**Instructions:**

1. **SET YOUR INPUT FOLDER:** Modify the PATH\_NIRS variable to specify the folder where the .csv files for one recording are stored. This is the only required input.
2. **OPTIONAL INPUTS:** The name of the output .prn file and the folder where to save it can be set. If not manually inserted, the script will generate a .prn file with the same name as the original folder in a default folder one level above.

**Steps Involved:**

* **Collection of data from different .CSV:** .csv files are opened and collected in one matrix. The first column of the matrix is always from ‘Timing.csv’; the others are ordered in alphabetical order.
* **Formatting .CSV Files:** Thematrix is saved in .PRN format with specified integer and decimal formats. The file are saved in the folder PATH\_NIRS\_PRN\_unsplit or the one define as outpulFolderPath .

**AUTOMATIZATION of the SPLITTING of fNIRS .PRN files base on TCD markers timing**

**split\_NIRS\_from\_TCD.m**

This MATLAB script is designed to extract specific time intervals from a NIRS (.prn) file based on markers from a corresponding TCD (.csv) file. If multiple markers are present in the TCD file, the script splits the NIRS data into sub-files accordingly. If no markers are present (as baseline data), the scripts saves the same .prn file of the NIRS adding the code RB at the end of the file name.

**General Information:**

* **Purpose:** Automate the splitting of data in the file .PRN without markers (fNIRS).
* **Functionality:** The names of the .prn fNIRS file and .csv TCD files must be set with also their corresponding paths. The output folder can be added manually.
* **Input Required:** The mandatory input are PATH\_NIRS, FILE\_NIRS, PATH\_TCD and FILE\_TCD.

**Instructions:**

* **SET YOUR INPUT FILES:**
  + Modify the PATH\_NIRS variable to specify the folder where the .prn file for the recording is stored, and FILE\_NIRS to specify the name of the fNIRS file that you want to split.
  + Modify the PATH\_TCD variable to specify the folder where the .csv unsplitted file for the recording is stored, and FILE\_TCD to specify the name of the TCD file that correspond to the fNIRS you want to split. Note that the TCD file is the .csv not-split and with the time column (usually in folder names TCD\_CSV\_TIME).
* **OPTIONAL INPUTS:** The folder where .prn split files will be saved can be set. If not manually inserted, the script will generate a folder named ‘PATH\_NIRS\_split’ in a default folder one level above PATH\_NIRS.

**Steps Involved:**

* **Collection of start and end time from .CSV TCD data:** .csv files are opened and the time corresponding to the start and end of each task are collected.
* **Corresponding timing on fNIRS:** given the start and end found in the TCD, the corresponding values are selected in the fNIRS matrix.
* **Formatting .PRN Files:** Thematrix is saved in .PRN format with specified integer and decimal formats. The file are saved in the folder ‘PATH\_NIRS\_split’ with the previous name+marker.
* **Printing check:** In the Command Windows the script prints out the start and end time of each marker. Please check it carefully since there might be mistakes in the way the marker were recorded.