Package 'PASenseWear'

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Type Package

Title Summarize Daily Physical Activity from 'SenseWear' Accelerometer Data

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Depends R (>= 3.2.5), ggplot2

Description Provide summary table of daily physical activity and per-person/grouped heat map for accelerometer data from SenseWear Armband. See <https://templehealthcare.wordpress.com/the-sensewear-armband/> for more information about SenseWear Armband.

License GPL-2

LazyData TRUE

RoxygenNote 5.0.1

NeedsCompilation no

Repository CRAN

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Contents

demography *Simulated Sample Demographic Data*

Description

Demographic data for 4 random participants is provided.

Usage

```
data(demography)
```

Format

A data frame with 4 rows and 3 colomns

Details

The variables are as follows:

- `ID` The ID of the participant
- `Age` The age of the participant
- `Gender` The gender of the participant

Heatmap *Heatmap*

Description

Generate a heatmap to show different activity intensities (in MET) at different time of different days.

Usage

```
Heatmap(data, a, category = FALSE)
```

Arguments

`data`	A csv file for one participant with multiple days' activity records from SenseWear. Data format refers to provided `sampledata`.
`a`	The desired cutpoints of METs. Lower and upper limits must be specified. E.g. `a=c(0,3,5,7)`. 0 and 7 are the lower and upper limit, respectively.
`category`	Default is FALSE which means treating METs as continuous. `category=TRUE` and a valid cutpoints `a` will categorize METs by `a`. If `category=TRUE` while no `a` is specified, METs will be treated as continuous.

Value

graph A heatmap generated by ggplot with x axis Time and y axis Date

Examples

```
#Continuous METs
Heatmap(sampledata);
#Categorical METs with cutpoint 0,3,5,7
 Heatmap(sampledata,c(0,3,5,7),category=TRUE)
```

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multipleheatmap *multipleheatmap*

Description

Generate heatmap to show activity intensity (in MET) of multiple participants grouped by specified factor (age, gender, etc.).

Usage

```
multipleheatmap(data, demography, f, category = TRUE)
```

Arguments

data	Combined csv file from SenseWear with multiple participants, participants are distinguished by ID. Refer to sampledata_multiple.rda for sample format.
demography	Demographic data includes the required factor(s) (e.g. age and/or gender) of the corresponding participant.
f	The factor (age, gender, etc.) user wants to group data by.
category	TRUE or FALSE for categorical factor. Default is TRUE.

Details

The mean of METs of available days/groups are calculated and used in the heatmap.

Value

Graph A heatmap generated by ggplot with x axis Time and y axis factor.

Table A table summarizes the number of records of each participant on each day.

Examples

```
# Continuous factor example
multipleheatmap(sampledata_multiple,demography,Age,category=FALSE)
# Categorical factor example
multipleheatmap(sampledata_multiple,demography,Gender,category=TRUE)
```

PASenseWear *Summarize Daily Physical Activity from 'SenseWear' Accelerometer Data*

Description

Package PASenseWear allows you to summarize SenseWear physical activity data and to plot heat map from different perspectives.

Details

Function `Sensewear_report` produces participant's daily activity report.

Function `heatmap` plots heat map for a single participant. It shows the daily activity intensity change and makes it easy to compare activity intensity across different days.

Function `multipleheatmap` gives the availability of grouping participants as user defined categories. The heat map illustrates different daily activity intensities of different groups.

Sample datasets are provided for a referance of data format:

`sampledata` provides one participant's sample activity data.

`sampledata_multiple` provides 4 participants' combined sample activity data. An extra column ID helps to identify different participants.

