User Guide for MATLAB App and Code

This supplemental document provides a user guide for the MATLAB App and ac-companying code developed for the calculation of the 3-item Health Index (HI). The App and code are available on GitHub, and this guide outlines the installation process of the App in MATLAB, as well as instructions on how to provide the required data to the App for analysis.

1. Installing the MATLAB App

To install the MATLAB App for the 3-item HI, please follow the steps below:

1. Ensure that you have MATLAB installed on your computer (version R2018a or later).
2. Clone or download the App repository from the provided GitHub link (https://github.com/SilvinPKnight/3ItemHealthIndexCalculator).
3. Extract the contents of the downloaded ZIP file to a desired location on your computer.
4. Navigate to the directory where the extracted App files are located and double click the '*3-Item Health Index Calculator.mlappinstall*' MATLAB App Installer file; this should launch MATLAB and provide the option to install the App.
5. To launch the 3-Item Health Index App, navigate to the '*APPS*' tab in MATLAB, locate and click on the '*3-Item Health Index Calculator*' button; this should launch the App (shown in Figure 1).

2. Providing Data to the App

The MATLAB App requires the following data files in .csv format:

BtB sBP Data

The BtB sBP data should be provided as two separate NxM matrices. Each matrix represents a different aspect of the data and should be uploaded to the App individually. The rows of the matrices represent individual participants, while the columns contain the data values.

- Matrix 1: Contains the absolute values of systolic blood pressure (sBP; mmHg) at each beat.
- Matrix 2: Contains the corresponding time point values for each beat (milli-seconds (ms)).

Please ensure that the matrices are properly formatted with the correct dimensions, and the values are accurately represented.

SART Data

The SART data should be provided as a single Nx207 matrix. Each row represents a participant, and each value within the row represents the reaction time (RT) in ms for each trial of the SART task. Please ensure that the matrix is correctly formatted and contains the accurate RT values for each participant.

Usual Gait Speed Data

The usual gait speed data should be provided a single column vector (Nx1), where each value represents the gait speed in centimeters per second (cm/s) for each individual participant. Please ensure that the vector is properly formatted and contains the correct gait speed values for each participant.
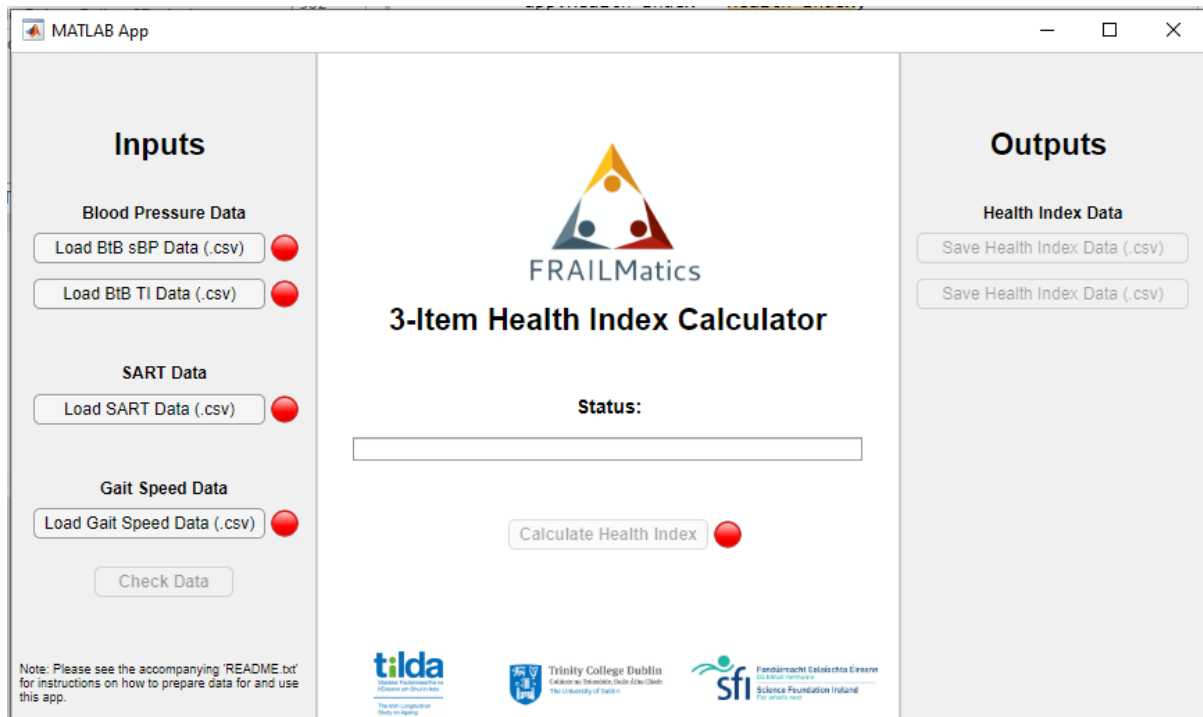
Figure 1. Graphic user interface (GUI) for 3-Item Health Index (HI) MATLAB App.

