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# Sensor Motion Documentation

*Release "1.1.4"*

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Nov 18, 2018

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Python package for analyzing sensor-collected human motion data (e.g. physical activity levels, gait dynamics).

Dedicated accelerometer devices, such as those made by Actigraph, usually bundle software for the analysis of the sensor data. In my work I often collect sensor data from smartphones and have not been able to find any comparable analysis software.

This Python package allows the user to extract human motion data, such as gait/walking dynamics, directly from accelerometer signals. Additionally, the package allows for the calculation of physical activity (PA) or moderate-to-vigorous physical activity (MVPA) counts, similar to activity count data offered by companies like Actigraph.

## 1 Installation

You can install this package using pip:

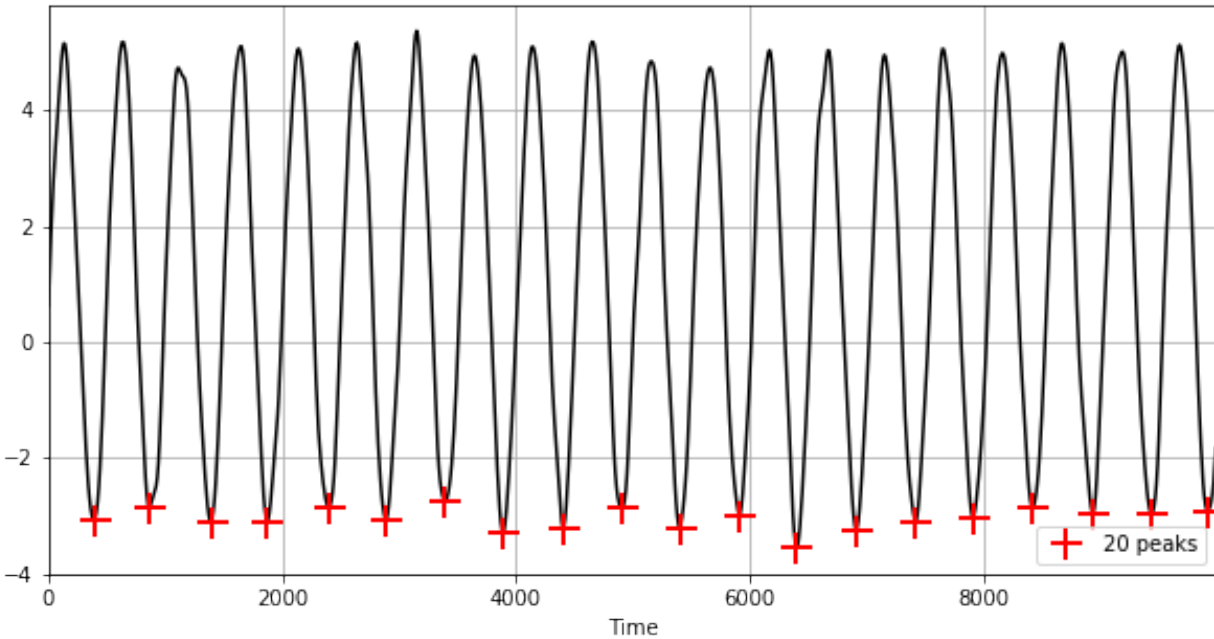
```
pip install sensormotion
```

## 2 Requirements

This package has the following dependencies, most of which are just Python packages:



## Peak Detection (val: 0.6, dist: 10)



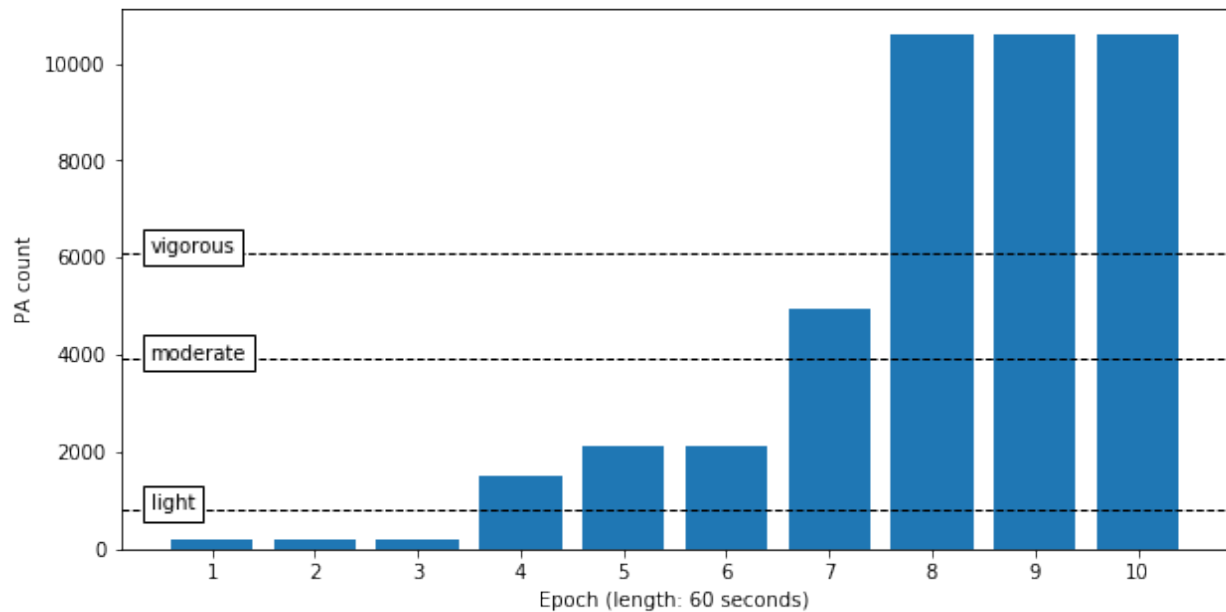
From the detected peaks, we can then calculate step metrics like cadence and step time:

```
cadence = sm.gait.cadence(time=t, peak_times=peak_times, time_units='ms')
step_mean, step_sd, step_cov = sm.gait.step_time(peak_times=peak_times)
```

Physical activity counts and intensities can also be calculated from the acceleration data:

```
x_counts = sm.pa.convert_counts(x, time, integrate='simpson')
y_counts = sm.pa.convert_counts(y, time, integrate='simpson')
z_counts = sm.pa.convert_counts(z, time, integrate='simpson')
vm = sm.signal.vector_magnitude(x_counts, y_counts, z_counts)
categories, time_spent = sm.pa.cut_points(vm, set_name='butte_preschoolers', n_axis=3)
```

## Physical activity counts and intensity



For a more in-depth tutorial, and more workflow examples, please take a look at the [tutorial](#).

I would also recommend looking over the [documentation](#) to see other functionalities of the package.

## 4 Contribution

I work on this package in my spare time, on an “as needed” basis for my research projects. However, pull requests for bug fixes and new features are always welcome!

Please see the [develop branch](#) for the development version of the package, and check out the [issues page](#) for bug reports and feature requests.

## 5 Getting Help

You can find the full documentation for the package [here](#)

Python’s built-in help function will show documentation for any module or function: `help(sm.gait.step_time)`

You’re encouraged to post questions, bug reports, or feature requests as an [issue](#)

Alternatively, ask questions on [Gitter](#)

## 6 Index & Modules

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