MotionSynthesis Toolset (MoST) User Guide

Diary Generation Tools

The Diary Generation tools allow the user to create a diary of motions. To start the tool go to the location where the tool is installed and to folder *MoST/Tools/bin*, double click **DiaryGenerator.exe** file in the folder.

Graph Panel

The Graph Panel is a tool that loads a file which allows the user to visualize the set of movements and the relationship between the movements.

1. In graphical user interface (GUI) that appears, click the "**Load from File**" button to load the "generated_graph" file.
    a. After the graph appears, the nodes can be rearranged as the user desires.
2. Click the "**Compose Sequence**" button to start the Diary Generato

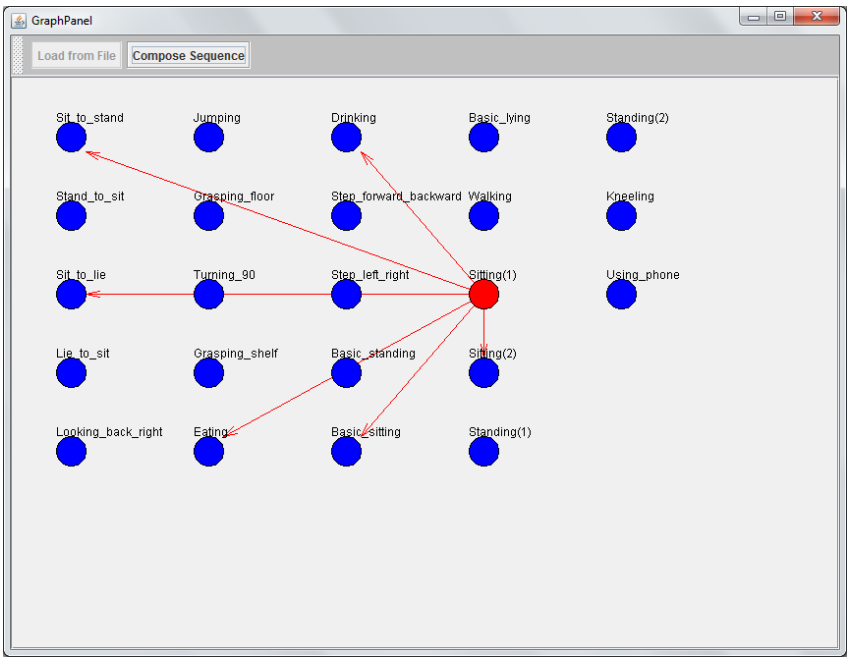

Figure 1: Graph Panel interface.

Diary Generator

The Diary Generator is the tool used to create the sequence of movements (i.e. diary).

1. Enter a diary name into the pop up window and click the "**OK**" button. Do **not** include '.txt' in your file name *Note: If no name is selected, the diary name will default to Untitled.txt.*

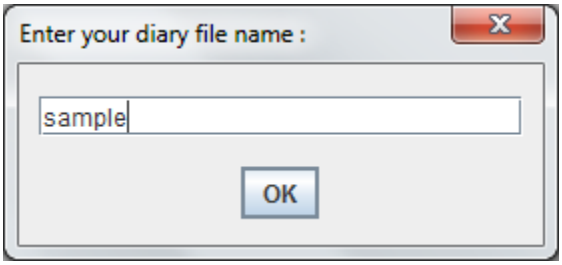

Figure 2: Diary Name pop up window.

2. The main Diary Generator GUI will open with the following controls.
    a. New Diary – Start a new diary with a new name
    b. Start Diary – Starts allows selection of diary options and protagonist
    c. Save Diary – Save the diary file when complete
    d. Restart Diary – Restart the current diary with the same name. progress is lost.
    e. Close Tool – Close the tool.

