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

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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`.

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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)
```

Index