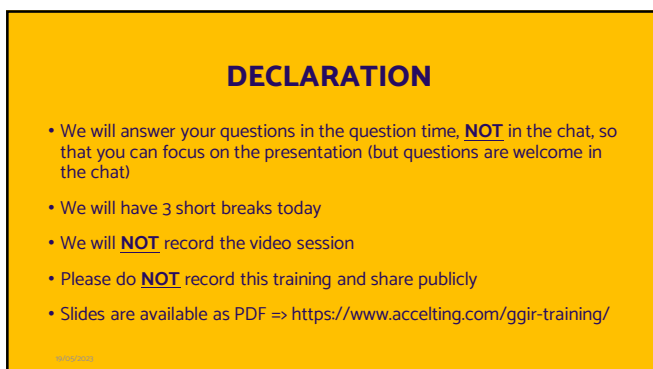




1



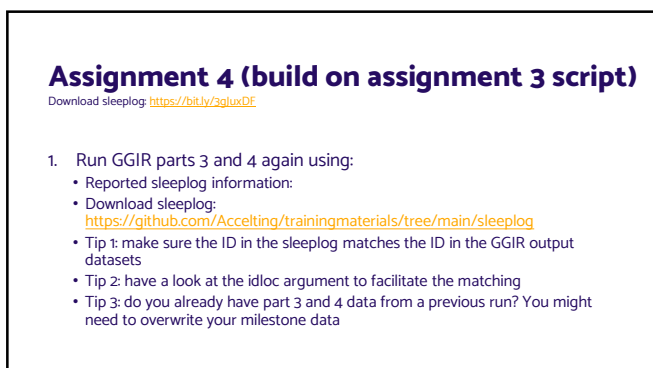
2



3



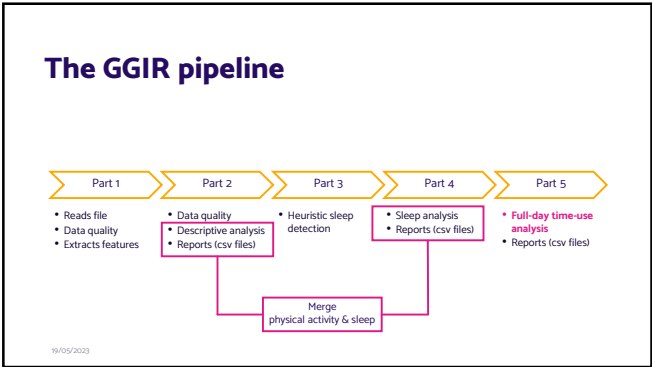
5



13



14



15

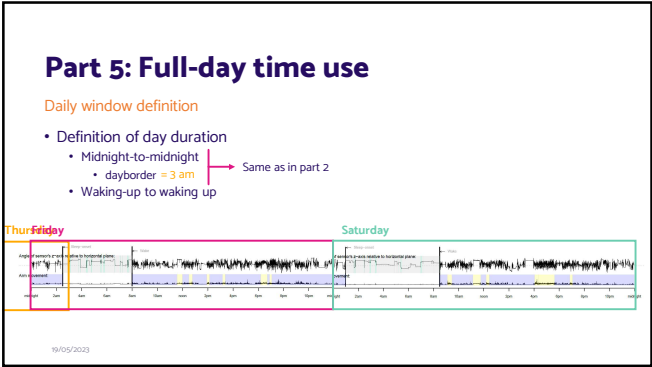
Part 5: Full-day time use

What it does

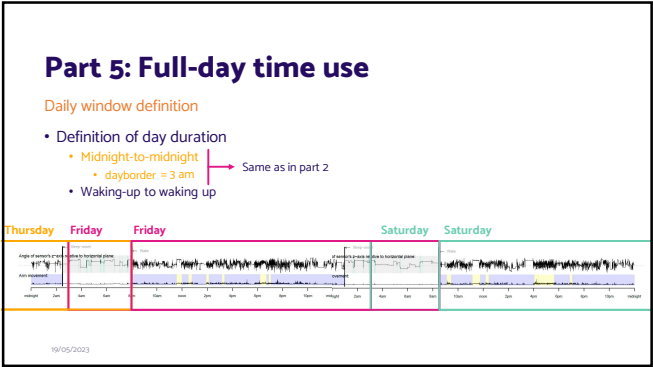
- Loads imputed acceleration data from part 2
- Loads sleep information from part 4 (SPT windows)
- Re-calculate variables based on the merged data (split by SPT & waking hours)
- Part 5 reports includes:
 - Daytime variables: physical activity intensities, inactivity
 - Nighttime variables: sleep indicators

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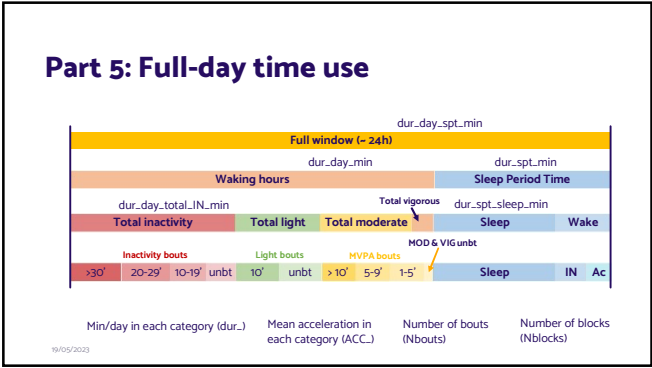
16



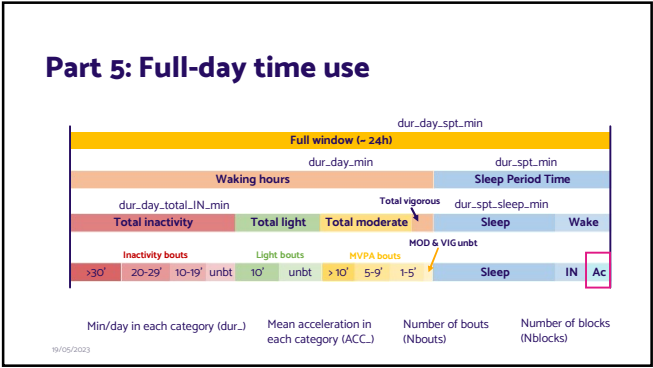
17



18



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Part 5: Full-day time use

Recalculated variables

- Average acceleration
- Bouts of MVPA

Why MVPA minutes do not exactly match in part 2 and part 5?