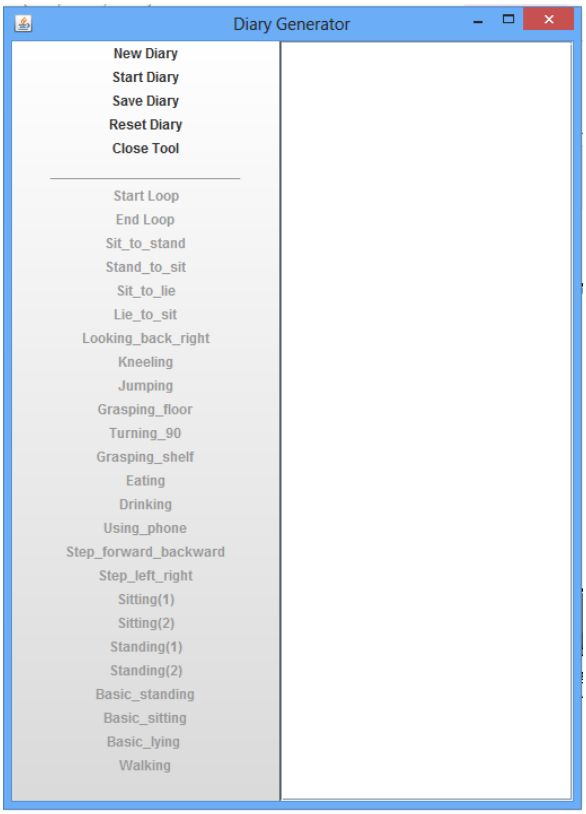

Figure 3: Diary Generator GUI.

3. Click "**Start Diary**" to begin a new diary.
4. In the "**Start Diary**" menu, Sensor Modalities (*i.e.* accelerometer & gyroscope axes), Body Part Monitored (*i.e.* sensor locations), and the Protagonist (*i.e.* subject or category)

can be selected. Once the Protagonist is selected, the diary begins. *Note: Hour and Minute can also be selected, but this functionality is currently unused.*

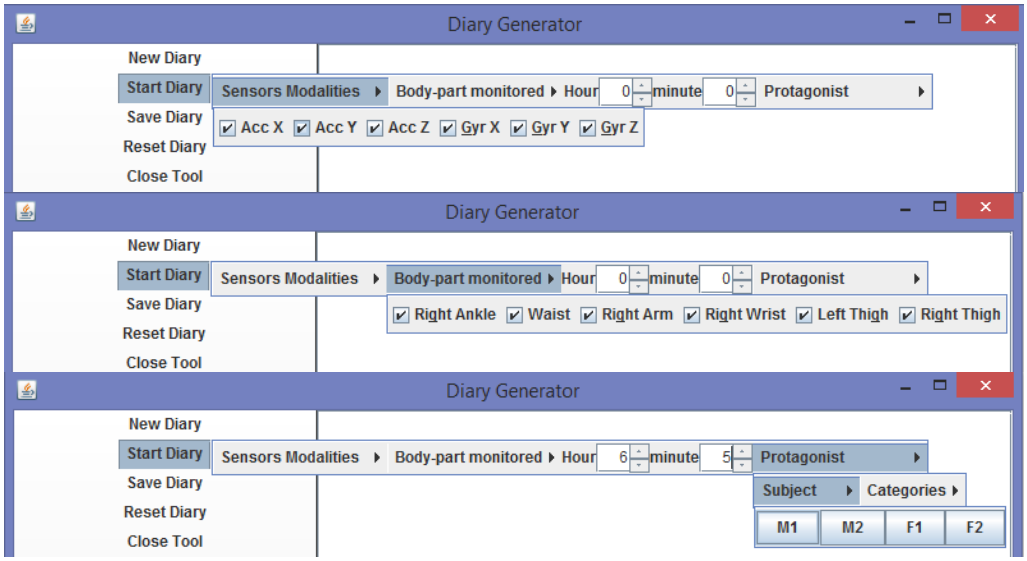

Figure 4: Start Diary submenus and selections.

