

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

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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 columns

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 <code>sampledata</code> . |
| a | The desired cutpoints of METs. Lower and upper limits must be specified. E.g. <code>a=c(0, 3, 5, 7)</code> . 0 and 7 are the lower and upper limit, respectively. |
| category | Default is FALSE which means treating METs as continuous. <code>category=TRUE</code> and a valid cutpoints a will categorize METs by a. If <code>category=TRUE</code> 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)
```

| | |
|-----------------|------------------------|
| multipleheatmap | <i>multipleheatmap</i> |
|-----------------|------------------------|

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)
```

| | |
|--------------|--|
| PA SenseWear | <i>Summarize Daily Physical Activity from 'SenseWear' Accelerometer Data</i> |
|--------------|--|

Description

Package PA SenseWear 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 reference 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 | <i>Simulated Sample SenseWear Data</i> |
|------------|--|

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

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 columns

| | |
|------------------|---|
| Sensewear_report | <i>Generate Report for SenseWear activity data.</i> |
|------------------|---|

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 \geq 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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