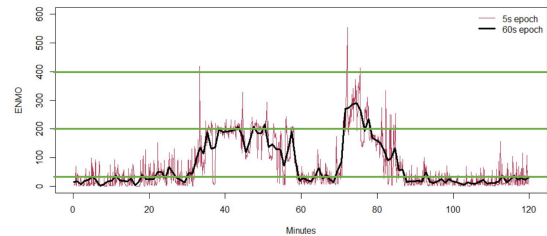
- Different window definition
- Activity minutes occurring during SPT
- Bouts calculation ↔ Full-day window definition
- Re-definition of epoch length? → `part5_agg2_60seconds = TRUE`

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Epoch length in part 5

GGIR[*# general settings*]
[...]
data quality and metrics
`window sizes = c(5, 900, 3600),`
`part5_agg2_60seconds = TRUE,`
[...]

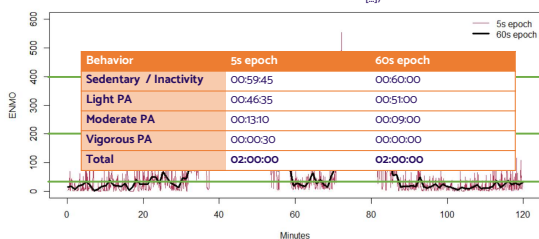


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Epoch length in part 5

GGIR[*# general settings*]
[...]
data quality and metrics
`window sizes = c(5, 900, 3600),`
`part5_agg2_60seconds = TRUE,`
[...]



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Part 5: Full-day time use

New variables (not in part 2)

- Inactivity
- Light physical activity
- Moderate physical activity
- Vigorous physical activity
- Bouts of inactivity and light physical activity

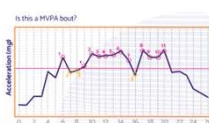
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The GGIR()

Full-day time-use analysis

GGIR[*# Physical activity and inactivity thresholds*]
`threshold.lig = 40, threshold.mod = 100, threshold.vig = 400,`
It can be more than one threshold
`threshold.lig = c(20, 40), threshold.mod = c(100, 120), threshold.vig = 400,`
Bout durations
`boutdur.in = c(10, 20, 30), boutdur.lig = 10, boutdur.mvpa = c(5, 10),`
Fraction of a bout that needs to meet the thresholds
`boutcriter.in = 0.9, boutcriter.lig = 0.8, boutcriter.mvpa = 0.8,`
[...]



What is the main purpose of part 5 in GGIR? (*Single choice*)

- ☐ To provide visualizations of the data
- ☐ To provide datasets for analytical purposes
- ☐ To clean the data that was analysed in parts 1 to 4
- ☐ To use sleep estimates to derive a more detailed analysis of daytime physical activity.



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What is the main purpose of part 5 in GGIR? *(Single choice)*

- ☐ To provide visualizations of the data
- ☐ To provide datasets for analytical purposes
- ☐ To clean the data that was analysed in parts 1 to 4
- ☒ To use sleep estimates to derive a more detailed analysis of daytime physical activity.

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Can you redefine the epoch length in GGIR part 5? *(Single choice)*

- ☐ No, this is done in part 1
- ☐ Yes, you can select the epoch of your interest in part 5 datasets
- ☐ Yes, but only aggregating to 60 seconds is supported in this phase of the pipeline

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Can you redefine the epoch length in GGIR part 5? *(Single choice)*

- ☐ No, this is done in part 1
- ☐ Yes, you can select the epoch of your interest in part 5 datasets
- ☒ Yes, but only aggregating to 60 seconds is supported in this phase of the pipeline

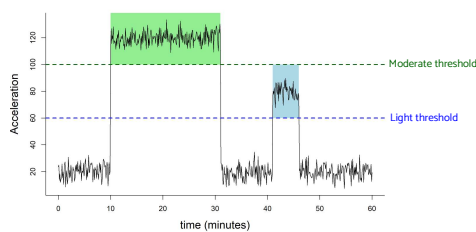
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Physical activity intensity: cut-points

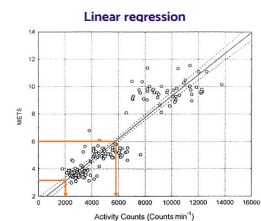
1. Time above threshold



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Physical activity intensity



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Part 2 and 5: Time spent in MVPA

- Traditionally threshold based => not perfect, but 'easy'
- Energy expenditure estimation should account for:
 - Body acceleration
 - Body weight (+ composition if possible)
 - Activity type
- Hundreds of publications tried to do better than threshold method, but remains difficult

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Why do we want to detect bouts

- Indicator of time spent in activities involving aerobic energy metabolism
- Consistent with historical self-report data
- To aid studying of fragmentation of behaviour

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Defining what a bout/sojourn is

1. What should the cut-point be?
2. What should the epoch length be?
3. What should minimum duration of bout (sojourn) be?
4. Should we allow for gaps in a bout (sojourn)?
5. Should this be a percentage of the bout duration, an absolute minimum in seconds, or both?
6. Are bout gaps counted towards the time spent in bouts?
7. Do the first and last epoch need to meet the threshold criteria?
8. In what order are the bouts extracted?
9. How many bout categories should there be?