5. Once the diary is started, all movement options will be available for selection.

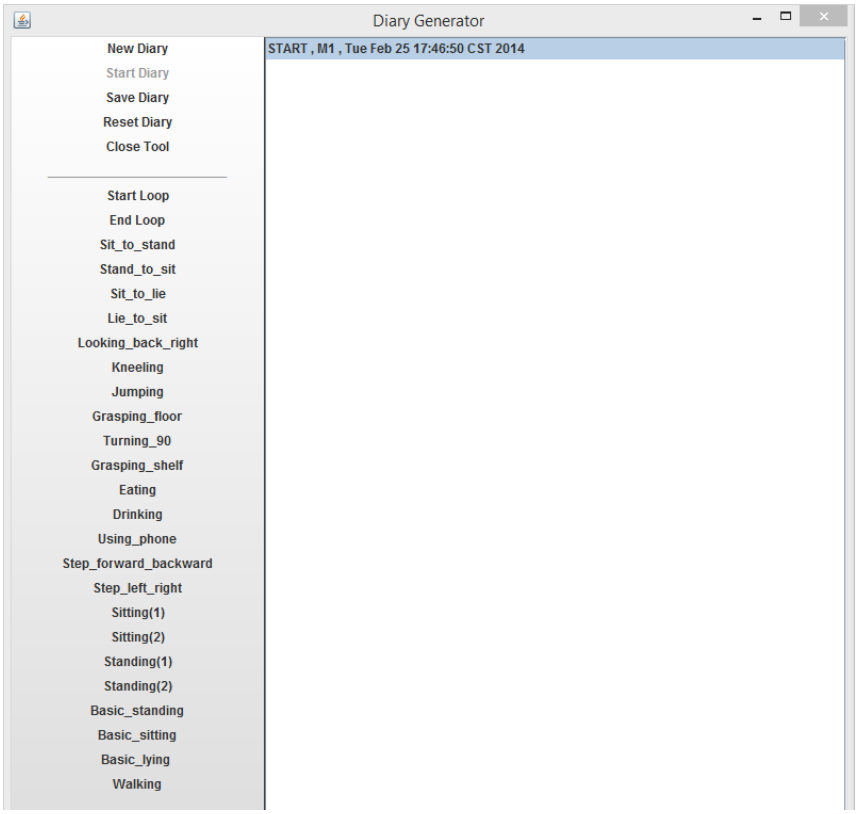

Figure 5: Diary Started. All movements are available.

6. When selecting movements, the options can be selected using the radio buttons. Click the button with the movement name to confirm the movement. The selected movement with options will be added to the panel on the right.
    a. Mode
        i. Best – Selects the first capture of the movement from the selected subject
        ii. Random – Selects a random captures of the movement from the seleced subject
    b. Duration – Selects the length of time for the movement in the synthesized data

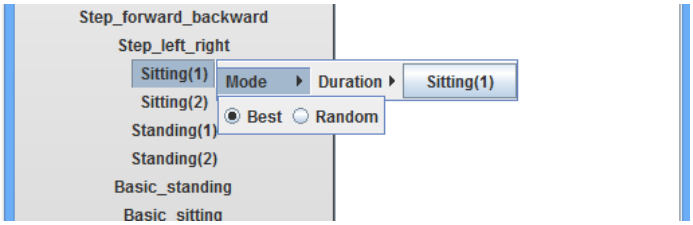

Figure 6: Movement selection.

7. Loops can be started by clicking the "**Start Loop**" menu item, selecting the number of iterations and clicking the "**Loop"** button. *Note: Each loop has a maximum of 30 iterations, and there is a maximum of 5 nested loops.*

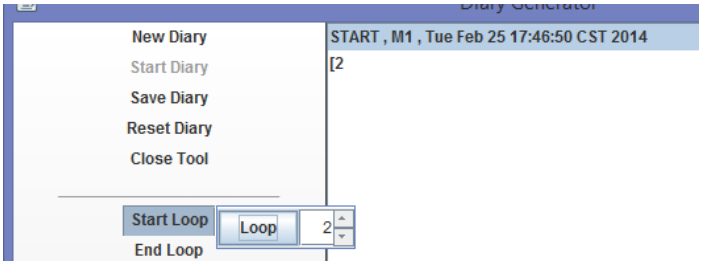

Figure 7: Starting a loop.