`demography` records the age and gender of the above 4 participants for the use of plotting group heat map. Users can provide other demographic information for the corresponding useage in function `multipleheatmap`.

sampledata *Simulated Sample SenseWear Data*

Description

Five consecutive days data is provided. The variables are as follows:

- `Time` The time of the record
- `Trans_accel_peaks` Transverse accel-peaks
- `Forw_accel_peaks` Forward accel-peaks
- `Longi_accel_peaks` Longitudinal accel-peaks
- `skin_temp_aver` Skin temp-average
- `GSR_aver` GSR-average
- `Trans_accel_aver` Transverse accel-average
- `Longi_accel_aver` Longitudinal accel-average
- `Near_body_temp_aver` Near-body temp-average
- `Trans_accel_MAD` Transverse accel-MAD

- `Longi_accel_MAD` Longitudinal accel-MAD
- `Step_counter` Step Counter
- `Forw_accel_aver` Forward accel-average
- `Forw_accel_MAD` Forward accel-MAD
- `Lying_down` Lying down
- `Sleep` Sleep
- `Physical_Activity` Physical Activity
- `EE` Energy Expenditure
- `Sedentary` Sedentary
- `Mild` Mild
- `Moderate` Moderate
- `Vigorous` Vigorous
- `METs` Metabolic Equivalent of Task
- `Speed` Speed
- `Distance` Distance
- `Activity_Class` 9-Sleeping, 4-Resting, 7-Motoring, 1-Walking, 2-Running, 10-Elliptical Training, 3-Stationary Biking, 8-Road Biking,5-Resistance
- `Sleep_Class` 0-Awake, 2-Light Sleep, 4-Deep Sleep, 5-Very Deep Sleep
- `Heat_flux_aver` Heat flux - average

Usage

```
data(sampledata)
```

Format

A data frame with 6099 rows and 28 variables

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sampledata_multiple *Simulated Sample SenseWear data with 4 participants combined*

Description

Simulated SenseWear physical activity data for 4 random participants including METs and Time The variables are as follows:

- `Time1` The time of the recorded activity
- `METs` The Metabolic Equivalent of Task of the recorded activity
- `ID` The ID of the participant

Usage

```
data(sampledata_multiple)
```

Format

A data frame with 22818 rows and 3 colomns

`Sensewear_report` *Generate Report for SenseWear activity data.*

Description

Summarize sedentary, mild, moderate, and MVPA related activity measures.

Usage

```
Sensewear_report(data)
```

Arguments

`data`	csv file from SenseWear

Details

MVPA long bout is defined as at least 10 consecutive minutes with METs>=3 (allowing 2 min below that threshold).

Value

`Year` The calendar year of recorded event

`Month` The calendar month of recorded event

`Day` The calendar day of recorded event

`Dayofweek` The day of that week

`Time_on_body_Hrs` Total time (hours) of SenseWear on body

`Time_waking_wearing_Hrs` Total waking time (hours) during wearing time

`Time_on_body_percent` Percent of wearing time of a day

`Steps` Total steps of the day

`Time_lying_Hrs` Total lying time (hours)

`Time_sleeping_Hrs` Total sleeping time (hours)

`Time_sed_Hrs` Total sedentary time (hours)

`TEE_Kcal` Total energy expenditure (Kcal)

`Time_waking_Sedentary_Hrs` When the wearer is waking, the total sedentary time (hours)

`Percent_waking_sed` When the wearer is waking, the percentage of sedentary time to wearing time

`Time_waking_Mild_Hrs` When the wearer is waking, the total mild time (hours)

`Percent_waking_mild` When the wearer is waking, the percentage of mild time to wearing time

Time_waking_Moderate_Hrs When the wearer is waking, the total moderate time (hours)

Percent_waking_moderate When the wearer is waking, the percentage of moderate time to wearing time

Time_waking_MVPA_Hrs When the wearer is waking, the total MVPA time (hours)

Percent_waking_MVPA When the wearer is waking, the percentage of MVPA time to wearing time

Time_waking_Vigorous_Hrs When the wearer is waking, the total vigorous time (hours)

Percent_waking_vigorous When the wearer is waking, the percentage of vigorous time to wearing time

No_sed_breaks Number of sedentary breaks (at least one minute interruption counting as a break)