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

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Implementation in GGIR

User decides on:

- Acceleration thresholds for light, moderate, and vigorous intensity
- Fraction of time for which cut-point criteria need to be met (light, inactive, MVPA)
- Bout duration ranges, e.g. [1, 5] [5, 10] and [10, ∞) minutes
- Epoch length

User does NOT decide on:

- Maximum bout gap of 1 minute
- First and last epoch need to meet cut-point criteria
- Number of intensity levels, which are always: inactive, light and MVPA
- Order in which bouts are calculated (1 MVPA; 2 inactive; 3 Light)
- Default code for detecting bout:
<https://github.com/wadpac/GGIR/blob/master/R/g.getboutR> -> where bout.metric = 6

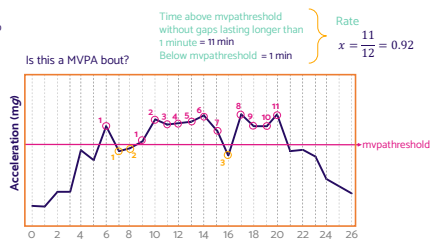
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Bouts of physical activity/inactivity

2. Bouts detection:

- $mvpathreshold = 100$
- $boutdur = 10$ ✓
- $boutcriter = 0.8$ ✓



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The cut-points vignette

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Why does GGIR facilitates bout detection?

- Guidelines mainly based:
 - 1-min epoch
 - Data from hip-worn sensors
 - ... but bouts might be useful for:
 - 5-s epochs
 - Data from wrist-worn sensors to smooth out spontaneous movements
- Guidelines based on:
 - Specific health outcomes
 - ... but bouts might be relevant for:
 - health outcomes not covered by current research
- Bouts might be useful to investigate fragmentation of behavior
- We aim to be neutral in the discussion and try to facilitate all approaches

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More reflections on the use of cut-points

The screenshot shows the Accelting website with a navigation bar (Home, About Accelting, Services, GGIR Software, Updates, Contact). The main heading is 'Why does GGIR facilitate the cut-points approach?'. The article text discusses the cut-point approach as one of the most criticized analytical approaches in the field of physical activity research, but also notes its widespread use. It mentions that the cut-point approach is based on the use of cut-points and that the cut-point approach is based on the use of cut-points. The article is dated Thursday, August 3, 2023. The URL at the bottom is <https://www.accelting.com/updates/why-does-ggir-facilitate-cut-points/>.

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Select the sentence/s that apply to MVPA bouts in GGIR. *(Multiple choice)*

- ☐ Users can define the bout length
- ☐ Users can define when a certain bout is broken (maximum gap length for a bout)
- ☐ Users can define the proportion of the bout duration that the acceleration should meet the threshold criteria.
- ☐ Users can define in which order the bouts should be detected.

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Select the sentence/s that apply to MVPA bouts in GGIR. *(Multiple choice)*

- ☒ Users can define the bout length
- ☐ Users can define when a certain bout is broken (maximum gap length for a bout)
- ☒ Users can define the proportion of the bout duration that the acceleration should meet the threshold criteria.
- ☐ Users can define in which order the bouts should be detected.

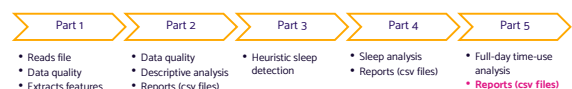
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Part 5 Output

www.accelting.com

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The GGIR pipeline



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Part 5
Output

- meta
 - ms5.outraw
 - 40_100_400
 - 101.RData
 - 101.csv
 - behavioralcodes.YYYY-MM-DD.csv
- results
 - file summary reports
 - Report_101.pdf
- QC
 - parts_dayssummary_full_MM_L40M100V400_T5A5.csv
- part5_dayssummary_MM_L40M100V400_T5A5.csv
- part5_personsummary_MM_L40M100V400_T5A5.csv

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Part 5
Output

- meta
 - ms5.outraw
 - 40_100_400
 - 101.T5A5.Rdata
 - 101.T5A5.csv
 - behavioralcodes.YYYY-MM-DD.csv
- results
 - file summary reports
 - Report_101.pdf
- QC
 - parts_dayssummary_full_MM_L40M100V400_T5A5.csv
- part5_dayssummary_MM_L40M100V400_T5A5.csv
- part5_personsummary_MM_L40M100V400_T5A5.csv

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Output from Part 5

Day-level features (full report)

do.report = 5

part5_dayssummary_full_MM_L40M100V400_T5A5.csv

GGIR [.]
Data cleaning
includedaycrit.part5 = 2/3,
[.])

66% of the waking hours available
(wearing the device)

| ID | window_number | weekday | calendar_date | cleaningcode | acc_available | gudler | nonwear_perc_day | nonwear_perc_spt | nonwear_perc_day_spt |
|----|---------------|-----------|---------------|--------------|---------------|----------|------------------|------------------|----------------------|
| 1 | 1 | Saturday | 7/7/2014 | 0 | 1 | sleeplog | 3 | 84 | 30 |
| 1 | 2 | Sunday | 8/7/2014 | 1 | 1 | HDCZA | 0 | 0 | 0 |
| 1 | 3 | Monday | 9/7/2014 | 0 | 1 | sleeplog | 0 | 0 | 0 |
| 1 | 4 | Tuesday | 10/7/2014 | 0 | 1 | sleeplog | 0 | 0 | 0 |
| 1 | 5 | Wednesday | 11/7/2014 | 0 | 1 | sleeplog | 10 | 0 | 6.667 |
| 1 | 6 | Thursday | 12/7/2014 | 0 | 1 | sleeplog | 0.4 | 0 | 0.267 |
| 1 | 7 | Friday | 13/7/2014 | 2 | 1 | sleeplog | 68 | 0 | 45.334 |

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Output from Part 5

Day-level features (full report)

do.report = 5

part5_dayssummary_MM_L40M100V400_T5A5.csv

GGIR [.]
Data cleaning
includedaycrit.part5 = 2/3,
[.])

