Xiaomi Redmi
Apple iPhone
35
30
25
20
15
10
50
100
150
200
250
300
350
400
Acceleration (m/s^2), $\sqrt{(x^2+y^2+z^2)}$
Sample number, t

Three characteristic time spans

- An elementary movement
- A motion
- An action
- ...
- The lifespan

Complex action: workers construct a rack

Complex action: workers construct a rack

Complex action: workers construct a rack

Classification of human physical activity with mobile devices

3D-projection of acceleration time series to spatial axis

$$\mathbf{x} = \{acc_x(t); acc_y(t); acc_z(t)\}_{t=1}^{n} \mapsto \mathbf{y} \in \mathbb{R}^S.$$

Slow walking

Jogging

Performance of the human physical activities classification

1) walk forward
2) walk left
3) walk right
4) go upstairs
5) go downstairs
6) run forward
7) jump up and down
8) sit and fidget
9) stand
10) sleep
11) elevator up
12) elevator down

Ignatov A.D., Strijov V.V. Human activity recognition using quasiperiodic time series collected from a single triaxial accelerometer // Multimedia Tools and Applications, 2015, 17.05.2015 : 1-14.

Complex movement: the worker stretches a string while walking

Complex movement: the worker is drilling while standing

Complex movement: the worker is twitching his hand

The hammer clogs a dowel, elementary movements

The hammer clogs a dowel, the movements join a motion

The motion "to clog dowel"

The motion and its neighborhood to discover an action