Package ‘Sojourn’

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LazyData true

Imports dplyr (>= 0.7), magrittr (>= 1.5), lubridate (>= 1.7.4), nnet (>= 7.3), PAutilities (>= 0.2.0), rlang (>= 0.2), stats, svDialogs (>= 1.0), utils, zoo (>= 1.8)

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BugReports https://github.com/paulhibbing/Sojourn/issues

Suggests data.table, testthat

NeedsCompilation no

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apply_youth_sojourn

**R topics documented:**

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**apply_youth_sojourn**

*Apply the youth Sojourn method*

**Description**

Function for using the youth Sojourn method developed by Hibbing et al. (2018)

**Usage**

```r
apply_youth_sojourn(
  AG,  
  vm = c("Vector.Magnitude", "ENMO"),  
  Site = c("Hip", "Wrist"),  
  demo_interactive = FALSE,  
  verbose = FALSE,  
  ...  
)
```

**Arguments**

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AG</td>
<td>a data frame of monitor and demographic data</td>
</tr>
<tr>
<td>vm</td>
<td>the variable to use for processing, either &quot;Vector.Magnitude&quot; (for activity counts) or &quot;ENMO&quot; (for raw acceleration)</td>
</tr>
<tr>
<td>Site</td>
<td>the wear location of the monitor, either &quot;Hip&quot; or &quot;Wrist&quot;</td>
</tr>
<tr>
<td>demo_interactive</td>
<td>logical. Input demographics interactively if missing variables are identified during format checking?</td>
</tr>
<tr>
<td>verbose</td>
<td>logical. Print processing updates to the console?</td>
</tr>
<tr>
<td>...</td>
<td>Further arguments passed to <code>youth_name_test</code></td>
</tr>
</tbody>
</table>
Value

The original data frame, plus additional predictions made by the Sojourn method

Note

The functions AGread::read_AG_counts and AGread::read_AG_raw are recommended for assembling the monitor-specific portion of the AG data frame.

Examples

```r
data(example_data, package = "Sojourn")

results_youth_soj <- apply_youth_sojourn(
  AG = example_data,
  vm = "Vector.Magnitude",
  Site = "Hip"
)
utils::head(results_youth_soj)
```

```
compute.bouts.info  Summarize outcomes from data processed using the Sojourn method

Description

A function to summarize predictions made by the original Sojourn method of Lyden et al. (2014).

Usage

```r
compute.bouts.info(est.mets, units = c("secs", "mins"))
```

Arguments

- `est.mets` numeric vector of predicted metabolic equivalents
- `units` time units associated with each row of data

Value

a data frame summarizing the predictions made by the Sojourn method.

Examples

```r
data(example_data, package = "Sojourn")
example_data <- soj_3x_original(
  example_data$axis1,
  example_data$axis2,
  example_data$axis3,
  example_data$Vector.Magnitude
```
example_data

)
compute.bouts.info(example_data$METs)

enhance_actigraph  Combine ActiGraph and activPAL data

Description
Merge data streams for separate monitors in the SIP method

Usage
enhance_actigraph(ag, ap, verbose = FALSE)

Arguments
ag  ActiGraph data
ap  activPAL data
verbose  logical. Print information to console?

Examples
data(SIP_ag, package = "Sojourn")
data(SIP_ap, package = "Sojourn")
combined_data <- enhance_actigraph(SIP_ag, SIP_ap)
utils::head(combined_data)

element_example  Sample data for exploring original and youth Sojourn methods

Description
Sample data for exploring original and youth Sojourn methods

Usage
element_example
Format

A data frame with 79989 rows and 11 variables:

- **id**: An example ID for the data set
- **Sex**: An example sex for the data set
- **Age**: An example age (in years) for the data set
- **BMI**: An example body mass index (in kg/m^2) for the data set
- **Timestamp**: POSIX-formatted variable giving the timestamp for each observation
- **axis1**: Activity counts from the first axis
- **axis2**: Activity counts from the second axis
- **axis3**: Activity counts from the third axis
- **Vector.Magnitude**: Vector magnitude of activity counts (sqrt(sum(axis1^2, axis2^2, axis3^2)))
- **steps**: Predicted steps taken
- **incline**: Inclinometer status (0 = off, 1 = lying, 2 = sitting, 3 = standing)

**get_youth_sojourns**

Label Sojourns in a data stream according to the youth-specific algorithm

Description

Identify Sojourns using the algorithm of Hibbing et al. (2018)

Usage