66% of the waking hours available
(wearing the device)

| ID | window_number | weekday | calendar_date | cleaningcode | acc_available | gudler | nonwear_perc_day | nonwear_perc_spt | nonwear_perc_day_spt |
|----|---------------|-----------|---------------|--------------|---------------|----------|------------------|------------------|----------------------|
| 1 | 1 | Saturday | 7/7/2014 | 0 | 1 | sleeplog | 3 | 84 | 30 |
| 1 | 2 | Sunday | 8/7/2014 | 1 | 1 | HDCZA | 0 | 0 | 0 |
| 1 | 3 | Monday | 9/7/2014 | 0 | 1 | sleeplog | 0 | 0 | 0 |
| 1 | 4 | Tuesday | 10/7/2014 | 0 | 1 | sleeplog | 0 | 0 | 0 |
| 1 | 5 | Wednesday | 11/7/2014 | 0 | 1 | sleeplog | 10 | 0 | 6.667 |
| 1 | 6 | Thursday | 12/7/2014 | 0 | 1 | sleeplog | 0.4 | 0 | 0.267 |
| 1 | 7 | Friday | 13/7/2014 | 2 | 1 | sleeplog | 68 | 0 | 45.334 |

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Output from Part 5

Day-level features (full report)

do.report = 5

part5_dayssummary_MM_L40M100V400_T5A5.csv

GGIR [.]
Data cleaning
includedaycrit.part5 = 2/3,
excludefirstlast.part5 = FALSE,
[.])

| ID | window_number | weekday | calendar_date | cleaningcode | acc_available | gudler | nonwear_perc_day | nonwear_perc_spt | nonwear_perc_day_spt |
|----|---------------|-----------|---------------|--------------|---------------|----------|------------------|------------------|----------------------|
| 1 | 1 | Saturday | 7/7/2014 | 0 | 1 | sleeplog | 3 | 84 | 30 |
| 1 | 2 | Sunday | 8/7/2014 | 1 | 1 | HDCZA | 0 | 0 | 0 |
| 1 | 3 | Monday | 9/7/2014 | 0 | 1 | sleeplog | 0 | 0 | 0 |
| 1 | 4 | Tuesday | 10/7/2014 | 0 | 1 | sleeplog | 0 | 0 | 0 |
| 1 | 5 | Wednesday | 11/7/2014 | 0 | 1 | sleeplog | 10 | 0 | 6.667 |
| 1 | 6 | Thursday | 12/7/2014 | 0 | 1 | sleeplog | 0.4 | 0 | 0.267 |

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Output from Part 5

Day-level features (full report)

do.report = 5

part5_dayssummary_MM_L40M100V400_T5A5.csv

GGIR [.]
Data cleaning
includedaycrit.part5 = 2/3,
excludefirstlast.part5 = TRUE,
[.])

| ID | window_number | weekday | calendar_date | cleaningcode | acc_available | gudler | nonwear_perc_day | nonwear_perc_spt | nonwear_perc_day_spt |
|----|---------------|-----------|---------------|--------------|---------------|----------|------------------|------------------|----------------------|
| 1 | 1 | Saturday | 7/7/2014 | 0 | 1 | sleeplog | 3 | 84 | 30 |
| 1 | 2 | Sunday | 8/7/2014 | 1 | 1 | HDCZA | 0 | 0 | 0 |
| 1 | 3 | Monday | 9/7/2014 | 0 | 1 | sleeplog | 0 | 0 | 0 |
| 1 | 4 | Tuesday | 10/7/2014 | 0 | 1 | sleeplog | 0 | 0 | 0 |
| 1 | 5 | Wednesday | 11/7/2014 | 0 | 1 | sleeplog | 10 | 0 | 6.667 |
| 1 | 6 | Thursday | 12/7/2014 | 0 | 1 | sleeplog | 0.4 | 0 | 0.267 |

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Part 5
Output

- meta
 - ms5.outraw
 - 40_100_400
 - 10L_T5A5.Rdata
 - 10L_T5A5.csv
 - behavioralcodes.YYYY-MM-DD.csv
 - results
 - file summary reports
 - Report_101.pdf
 - QC
 - part5_daysummary.full_MM.L40M100V400.T5A5.csv
 - part5_daysummary_MM.L40M100V400.T5A5.csv
 - part5_personsummary_MM.L40M100V400.T5A5.csv

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Output from Part 5

Person-level features (time-use)

do_report = 5

part5_personsummary_MM.L40M100V400.T5A5.csv

| ID | Calendar.date | Nvaliddays | Nvaliddays_WD | Nvaliddays_WE | Ndaysleeper | Ncleaningcodezero | Ncleaningcode1 | Nsleeplog_used | Nacc.available |
|----|---------------|------------|---------------|---------------|-------------|-------------------|----------------|----------------|----------------|
| T1 | 24/08/2022 | 6 | 4 | 2 | 0 | 5 | 1 | 5 | 6 |

Plain avg

| ID | nonwear_perc_day_pla | dur_spt_sleep_min_pla | dur_day_IN_unbt_min_pla | dur_day_MOD_unbt_min_pla | dur_day_VIG_unbt_min_pla | dur_day_HVPA_bts_10_min_pla | dur_day_HVPA_bts_5_10_min_pla | dur_day_total_MOD_min_pla | dur_day_total_VIG_min_pla |
|----|----------------------|-----------------------|-------------------------|--------------------------|--------------------------|-----------------------------|-------------------------------|---------------------------|---------------------------|
| T1 | 0 | 325.306 | 230.986 | 49.375 | 0.319 | 2.806 | 2.681 | 72.597 | 0.514 |

Weighted avg

| ID | nonwear_perc_day_wgt | dur_spt_sleep_min_wgt | dur_day_IN_unbt_min_wgt | dur_day_MOD_unbt_min_wgt | dur_day_VIG_unbt_min_wgt | dur_day_HVPA_bts_10_min_wgt | dur_day_HVPA_bts_5_10_min_wgt | dur_day_total_MOD_min_wgt | dur_day_total_VIG_min_wgt |
|----|----------------------|-----------------------|-------------------------|--------------------------|--------------------------|-----------------------------|-------------------------------|---------------------------|---------------------------|
| T1 | 0 | 327.58 | 231.009 | 49.107 | 0.298 | 3.006 | 2.693 | 72.952 | 0.497 |

Weekday

week_weekend_aggregate:part5= TRUE

| ID | nonwear_perc_day_WD | dur_spt_sleep_min_WD | dur_day_IN_unbt_min_WD | dur_day_MOD_unbt_min_WD | dur_day_VIG_unbt_min_WD | dur_day_HVPA_bts_10_min_WD | dur_day_HVPA_bts_5_10_min_WD | dur_day_total_MOD_min_WD | dur_day_total_VIG_min_WD |
|----|---------------------|----------------------|------------------------|-------------------------|-------------------------|----------------------------|------------------------------|--------------------------|--------------------------|
| T1 | 0 | 341.229 | 231.146 | 475 | 0.167 | 4.208 | 2.771 | 75.083 | 0.396 |

