

EECS 507: Introduction to Embedded Systems Research Applications: Wearables

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Properties

Worn on body.

Unobtrusive.

Measures and displays data from body or environment.

Many niches, with activity monitoring and sports important.

Market and history I

2000s: Flashing clothing digital “art” exhibits.

2003–: Garmin Forerunner sports watch.

2004–: Suunto sports watch.

2009–: Fitbit activity tracker.

2010–2017: Recon HUD. Sold to Intel in 2015. ☠

2012–: Misfit Shine activity tracker (Fossil Group at \$260M in 2015).

2013–2016: Pebble smart watch. ☠

2013–2015: Bia sports watch. ☠

2014–2015: Google Glass. “Enterprise edition” promised in the future. ☠

2015–: Apple smart watch.

2011–2017: Jawbone activity tracker. 🦴

Xiaomi also a major player.

Many, many more. 🦴, 🦴, 🦴





Bia Sportswatch





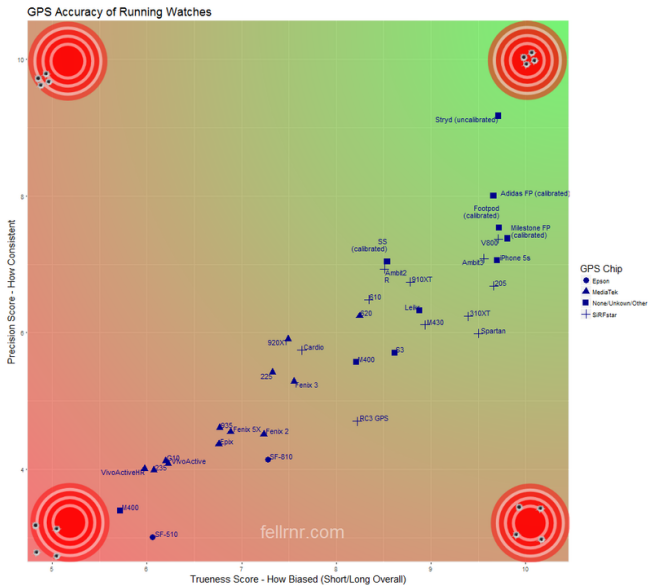
2015–: wearable power meter for runners and triathletes.

Focused on specific training and racing use cases.

Broad ecosystem support.

Focus on product performance.

GPS vs. IMU



Piazza Stryd questions I

What were the biggest technical challenges in founding Stryd and making it self sustaining?

- Signal processing algorithm design.
- Wireless communication reliability.
- Training portal development.
- Hiring salespeople and marketers.
- Identifying product-market fit.

Were there specific venture capital related challenges?

None severe, as we used an unconventional strategy. A lot of time and work, though.

What unforeseen failures did the Stryd devices have in the field?

What would you recommend for those interested in wearables?

- Start searching for a large-market, “sticky” app now. It will take a while to find.
- Simple or no prototypes at first.

Is there a specific component or optimization for such devices that are often overlooked?

- Power consumption.
- Deep understanding of use case to eliminate frustrations and time wasters.
- Interoperability.
- Scientific underpinings.

What is the current state of Stryd, and what is the ultimate end-goal for the company?

- Market leader for wearable power meters.
- “Gold standard” .
- Self-sustaining and growing.
- Focused on customers and product design.
- Not answering end-goal question, because doing that would be in conflict with my duties as a board member.

Security

Strava is a military security nightmare as US base locations are leaked by fitness fanatics

By tracking user's exercise habits, Strava has unwittingly become a major security breach for the US military

Vaughn Highfield

@starfox118

29 Jan 2018



Strava, the running and cycling fitness tracking app, has unwittingly revealed some of the US

Wearables: a target-rich environment

Detailed training and performance data.

Location tracking.

Control of drug delivery.

Heart stimulation, etc.

Bluetooth LE / SMART.

USB.

ANT+.

Common sensors

IMUs.

(Optical) heart rate.

Temperature.

Barometers.

Blood glucose.

GSR.

Many more.

Design considerations

Determine most important attributes for specific application.

Optimize these (they will almost certainly conflict).

Focus on capabilities not specifications: Apple not Samsung.

Killer app.

Generality vs. stickiness.

Medical.

Conductive fabric.

CNT probes.