Time_all_break_length_Hrs Summation of time (hours) of breaks

Average_EE_break_kcal Average energy expenditure of breaks

Time_below_1_METs_Hrs Total time (hours) of MET less than 1

Time_btw_1_2_METs_Hrs Total time (hours) of MET between 1 and 2

Time_btw_2_3_METs_Hrs Total time (hours) of MET between 2 and 3

Time_btw_3_4_METs_Hrs Total time (hours) of MET between 3 and 4

Time_btw_4_5_METs_Hrs Total time (hours) of MET between 4 and 5

Time_btw_5_6_METs_Hrs Total time (hours) of MET between 5 and 6

Time_above_6_METS_Hrs Total time (hours) of MET over 6

Steps_above_1.5_METs Summation of step count when energy expenditure is >1.5 METs with step counts not equal to 0

EE_steps_above_1.5METs_kcal Summation of energy expenditure for in Kcal when energy expenditure is >1.5 METs with step counts not equal to 0

Steps_above_3_METs Summation of step count when energy expenditure is >3 METs with step counts not equal to 0

EE_steps_above_3METs_kcal Summation of energy expenditure for in Kcal when energy expenditure is >3 METs with step counts not equal to 0

Time_100_steps_per_day_Hrs Summation of time (hours) for Steps>=100 per minute

PAEE_above_1.5METs_kcal Summation of energy expenditure in Kcal when energy expenditure is >1.5 METs

Time_PAEE_1.5METs_Hrs Summation of time (hours) when energy expenditure is >1.5 METs

PAEE_above_3METs_kcal Summation of energy expenditure in Kcal when energy expenditure is >3 METs

Time_PAEE_3METs_Hrs Summation of time (hours) energy expenditure is >3 METs

No_unBouted_10min Summation of number of MVPA bout which energy expenditure is >3 METs and length is less than 10 minutes

EE_unBouted_10min_Kcal Summation of energy expenditure of bout which energy expenditure is >3 METs and length is less than 10 minutes

Time_unBouted_10min_Hrs Summation of time (hours) of bout which length is less than 10 minutes

No_Bout_10min Summation of number of bout which length is more than 10 minutes

`EE_Bouted_10min_Kcal` Summation of energy expenditure of MVPA bout which length is more than 10 minutes

`Time_Bouted_10min_Hrs` Summation of time (hours) of MVPA bout which length is more than 10 minutes

`No_Bout_20min` Summation of number of MVPA bout which length is more than 20 minutes

`EE_Bouted_20min_Kcal` Summation of number of MVPA bout which length is more than 20 minutes

`Time_Bouted_20min_Hrs` Summation of time (hours) of MVPA bout which length is more than 20 minutes

`No_Bout_30min` Summation of number of MVPA bout which length is more than 30 minutes

`EE_Bouted_30min_Kcal` Summation of energy expenditure of MVPA bout which length is more than 30 minutes

`Time_Bouted_30min_Hrs` Summation of time (hours) of MVPA bout which length is more than 30 minutes

`Mean_bout_duration` Mean MVPA bout duration which bout length is more than 10 minutes: Time_Bouted_10min_Hrs/No_Bout_10min

`No_Bouts_Extra_Long_steps` The number of bouts of 'extra long' (>500 steps) walks in each day

`No_Bouts_Long_steps` The number of bouts of 'long' (100-499 steps) walks in each day

`No_Bouts_Moderate_steps` The number of bouts of 'moderate' (20-99 steps) walks in each day

`No_Bouts_Short_steps` The number of bouts of 'short' walks (<20 steps) in each day

`Mean_cadence_extra_long` Mean cadence (steps/min) in 'extra long' bouts of walking

`Mean_cadence_long` Mean cadence (steps/min) in 'long' bouts of walking

`Mean_cadence_moderate` Mean cadence (steps/min) in 'moderate' bouts of walking

`Mean_cadence_short` Mean cadence (steps/min) in 'short' bouts of walking

`Mean_cadence_day` Mean cadence (steps/min) in each day

Examples

```
Sensewear_report(sampledata)
```

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