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Output from Part 5

Person-level features (acceleration)

do_report = 5

part5_personsummary_MM.L40M100V400.T5A5.csv

| ID | Calendar.date | Nvaliddays | Nvaliddays_WD | Nvaliddays_WE | Ndaysleeper | Ncleaningcodezero | Ncleaningcode1 | Nsleeplog_used | Nacc.available |
|----|---------------|------------|---------------|---------------|-------------|-------------------|----------------|----------------|----------------|
| T1 | 24/08/2022 | 6 | 4 | 2 | 0 | 5 | 1 | 5 | 6 |

Plain avg

| ID | ACC_day_total_IN_mg_pla | ACC_day_total_LIG_mg_pla | ACC_day_total_MOD_mg_pla | ACC_day_total_VIG_mg_pla | ACC_day_mg_pla | ACC_spt_mg_pla | ACC_day_spt_mg_pla |
|----|-------------------------|--------------------------|--------------------------|--------------------------|----------------|----------------|--------------------|
| T1 | 12.312 | 64.438 | 140.033 | 497.212 | 34.072 | 20.446 | 30.437 |

Weighted avg

| ID | ACC_day_total_IN_mg_wgt | ACC_day_total_LIG_mg_wgt | ACC_day_total_MOD_mg_wgt | ACC_day_total_VIG_mg_wgt | ACC_day_mg_wgt | ACC_spt_mg_wgt | ACC_day_spt_mg_wgt |
|----|-------------------------|--------------------------|--------------------------|--------------------------|----------------|----------------|--------------------|
| T1 | 12.224 | 64.535 | 139.877 | 495.554 | 34.114 | 20.101 | 30.366 |

Weekday

week_weekend_aggregate:part5= TRUE

| ID | ACC_day_total_IN_mg_WD | ACC_day_total_LIG_mg_WD | ACC_day_total_MOD_mg_WD | ACC_day_total_VIG_mg_WD | ACC_day_mg_WD | ACC_spt_mg_WD | ACC_day_spt_mg_WD |
|----|------------------------|-------------------------|-------------------------|-------------------------|---------------|---------------|-------------------|
| T1 | 11.694 | 65.719 | 138.941 | 485.61 | 34.365 | 18.034 | 29.945 |

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Output from Part 5

Person-level features (acceleration)

do_report = 5

part5_personsummary_MM.L40M100V400.T5A5.csv

| ID | Calendar.date | Nvaliddays | Nvaliddays_WD | Nvaliddays_WE | Ndaysleeper | Ncleaningcodezero | Ncleaningcode1 | Nsleeplog_used | Nacc.available |
|----|---------------|------------|---------------|---------------|-------------|-------------------|----------------|----------------|----------------|
| T1 | 24/08/2022 | 6 | 4 | 2 | 0 | 5 | 1 | 5 | 6 |

Plain avg

| ID | ACC_day_total_IN_mg_pla | ACC_day_total_LIG_mg_pla | ACC_day_total_MOD_mg_pla | ACC_day_total_VIG_mg_pla | ACC_day_mg_pla | ACC_spt_mg_pla | ACC_day_spt_mg_pla |
|----|-------------------------|--------------------------|--------------------------|--------------------------|----------------|----------------|--------------------|
| T1 | 12.312 | 64.438 | 140.033 | 497.212 | 34.072 | 20.446 | 30.437 |

Weighted avg

| ID | ACC_day_total_IN_mg_wgt | ACC_day_total_LIG_mg_wgt | ACC_day_total_MOD_mg_wgt | ACC_day_total_VIG_mg_wgt | ACC_day_mg_wgt | ACC_spt_mg_wgt | ACC_day_spt_mg_wgt |
|----|-------------------------|--------------------------|--------------------------|--------------------------|----------------|----------------|--------------------|
| T1 | 12.224 | 64.535 | 139.877 | 495.554 | 34.114 | 20.101 | 30.366 |

Weekday

week_weekend_aggregate:part5= TRUE

| ID | ACC_day_total_IN_mg_WD | ACC_day_total_LIG_mg_WD | ACC_day_total_MOD_mg_WD | ACC_day_total_VIG_mg_WD | ACC_day_mg_WD | ACC_spt_mg_WD | ACC_day_spt_mg_WD |
|----|------------------------|-------------------------|-------------------------|-------------------------|---------------|---------------|-------------------|
| T1 | 11.694 | 65.719 | 138.941 | 485.61 | 34.365 | 18.034 | 29.945 |

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Output from Part 5

Other variables

NIGHTTIME

N_atleast5minwakenight

Nblocks

dur_spt_wake_IN_min

dur_spt_wake_LIG_min

dur_spt_wake_MOD_min

dur_spt_wake_VIG_min

DAYTIME

Nbouts

Nblocks

FULL WINDOW

quantile_mostactive60min_mg_pla

quantile_mostactive30min_mg_pla

L5VALUE_pla

M5VALUE_pla

L5TIME_num_pla

M5TIME_num_pla

ig_gradient_pla

ig_intercept_pla

ig_rsquared_pla

Fragmentation metrics

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Output from Part 5

Other variables

NIGHTTIME

N_atleast5minwakenight

Nblocks

dur_spt_wake_IN_min

dur_spt_wake_LIG_min

dur_spt_wake_MOD_min

dur_spt_wake_VIG_min

DAYTIME

Nbouts

Nblocks

FULL WINDOW

quantile_mostactive60min_mg_pla

quantile_mostactive30min_mg_pla

L5VALUE_pla

M5VALUE_pla

L5TIME_num_pla

M5TIME_num_pla

ig_gradient_pla

ig_intercept_pla

ig_rsquared_pla

Fragmentation metrics

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Output from Part 5

Other variables

NIGHTTIME

N_atleast5minwakenight
Nblocks
dur_spt_wake_IN_min
dur_spt_wake_LIG_min
dur_spt_wake_MOD_min
dur_spt_wake_VIG_min