3. Additional Instructions

- Before running the App, double-check that the data files are in the appropriate format (see above).
- Launch the App by clicking the "Run" button in the App Designer interface.
- Follow the on-screen instructions and prompts to load the BtB sBP, SART, and gait speed data into the App.
- The App will then perform the necessary calculations and generate the 3-item HI score for each participant based on the provided data. It will also provide the risk-stratified groups, coded as follows: 0, Low-Risk; 1, Medi-um-Risk; and 2, High-Risk.
- The results can be downloaded in .csv format within the App's interface.

4. Example Data

To assist users in understanding the data requirements and format for running the MATLAB App and code, simulated example data is provided on the GitHub repository. The example data serves as a reference and can be used to test the functionality of the App and code, as well as troubleshoot any potential issues that may arise. The example data is available in the form of CSV files that represent 10 fictious individuals, which can be easily loaded into the App for analysis. The following files are included:

- " example_sBP_BtB_values.csv": This file contains the sBP absolute values at each beat in mmHg. Each row represents the data for an individual participant, with the sBP values listed sequentially.
- "example_sBP_BtB_timepoints.csv": This file contains the corresponding time points for each sBP beat in ms. It enables the synchronization of the sBP values with the respective time intervals. Similar to the previous file, each row corresponds to a participant, and the time point values are listed sequentially.

- "example_SART_data.csv": This file contains the SART data. Each row rep-resents a participant, and the columns represent the reaction time values in ms, listed sequentially for each of the 217 SART trials.
- "example_gait_speed.csv": This file contains the usual gait speed data. It is structured as a single column vector, where each value represents the gait speed in centimeters per second (cm/s) for an individual participant.

By referring to the example data, users can gain insights into the expected data for-mat, column organization, and overall structure required for successful execution of the MATLAB App and code. Furthermore, the example data serves as a troubleshooting aid, allowing users to compare their own data format and identify any discrepancies or issues that may arise during the data loading process.

Note: The example data is intended solely for illustrative purposes and does not represent actual participant data.

5. Troubleshooting

If you encounter any issues or have questions regarding the installation process or data requirements, please refer to the README file provided in the GitHub repository. Additionally, feel free to reach out to the developers for assistance by creating an issue on the GitHub repository page.

7. Conclusion

This user guide has provided instructions for installing the MATLAB App and loading the required data for the 3-item HI calculator. By following these guidelines, researchers and practitioners can effectively utilize the App and code to calculate the 3-item HI based on BtB sBP data, SART data, and usual gait speed data. We hope that this user guide, along with the MATLAB App, will contribute to advancing health assessment methodologies and provide valuable insights into the prediction of health out-comes. Should you have any further questions or require assistance, please refer to the provided contact information or the GitHub repository for support.

Note: The App is provided "as is" and users are responsible for ensuring the suitability, accuracy, and appropriate use of the tools for their specific research or clinical purposes.