1S-17

A 19-μA Metabolic Equivalents Monitoring SoC using Adaptive Sampling

Mio Tsukahara[1], Shintaro Izumi[1], Motofumi Nakanishi[1], Hiroshi Kawaguchi[1], Hiromitsu Kimura[2], Kyoji Marumoto[2], Takaaki Fuchikami[2], Yoshikazu Fujimori[2], and Masahiko Yoshimoto[1]

[1]Kobe University, Japan
[2]Rohm Co. Ltd., Japan

METs estimation

METs (Metabolic Equivalents): PA intensity indicator

1. Measurement with Douglas bag test

○ The most accurate way following METs definition

× NOT suitable for daily use

2. Estimation method with Triaxial accelerations

○ Stress-free way using small accelerometer

× Poor power efficiency with fixed sampling rate

The problem of power should be solved for more user-friendly METs estimation.

http://www.linkdediet.org/hn/modules/pico/index.php?content_id=501

Prop. METs estimation algorithm

Triaxial accelerations

Adaptive sampling

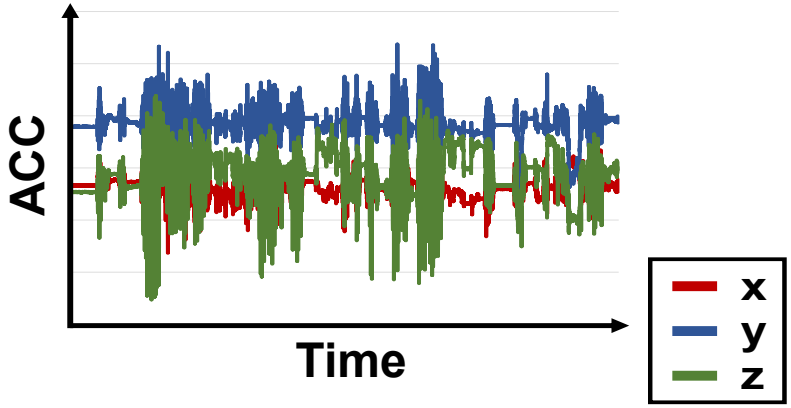
Synthetic acceleration

$$\sqrt{x^2 + y^2 + z^2}$$

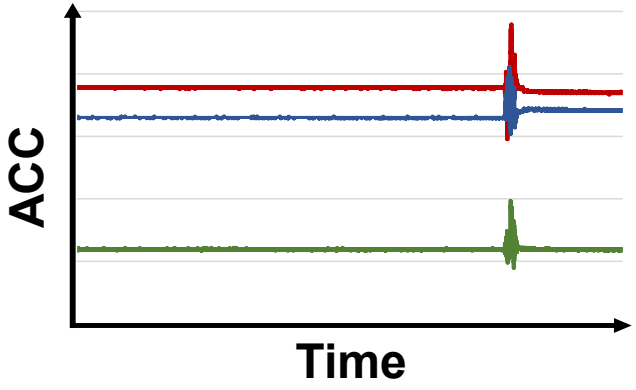
Classify the PA level

Estimate METs

- Running → **High SR**



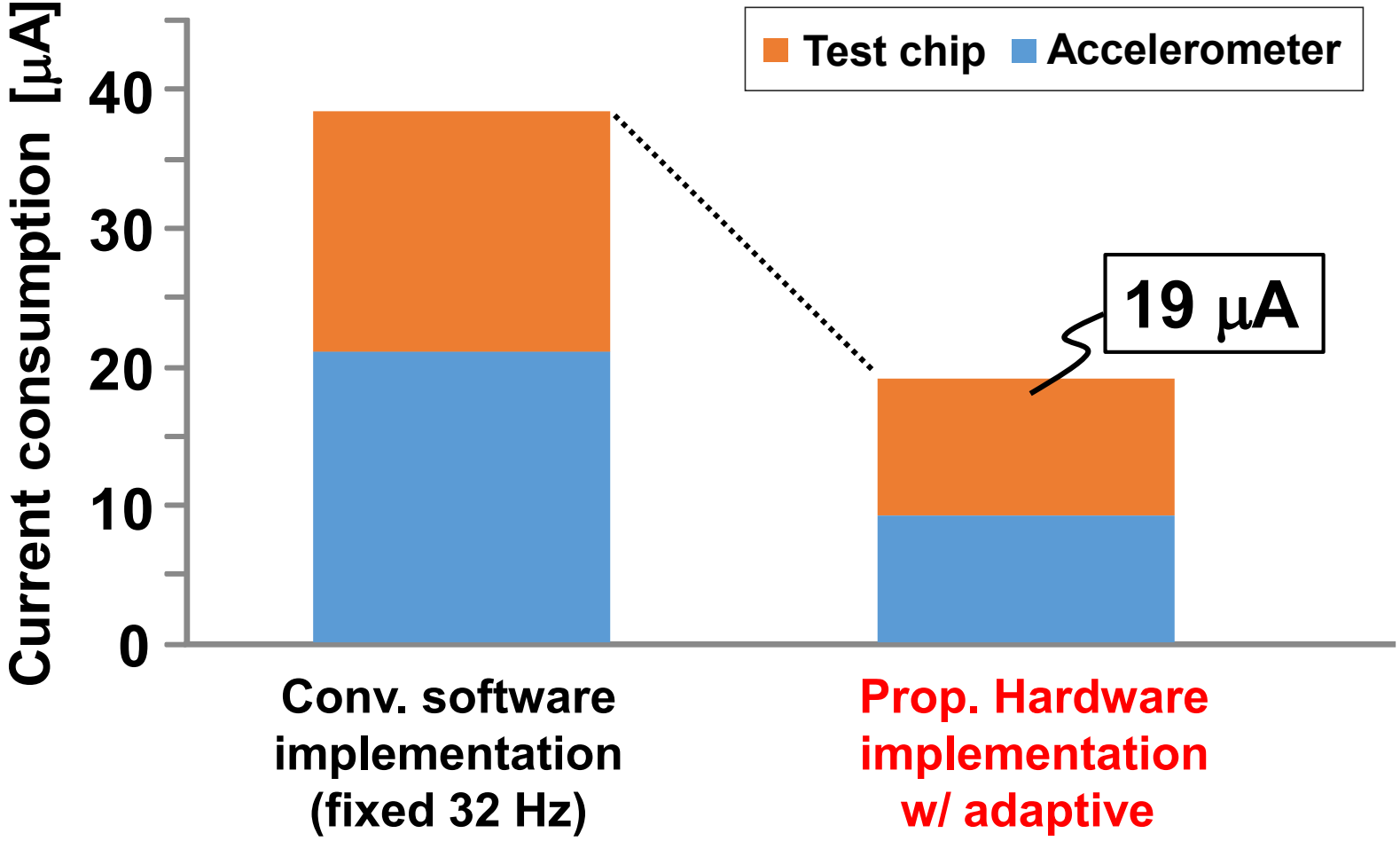
- Sleeping → **Low SR**



Adaptive sampling can reduce estimation power at low sampling rate.

Hardware implementation

- System-level current consumption



Prop. system achieved 19μA consumption in total.