DAYTIME

Nbout
Nblocks

FULL WINDOW

quantile_mostactive60min_mg
quantile_mostactive30min_mg
LSVALUE
MSVALUE
L5TIME_num
M5TIME_num
ig_gradient
ig_intercept
ig_rsquared
Fragmentation metrics

→ fragmetrics="all"

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Output from Part 5

Fragmentation metrics

Nr. Of fragments

FRAG_Nfrag_IN.day
FRAG_Nfrag_LIPA.day
FRAG_Nfrag_MVPA.day
FRAG_Nfrag_PA.day
FRAG_Nfrag_INzLIPA.day
FRAG_Nfrag_INzMVPA.day

Transition probability

FRAG_TP_PA2IN.day
FRAG_TP_INzPA.day
FRAG_TP_INzLIPA.day
FRAG_TP_INzMVPA.day

Mean duration

FRAG_mean_dur_IN.day
FRAG_mean_dur_LIPA.day
FRAG_mean_dur_MVPA.day
FRAG_mean_dur_PA.day

Indices

Gini
CoV
Alpha
-

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Output from Part 5

Fragmentation metrics

Nr. Of

FRAG
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FRAG
FRAG
FRAG
FRAG

Implementation of the zero-crossing counts and Sadeh algorithm, specify argument: `NOISE_xlog = "false"` and argument: `scale_xaxis = "Y"` to indicate that the algorithm should use the Y-axis of the sensor.

- Galland2012:** The count-based algorithm proposed by Galland et al. link. To use our implementation of the Galland2012 algorithm specify argument: `NOISE_xlog = "false"`. Further, set `scale_xaxis = "Y"` to specify that the algorithm should use the Y-axis.
- ColeKripke1992:** The algorithm proposed by Cole et al. link, more specifically GORR uses the algorithm proposed in the paper for 10-second non-overlapping epochs with counts expressed average per minute. We skip the re-scoring steps as the paper showed marginal added value of this added complexity. To use the GORR implementation of the zero-crossing counts and Sadeh algorithm, specify argument: `NOISE_xlog = "false"` and argument: `scale_xaxis = "Y"` to indicate that the algorithm should use the Y-axis of the sensor.

5.6.1 Notes on sleep classification algorithms designed for count data
5.6.1.1 Replication of the movement counts needed

Source: <https://cran.r-project.org/web/packages/actlog/vignettes/actlog.html>

Web View: Terms | Privacy & Cookies

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Part 5

Output

- meta
 - ms5.outraw
 - 40..100..400
 - 101.T5A5.Rdata
 - 101.T5A5.csv
 - behavioralcodes.YYYY-MM-DD.csv
- results
 - file summary reports
 - Report_101.pdf
- QC
 - part5.daysummary_full_MM-L40M100V400..T5A5.csv
- part5.daysummary_MM-L40M100V400..T5A5.csv
- part5.personsummary_MM-L40M100V400..T5A5.csv

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Output from Part 5

Epoch-level features

save_ms5rawlevels = TRUE # default = FALSE
save_ms5raw_format = "csv" # default = "RData"
save_ms5raw_without_invalid = FALSE
default = TRUE

| meta > ms5.outraw > 20_70_260 | | |
|-------------------------------|-------------------------------------|--|
| Name | Status | |
| 100019037_T5A5.csv | <input checked="" type="checkbox"/> | |
| 100023983_T5A5.csv | <input checked="" type="checkbox"/> | |

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Output from Part 5

Epoch-level features

save_ms5rawlevels = TRUE # default = FALSE
save_ms5raw_format = "csv" # default = "RData"
save_ms5raw_without_invalid = FALSE
default = TRUE

| meta > ms5.outraw > 20_70_260 | | | | | | | | | | | |
|-------------------------------|--------|----------|------------|------|-----------|----------|----------|-------|--------|-------|--------|
| epoch | acc | activity | inactivity | gait | sedentary | standing | sleeping | awake | asleep | awake | asleep |
| 1404072000 | 0 | 1 | 1 | 2 | 13 | 0 | 25.76 | 14.54 | 11.09 | | |
| 1404072120 | 0 | 1 | 1 | 2 | 13 | 0 | 25.76 | 14.54 | 11.09 | | |
| 1404072240 | 0 | 1 | 1 | 2 | 13 | 0 | 25.76 | 14.54 | 11.09 | | |
| 1404072360 | 0 | 1 | 1 | 2 | 13 | 0 | 25.76 | 14.54 | 11.09 | | |
| 1404072480 | 0 | 1 | 1 | 2 | 13 | 0 | 25.76 | 14.54 | 11.09 | | |
| 1404072600 | 0 | 1 | 1 | 2 | 13 | 0 | 25.76 | 14.54 | 11.09 | | |
| 1404072720 | 19.3 | 1 | 0 | 2 | 13 | 0 | 25.76 | 14.54 | 11.09 | | |
| 1404072840 | 24.933 | 1 | 0 | 2 | 13 | 0 | 25.76 | 14.54 | 11.09 | | |
| 1404072960 | 26.1 | 0 | 0 | 2 | 13 | 13 | 55.65 | 77.99 | 0 | | |
| 1404073080 | 29.608 | 0 | 0 | 2 | 13 | 13 | 55.65 | 77.99 | 0 | | |

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How many csv reports (datasets) do we expect from part 5? (*Single choice*)

- ☐ One per configuration selected, including thresholds, sustained inactivity bout, and window definition
- ☐ Two per configuration selected, including thresholds, sustained inactivity bout, and window definition
- ☒ Three per configuration selected, including thresholds, sustained inactivity bout, and window definition

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What does “_wei” mean at the end of the variable names in part 5 personsummary reports? (*Single choice*)

- ☐ Weekend average.
- ☐ Weekly average
- ☐ Weekday and weekend day weighted average.

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What does “_wei” mean at the end of the variable names in part 5 personsummary reports? (*Single choice*)

- ☐ Weekend average.
- ☐ Weekly average
- ☒ Weekday and weekend day weighted average.

