NeuroGeriatrics Motion Toolbox

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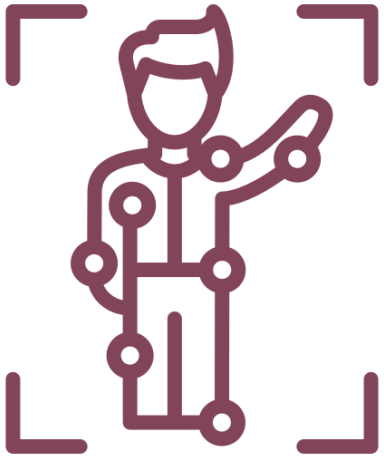
NGMT ...

... a Python package for (IMU-based) motion analysis



NGMT ...

... a Python package for (IMU-based) motion analysis

The objective is to develop a modular algorithmic framework for analysis of daily-life relevant movements

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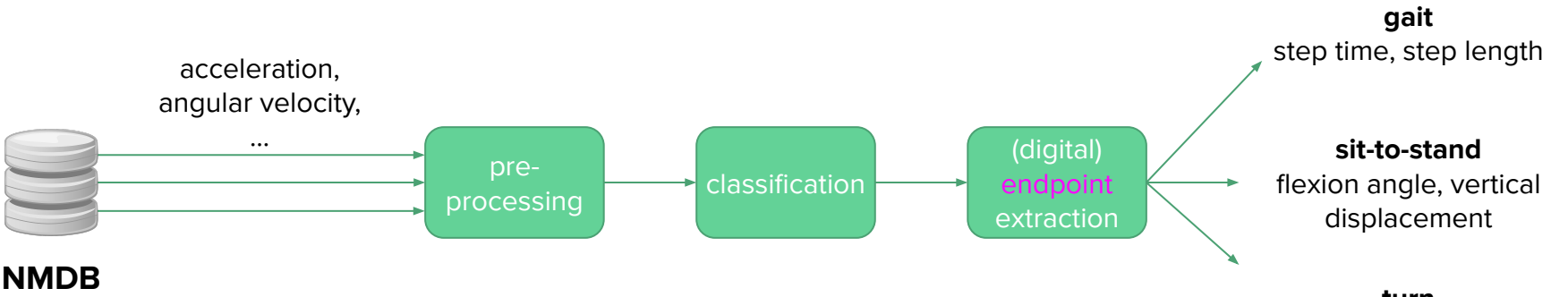
Processing of IMU data




```
from nmdb.datasets import keepcontrol

# Load dataset
dataset = keepcontrol.load_dataset()
```

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```
…

from utils.preprocessing import butter_lowpass_filter

# Low-pass filter sensor data
filtered_data = butter_lowpass_filter(data, fcut=5., fs=200.)
```

```
def butter_lowpass(fcut, fs, order=4):
    b, a = butter(order, fcut/(fs/2), btype='low')
    return b, a

def butter_lowpass_filter(data, fcut, fs, order=4):
    b, a = butter_lowpass(fcut=fcut, fs=fs, order=order)
    y = filtfilt(b, a, data, axis=0, padlen=3*(max(len(b),len(a))-1))
    return y
```

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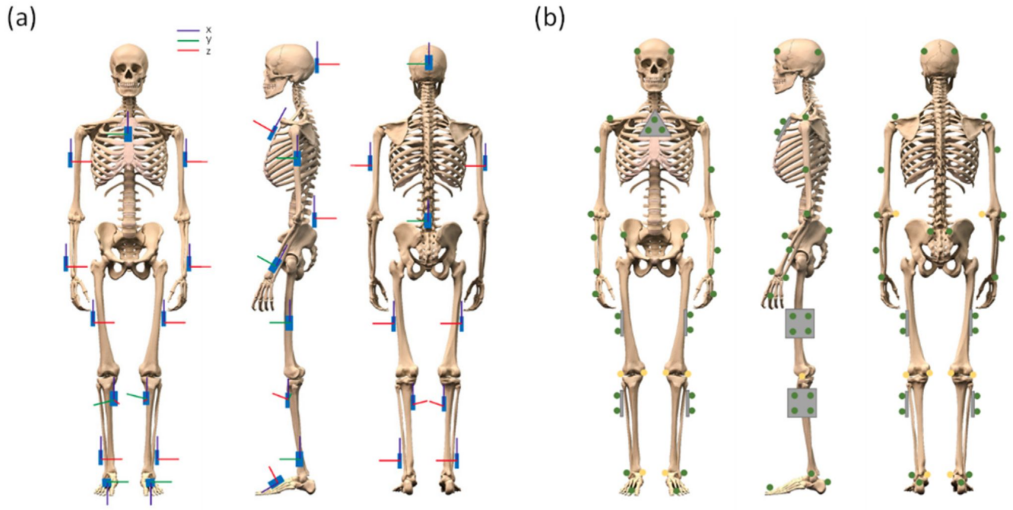
Extracting spatial endpoints, e.g.:

- Step length or stride length,
  - From a shank-worn IMU,

requires a position and orientation (pose) estimation, e.g.:

- Kalman filter/complementary filter



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1. Activity recognition
    - Heuristics-based algorithm (Pham papers)
    - Neural network-based algorithms (...)
2. Extracting digital endpoints that are clinically meaningful
    - Spatial parameters estimation,
    - Temporal parameters
    - ... look at frequency spectra?