



### Activity and Sports Library Swimming Analysis



Swimming is one of the best activities you can do to get and stay in shape. Cardio, meditation, muscle building - you name it, swimming will help you do it.

Nohayo has developed algorithmic abilities especially for swimming that is able to calculate the followings:

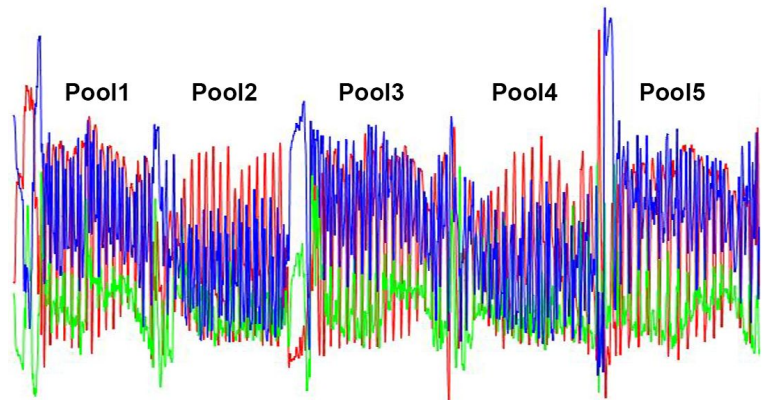
- Lap counting
- Stroke count
- Swimming type detection



The algorithm is suitable for watches and rings that has motion sensors.

### How does it work?

We've collected 780 sessions of swimmers, both professional and amateurs, performing different types of swimings. We analyze the 3D accelerometer\ 3D gyroscope\ 3D magnetometer signals available on the wearables, extract both time and frequency domain features, and apply ML models to detect type of swimming (front crawl, breaststroke, backstroke and butterfly), and count laps and strokes.



### Swimming algorithm performance

The algorithm is implemented in embedded C and can run on wearables like a smartwatch, ring, and earbuds that has a 3-9DOF motion sensors and a DSP unit.

Below are the accuracies of both swimming type detection and pool (lap) count:

	Accuracy
Breaststroke	92.5%
Butterfly	91.9%
Front Crawl	97.9%
Backstroke	96.8%

	Accuracy
0 pools count error	94.2%
Below 1 pools count error	95.6%
Below 2 pools count error	98.9%