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Other variables

www.accelting.com

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Other variables

Circadian rhythm - documentation

IVISactivity.metric = 2

Circadian Rest-Activity Rhythm Disturbances in Alzheimer's Disease

Eas J.W. van Someren, Eveline E.O. Haghebaek, Cees Lijzenaga, Philip Schelens, Sophie E.J.A. de Rooij, Cees Jonker, Anne-Margriet Pot, Majid Mirmiran, and Dick F. Swaab

<https://link.springer.com/content/pdf/10.1007/s12561-019-09236-4.pdf>

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cosinor

Statistics in Biosciences (2019) 11:371–402
<https://doi.org/10.1007/s12561-019-09236-4>

Joint and Individual Representation of Domains of Physical Activity, Sleep, and Circadian Rhythmicity

Junruo Di, et al. (full author details at the end of the article)

Received: 18 December 2017 / Revised: 7 March 2019 / Accepted: 2 April 2019 / Published online: 15 April 2019
© International Chinese Statistical Association 2019

<https://link.springer.com/content/pdf/10.1007/s12561-019-09236-4.pdf>

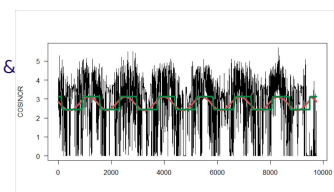
73

Other variables

Circadian rhythms

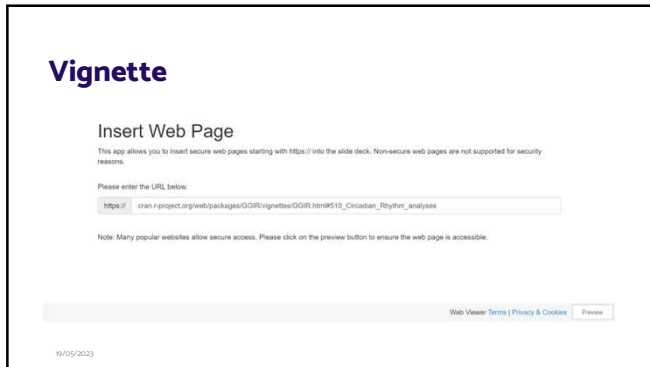
- Part 2 & 5
 - MXLX – Most and Least active X hours
 - Average acceleration
 - Start time
 - Intensity gradient
 - IV & IS – Intradaily Variability &
- Part 2
 - Cosinor

```
GGIR(
  [,]
  # Circadian rhythms
  winhr = c(5, 10),
  IVIS.activity.metric = 2,
  IVIS.acc.threshold = 20
  cosinor = TRUE,
  [,])
```



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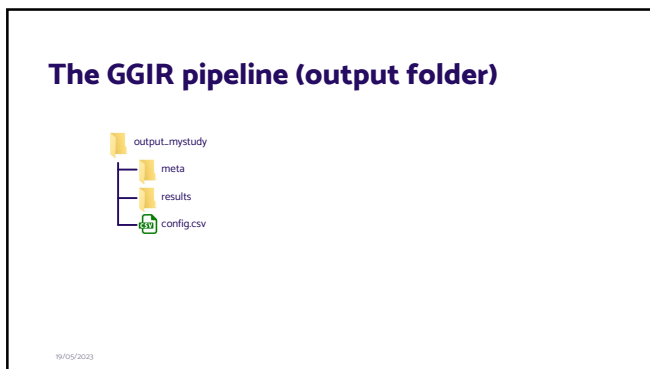
74



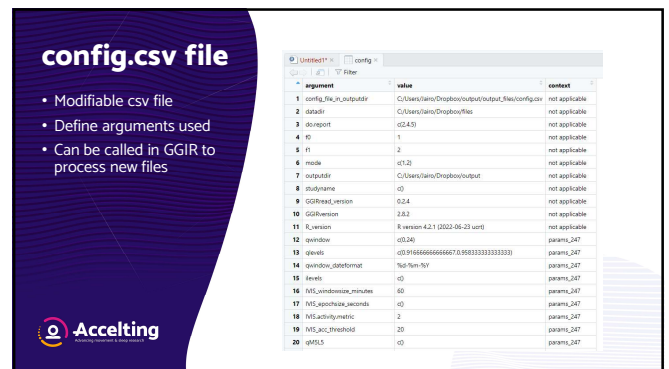
75



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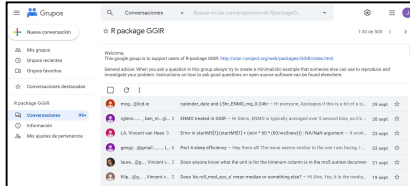


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Where and How to find help

1. GGIR function documentation
2. GGIR vignettes
3. Google group

<https://groups.google.com/g/RpackageGGIR>

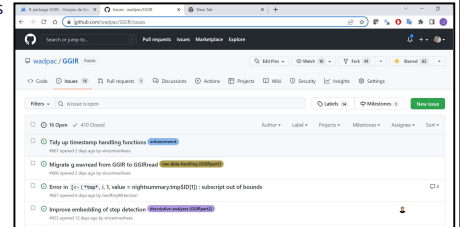


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Where and How to find help

1. GGIR function documentation
2. GGIR vignettes
3. Google group
4. Github issues

<https://github.com/wadpac/GGIR/issues>



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What entails a good question?

Describe the bug

A short, clear and concise description of what the bug is.

To Reproduce

Steps to reproduce the behavior.

1. Sensor brand: "..."
2. Data format: "..."
3. Approximate recording duration: "... days"
4. Are you using a sleep diary to guide the sleep detection: YES / NO
5. Copy of R command used: "..."
6. Have you tried processing your data based on GGIR's default argument values? Does the issue you report still appear? YES / NO

Expected behavior

A clear and concise description of what you expected to happen.

Screenshots

If applicable, add screenshots to help explain your problem. Note that usually we are not only interested in see the error message in red, but all GGIR output to the console.