```r
get_youth_sojourns(
  vm,
  short = 30,
  Output = c("Counts", "Raw"),
  Site = c("Hip", "Wrist"),
  epoch = 1,
  difference = 15,
  threshold = 100,
  verbose = FALSE
)
```

Arguments

- **vm**: vector of triaxial accelerometer values, either the vector magnitude for activity counts, or the Euclidian Norm Minus One for raw acceleration
- **short**: numeric scalar. Shortest allowable duration for a Sojourn. Should be detected automatically from the internally-stored grid search values for the attachment site (hip or wrist) and data type (counts or raw)
input_demographic

Output the data type (counts or raw)
Site the attachment site (hip or wrist)
epoch the epoch length, in seconds
difference the difference parameter
threshold the threshold parameter
verbose logical. Print processing updates to the console?

Value

A data frame (with \texttt{nrow} equal to \texttt{length(vm)}) that gives sojourn labels and durations

Examples

\begin{verbatim}
if (interactive()) {
  input_demographic()
}
\end{verbatim}

Description

Interactively input demographic information

Usage

\begin{verbatim}
input_demographic(...)\end{verbatim}

Arguments

\begin{verbatim}
... Further arguments passed to svDialogs functions\end{verbatim}

Value

A data frame containing an ID, attachment site of the monitor (hip or wrist), and the participant’s sex, age, and BMI

Examples

\begin{verbatim}
if (interactive()) {
  input_demographic()
}
\end{verbatim}
### read_AP

*Read an activPAL events file*

**Description**

Read an activPAL events file

**Usage**

```r
read_AP(filename, tz = "UTC")
```

**Arguments**

- `filename` character. Path to the file
- `tz` character. The timezone to use

**Value**

Data frame reflecting the data contained in `filename`.

**Note**

There must be a corresponding `.def` file located in the same directory as `filename`.

**Examples**

```r
ap_file <- system.file(
  "extdata/sampledata_Events.csv",
  package = "Sojourn"
)
if (isTRUE(requireNamespace("data.table"))) {
  ap_data <- read_AP(ap_file)
  utils::head(ap_data)
}
```

---

### SIP_ag

*ActiGraph sample data for exploring Sojourns Including Posture (SIP) method.*

**Description**

ActiGraph sample data for exploring Sojourns Including Posture (SIP) method.

**Usage**

```r
SIP_ag
```
Format

A data frame with 12257 rows and 5 variables:

- **counts** Activity counts from the first axis
- **axis2** Activity counts from the second axis
- **axis3** Activity counts from the third axis
- **vm** Vector magnitude of activity counts
- **Time** POSIX-formatted variable giving the timestamp for each observation

---

Description

activPAL sample data for exploring Sojourns Including Posture (SIP) method

Usage

SIP_ap

Format

A data frame with 12257 rows and 5 variables:

- **Time** POSIX-formatted variable giving the timestamp for each observation
- **DataCount** Integer value giving the index of the sample from which the row of data is drawn
- **Interval** Duration (in seconds) of the interval from one data point to the next
- **ActivityCode** Integer giving the posture activity classification: 0 is sedentary, 1 is standing, and 2 is stepping
- **CumulativeStepCount** Integer giving the cumulative step count from the start of the file to the current data point.
- **ActivityScore** Numeric giving MET-hours
Sojourn: Apply Sojourn Methods for Processing ActiGraph Accelerometer Data

Description


Details

It is meant for use with data from ActiGraph monitors and (in the case of Sojourns Including Posture, by Ellingson et al. (2016)) activPAL monitors. File reading is not included in the functionality of the Sojourn package. For help with that preliminary step, users are directed to the packages AGread (for ActiGraph files) and activpalProcessing (for activPAL files).

sojourn_3x_SIP

Triaxial Sojourn method for the SIP method

Usage

sojourn_3x_SIP(ag, short = 30)

Arguments

ag
combined ActiGraph and activPAL data on which to identify transitions and make predictions

short
the minimum duration of a qualifying Sojourn

Value

A data frame of processed data using the SIP method

Examples

data(SIP_ag, package = "Sojourn")
data(SIP_ap, package = "Sojourn")
data <- Sojourn::enhance_actigraph(SIP_ag, SIP_ap)
utils::head(sojourn_3x_SIP(data))
soj_1x_original  Invoke the original uni-axial Sojourn method

Description
Calls the uni-axial Sojourn method from Lyden et al. (2014).

Usage
soj_1x_original(
  counts,
  perc.cut = 0.05,
  perc.cut.2 = 0.12,
  perc.cut.3 = 0.55,
  too.short = 10,
  sit.cut = 90,
  long.soj = 120
)

Arguments
  counts    numeric vector of vertical axis counts
  perc.cut  decision tree threshold 1
  perc.cut.2 decision tree threshold 2
  perc.cut.3 decision tree threshold 3
  too.short minimum length of one Sojourn
  sit.cut   cut-point for determining sitting
  long.soj  maximum length of one Sojourn

Value
  a data frame of processed data

Examples
  data(example_data, package = "Sojourn")
  results_1x <- soj_1x_original(example_data$axis1)
  utils::head(results_1x)
soj_3x_original

Invoke the original triaxial Sojourn method

Description
Calls the triaxial Sojourn method from Lyden et al. (2014).

Usage
soj_3x_original(
counts,
counts.2,
counts.3,
vect.mag,
short = 30,
verbose = FALSE
)

Arguments

counts numeric vector of activity counts from the first axis
counts.2 numeric vector of activity counts from the second axis
counts.3 numeric vector of activity counts from the third axis
vect.mag vector magnitude of the activity counts
short minimum length of one Sojourn
verbose logical. Print updates to console?

Value
a data frame of processed data

Examples
data(example_data, package = "Sojourn")
results_3x <- soj_3x_original(
  example_data$axis1,
  example_data$axis2,
  example_data$axis3,
  example_data$Vector.Magnitude
)

utils::head(results_3x)
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