8. Once a loop is started, movements can be selected as described in step 6.
9. To close a loop, click the "**End Loop**" menu item and click the "**End Loop**" button. *Note: The posture (i.e. sitting, standing, lying) at the end of a loop must match the posture at the beginning of a loop. All loops must be closed before saving a file*

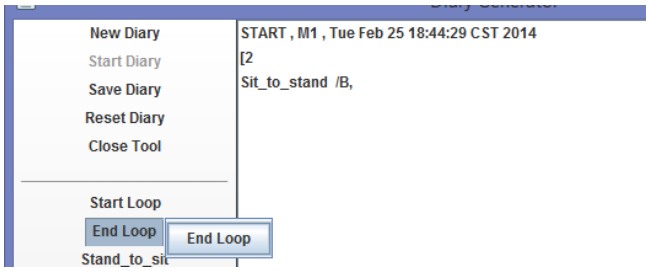

Figure 8: Ending a loop.

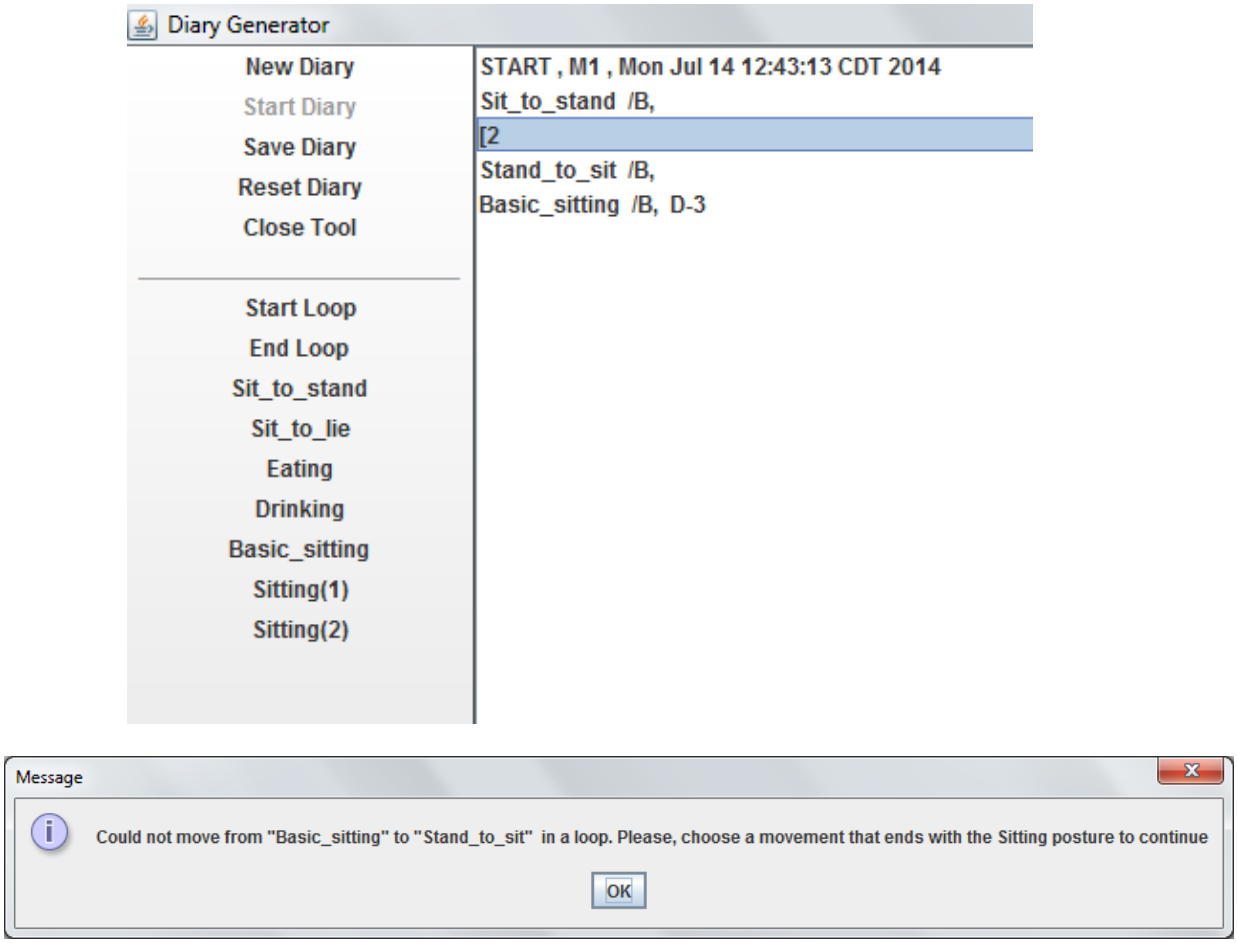

Figure 9: Message received if Loop starting and ending posture do not match

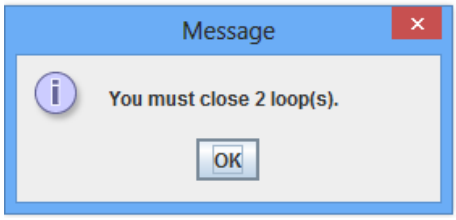

Figure 10: Message received if there are unclosed loops when trying to save the diary

10. Once the sequence of movements has been completed, click the "**Save Diary**" menu item and the "**Save**" button to save the diary

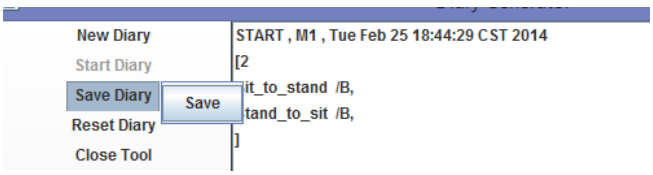

Figure 11: Saving the diary.

9. After you click “Save” button, a message will pop out reminding you the diary is created.

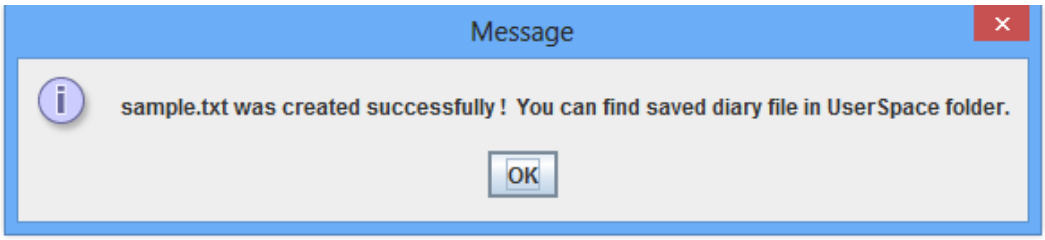

Figure 12: Message showing that the diary is saved.

```
START , M1 , Tue Feb 25 18:44:29 CST 2014

[2
Sit_to_stand   /B,
Stand_to_sit   /B,
]
STOP!  * 0:0{Right Ankle, Waist, Right Arm, Right Wrist, Left Thigh, Right Thigh, }  <Acc X, Acc Y,
Acc Z, Gyr X, Gyr Y, Gyr Z, >
Note : Use Matlab Synthesis tool under Tools/MATLAB Folder
```

Figure 13: Diary output file.

Data Synthesis Tool

The Data Synthesis tool reads in the diary file and generates the output sensor data based on the selections in the diary file. *Note: Matlab is required to use the Data Synthesis Tool.*

1. There are two ways to start the DataSynthesis tool.
    a. Open Matlab. Within Matlab, navigate to *MoST/Tools/MATLAB.* At the command prompt (i.e. >>), type DataSynthesis
    b. Open Matlab. In Windows explorer, navigate to *MoST/Tools/MATLAB*. Right click DataSynthesis.m, and select "Run" from the menu.
2. When the script begins, a file selection screen will pop up. Select the desired diary text file for synthesis.

