

# 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 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

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 demography

*Simulated Sample Demographic Data*


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### 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

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 Heatmap

*Heatmap*


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### 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>sampdata</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)
```

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multipleheatmap	<i>multipleheatmap</i>
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**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)
```

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PA SenseWear	<i>Summarize Daily Physical Activity from 'SenseWear' Accelerometer Data</i>
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### 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](#).

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sampledata	<i>Simulated Sample SenseWear Data</i>
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### 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*

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**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

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