This guide shows how to go from raw accelerometry and sleep diary data to the GGIR Output. Use output 4 or 5 depending on if you want sleep data or physical activity data.

Specific files created by MK (8/2023)

GGIR_No_Sleep_Diary - This file is the GGIR run that does not utilize the sleep diary. It used GGIR's own algorithm to detect sleep based off the raw accelerometry data. I thought this could be useful because there is a lot of poor data in the self reported sleep diary file (ex one person listed the same bed time every day but the manual analysis showed that data to be incorrect). The activity level cutoffs for this file are 45-101-429.

GGIR_Output_BaseCutoffs - This file uses the process below which takes Actisleeps sleep duration output and then forces that as GGIR's sleep window. GGIR then analyzes the raw accelerometry data to detect physical activity outside of the sleep window. The activity level cutoffs for this file are 30-100-400.

GGIR_Output_AltCutoffs - This file uses the process below which takes Actisleeps sleep duration output and then forces that as GGIR's sleep window. GGIR then analyzes the raw accelerometry data to detect physical activity outside of the sleep window. The activity level cutoffs for this file are 45-101-429.

Inputs:

1) Raw Accelerometry AGD files
2) Raw Accelerometry GT3X files
3) Sleep Diary

Outputs:

1) Physical Activity Summary (3 versions described above)

Interim Outputs:
1) Actisleep Output
2) GGIR Output

Process:
1) Start with the Inputs listed above
2) Put raw Sleep Diary input into **CleanDiary.R** R file
   a) Manually go through and make updates to the R code for errors, most commonly we find AM/PM errors and typos. The R code will likely error out to help identify these

b) A step of this code is imputation, if too much data is missing that person must be removed as imputation will not be possible

c) This output goes into Actisleep to be the diary input

3) Run Actisleep (**ActisleepExampleRun.R**)
   a) The R files output will then be used as the sleep diary for Actisleep (as an input)
   b) Load all AGD files in to the proper folder (identified in Actisleep)
   c) Run Actisleep
   d) Note, this may fail if data is missing at the start or end, if it fails the run will end and will need to be manually restarted after removing the bad file. Margaret plans to look into this error, it is related to an underlying R package being used.
      i) For manual restart the loop starting on line 74 needs to be adjusted to the appropriate number. ex) if #20 failed then set i = 21 so 20 is bypassed and the new data will be added to the table.

4) Grab Actisleep Output and do manual Update
   a) Use the excel file to search for days of under 3 hours and over 16 hours of sleep (these are likely, but not necessarily error)
   b) In the cases identified above, use this r shiny app (https://jongguri.shinyapps.io/manualanalysis/) to manually identify sleep, look for floor across the 3 axis.
   c) Update the files and highlight all updates as well as rename the files (so we don't lose data)

5) Run manual update through the R file **DiaryConversion_ActisleeptoGGIR.R** to get the GGIR sleep diary input.

6) Convert GT3X files to csv files
   a) Run the R **file gt3x_conversion.R** to convert all GT3X files to csv files. Note, this may require a lot of storage and may have to be done in batches. Some files will error out, first try to run again, if they fail due to a size issue then the data may just be lost but over 99% should be possible to convert.

7) Run GGIR
   a) Use the code file **GGIR_Run.R**
   b) Look at line 77 to get the parameters that are desired (currently using 45-101-419) for light, moderate, and vigorous physical activity
   c) Load all CSV files into a specific folder identified by the datafir (line 32) variable in GGIR
   d) Load sleep log to the loglocation (line 30) variable.
   e) Set output path to desired location (line 31)
   f) Run GGIR (May need to use cluster depending on number of files and file size)

8) GGIR Outputs will be saved to the identified output directory

9) Summarize r file **PostOutput_DataOrg.R**
   a) Load GGIR file output from Part 5 day summary to the input.
   b) Can update based used variables, the below link shows what is available
      i) https://cran.r-project.org/web/packages/GGIR/vignettes/GGIR.html#43_Output_part_5
   c) Run the R code and the output should be the end result!