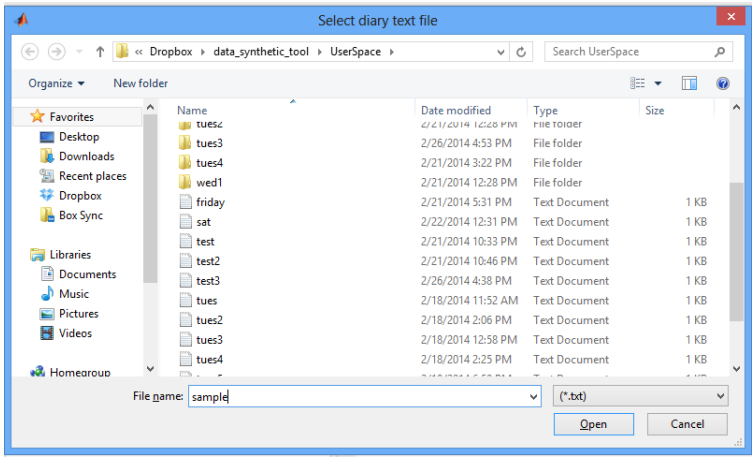

Figure 14: Diary text file selection window.

3. Once the file is selected, the outputs will be synthesized. When the synthesis completes, a notification will pop up. *Note: The run time of the Data Synthesis tool is dependent on the size of the number of movements, number of nodes selected, and the number and depth of loop in the diary file.*

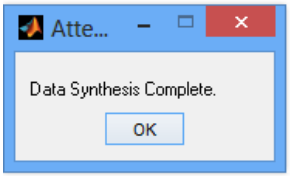

Figure 15: Data Synthesis complete message.

4. The Data Synthesis Tool creates a folder in the UserSpace with the same name (for example *Diaryname*) as the diary. The following output text files can be found in this folder. *Note: The sensor files are only available for the sensors selected in the diary file.*
    a. *Diaryname_sequence* – Sequence of database files used to create the synthesized data

b. *Diaryname_annotation* – Annotation information for the end of the movements in the diary data
c. *Diaryname_n01* – Datafile for right ankle sensor.
d. *Diaryname_n02* – Datafile for waist sensor.
e. *Diaryname_n03* – Datafile for right arm sensor.
f. *Diaryname_n04* – Datafile for right wrist sensor.
g. *Diaryname_n05* – Datafile for left thigh sensor.
h. *Diaryname_n06* – Datafile for right thigh sensor.

Data Visualization Tool

The data visualization tools shows synthesized data along with video of the recorded movements. *Note: Please see the README file in the Support folder for necessary video codecs for this tool.*

1. There are two ways to start the Visualization tool.
    a. Open Matlab. Within Matlab, navigate to *MoST/Tools/MATLAB.* At the command prompt (i.e. >>), type Visualization
    b. Open Matlab. In Windows explorer, navigate to *MoST/Tools/MATLAB*. Right click Visualization.m, and select "Run" from the menu.
2. When the script begins, a file selection screen will pop up. Select the desired *diaryname_sequence* text file for visualization from the related folder.

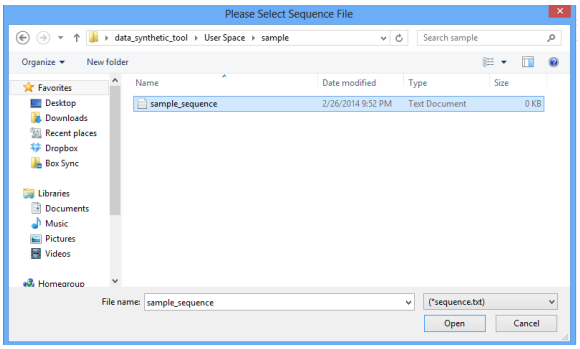

Figure 16: Sequence file selection window.

3. When the file is selected, the tool reads the related videos and opens a GUI with a video area in the upper right corner, and plots for each sensor modality selected in the diary file. Each specific sensor shows up as a different color on the plot. *Note: If any data necessary visualization data is missing, a pop up will appear and a file will be written identifying the missing data. Most likely, video files need to be downloaded.*

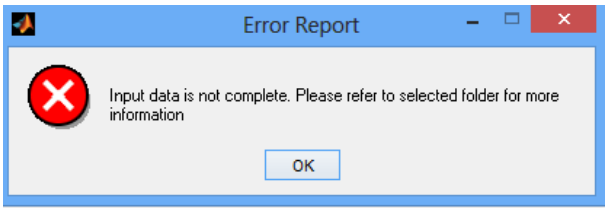

Figure 17: Message for missing visualization data.