Desktop:

- OS (e.g. iOS)
- GGIR Version (e.g. 2.2-0)

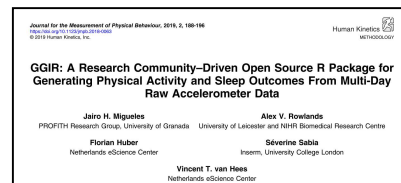
Additional context

Add any other context about the problem here.

Before submitting

- Have you tried the steps to reproduce? Do they include all relevant data and configuration? Does the issue you report still appear there?
- Have you tried this on the latest 'master' branch from GitHub?

More information (paper/s)



Please cite when you use GGIR in your research:
doi: 10.1123/jmpb.2018-0063

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More information (paper/s)

J Appl Physiol 127: 1336-1344, 2014.
First published August 7, 2014; doi:10.1152/jappphysiol.00421.2014.

Autocalibration of accelerometer data for free-living physical activity assessment using local gravity and temperature: an evaluation on four continents

Vincent T. van Hees,^{1,2} Zhao Fang,^{3,4} Ross Langford,⁵ Felix Asaah,⁶ Anwar Muhammad,⁷ Isaac C. M. de Silva,^{8,9} Michael L. Tremblé,¹⁰ Tom White,¹¹ Nicholas J. Wareham,¹² and Søren Brage¹
¹MovLab, Institute of Cellular Medicine, Newcastle University, Newcastle, United Kingdom; ²Department of Statistics, University of Oxford, Oxford, United Kingdom; ³Neuroimaging, Central, Newcastle, United Kingdom; ⁴University of Birmingham, Birmingham, United Kingdom; ⁵Department of Health, Behavior, and Society, Harvard University, Boston, MA, United States; ⁶Department of Health, Behavior, and Society, Harvard University, Boston, MA, United States; ⁷Department of Health, Behavior, and Society, Harvard University, Boston, MA, United States; ⁸Department of Health, Behavior, and Society, Harvard University, Boston, MA, United States; ⁹Department of Health, Behavior, and Society, Harvard University, Boston, MA, United States; ¹⁰Department of Health, Behavior, and Society, Harvard University, Boston, MA, United States; ¹¹Department of Health, Behavior, and Society, Harvard University, Boston, MA, United States; ¹²Department of Health, Behavior, and Society, Harvard University, Boston, MA, United States

Submitted 20 May 2014; accepted in final form 3 August 2014

Auto-calibration algorithm:
doi: 10.1152/jappphysiol.00421.2014

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More information (paper/s)

J Appl Physiol 127: 1336-1344, 2014.
First published August 7, 2014; doi:10.1152/jappphysiol.00421.2014.

Autocalibration of accelerometer data for free-living physical activity assessment using local gravity and temperature: an evaluation on four continents

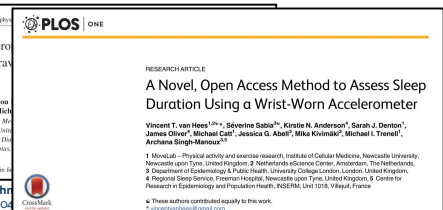
Vincent T. van Hees,^{1,2} Zhao Fang,^{3,4} Ross Langford,⁵ Felix Asaah,⁶ Anwar Muhammad,⁷ Isaac C. M. de Silva,^{8,9} Michael L. Tremblé,¹⁰ Tom White,¹¹ Nicholas J. Wareham,¹² and Søren Brage¹
¹MovLab, Institute of Cellular Medicine, Newcastle University, Newcastle, United Kingdom; ²Department of Statistics, University of Oxford, Oxford, United Kingdom; ³Neuroimaging, Central, Newcastle, United Kingdom; ⁴University of Birmingham, Birmingham, United Kingdom; ⁵Department of Health, Behavior, and Society, Harvard University, Boston, MA, United States; ⁶Department of Health, Behavior, and Society, Harvard University, Boston, MA, United States; ⁷Department of Health, Behavior, and Society, Harvard University, Boston, MA, United States; ⁸Department of Health, Behavior, and Society, Harvard University, Boston, MA, United States; ⁹Department of Health, Behavior, and Society, Harvard University, Boston, MA, United States; ¹⁰Department of Health, Behavior, and Society, Harvard University, Boston, MA, United States; ¹¹Department of Health, Behavior, and Society, Harvard University, Boston, MA, United States; ¹²Department of Health, Behavior, and Society, Harvard University, Boston, MA, United States

Submitted 20 May 2014; accepted in final form 3 August 2014

Auto-calibration algorithm:
doi: 10.1152/jappphysiol.00421.2014

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Sleep algorithm:
doi: 10.1371/journal.pone.0142533



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Contribute by...

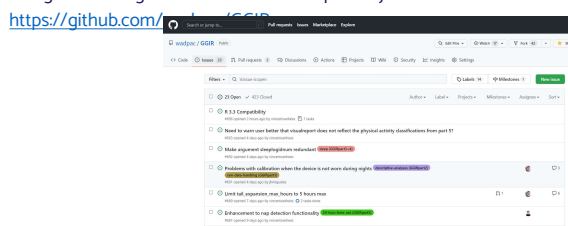
Doing research on algorithms or evaluating GGIR functionalities

1. Help improve imputation methods for epoch-level data
2. Optimize and evaluate:
 1. HorAngle algorithm for sleep period time definition
 2. Sleep detection in children and preschoolers
 3. Implementation of the Sadeh and the Cole-Kripke sleep algorithms
3. Help develop new functionality

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Contribute by...

Posting/addressing issues in the Github repository



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I got an error in GGIR that I am not able to resolve, so, how do I proceed? *(Single choice)*

- ☐ If I've got some coding skills, I try to fix that problem in my local version of GGIR, so that I can go ahead with myproject bothering anyone else
- ☐ I post the error to the google group or as an issue in the GitHub repository, and wait for help
- ☐ I e-mail Vincent, Jairo, or someone else with experience with GGIR and hope that they can help me.
- ☐ I create a detailed, reproducible description of the error and what I have tried to solve it. Here, I try to make it as easy as possible for others to help me. Next I post this in the GGIR Google group

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I got an error in GGIR that I am not able to resolve, so, how do I proceed? *(Single choice)*

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Day Evaluation

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