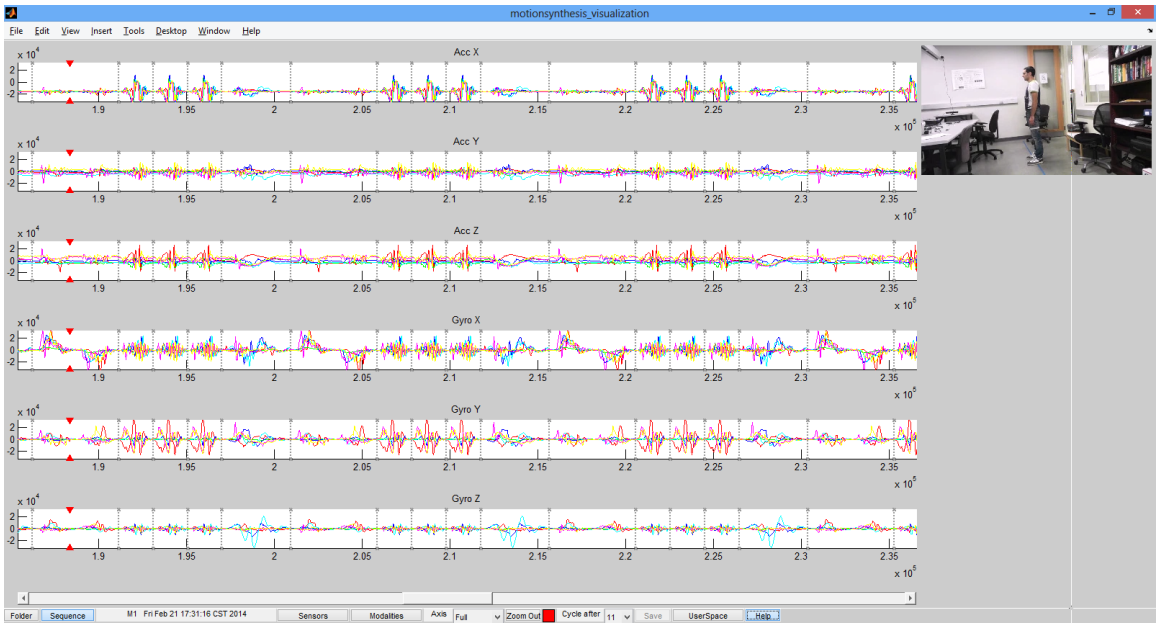

Figure 18: Data Visualization Tool

4. The Data Visualization Tool has the following functionality in the lower menu.
    a. Folder button: Open Standard windows explorer navigator.
    b. Sequence button: Allows the selection of a new sequence file for visualization
    c. Sensors button: Allows selection of which sensors to see on the plots.
    d. Modalities button: Allows selection of sensor modalities.
    e. Axis Option: Determines the vertical resolution of the plots
    f. Zoom out button: Zoom all plots to full scale
    g. Cycle after option: Determines the number of colors used for annotations.
    h. Save button: Save annotation file.
    i. Help button: Opens a help file with shortcuts and commands for tool.
5. Hot-key Functions:
    a. Select data position and related frame: Left click mouse on data plot.
    b. Zoom: Shift + Highlight with left mouse button held.
    c. Add annotation: Right click mouse on data plot or press space.
    d. Delete annotation: Hold “d” key and highlight with right mouse button held.
    e. Move to previous frame: Left arrow key.
    f. Move to next frame: Right arrow key.
    g. Move to previous sample: Shift+Left arrow key.
    h. Move to next sample: Shift+Right arrow key.
    i. Play video: Up arrow key.
    j. Play video slowly: Down arrow key.