

Mobile hydration sensor technology

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Demonstration of device prototype technology is available

Scope

What is hydration sensor? Who need it?

Markets for hydration sensor technology

Physics of operation

Operation example

Questions

What is hydration sensor? Who need it?

-hydration sensor traces amount of water in our blood



ACE
AMERICAN COLLEGE OF
EXERCISE PHYSIOLOGY

THE IMPACT OF HYDRATION ON ATHLETIC PERFORMANCE

RESEARCH FROM THE ACE SCIENTIFIC ADVISORY PANEL
W. LARRY KENNEY, PH.D., FACSM

Maintaining optimal hydration is essential during exercise, as both dehydration and overhydration can be detrimental to performance and, if extreme, can have severe health consequences.

Dehydration occurs during high-intensity or long-duration exercise, especially in hot and humid conditions. Symptoms include thirst, flushed skin, apathy and discomfort. Exercise performance begins to decline once water loss exceeds 2% of an individual's body mass. In addition to physical impairments, dehydration also impairs cognitive function, including reaction time, task performance and mood state.

Overhydration occurs when plasma sodium concentration levels drop too low, either because water clearance by the kidneys is insufficient or water intake exceeds sweat losses. Signs include dizziness, nausea and puffiness, which worsen to confusion, vomiting and swelling of the hands and feet when plasma sodium concentration levels continue to drop. Overhydration is typically treated with hypertonic fluids or IV infusion.

Assessing hydration status involves monitoring changes in body weight, urine color and thirst, and can be used to help make individualized decisions for replacing fluids. People who exercise longer than 60 minutes, especially in hot and humid environments, may benefit from drinking fluids with added carbohydrates or electrolytes.

THE IMPACT OF HYDRATION ON ATHLETIC PERFORMANCE 1

Smartwatch history notes...



The idea of a SmartWatch has been taken from the 1940's comic strip, **Dick Tracy**, who was a detective.

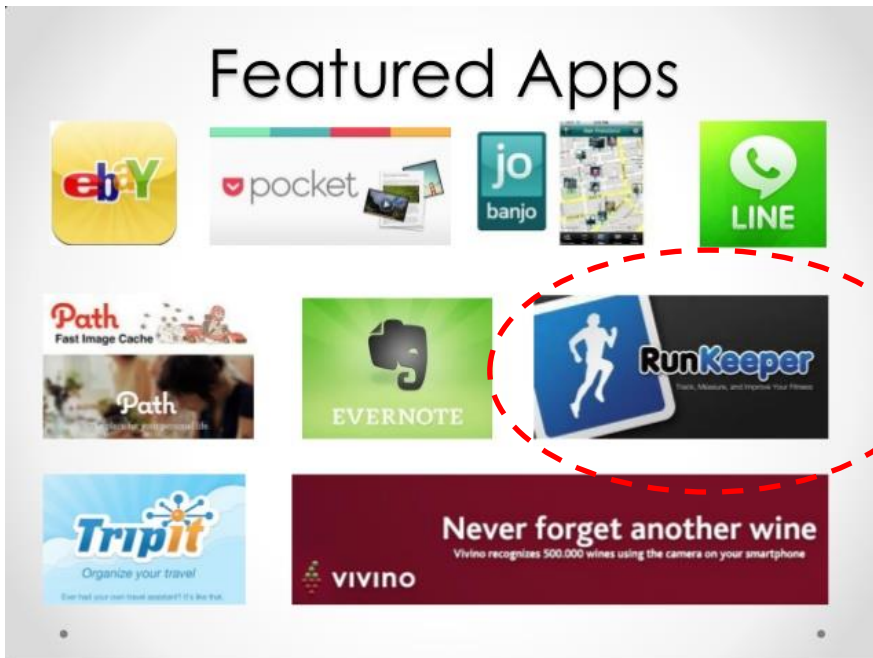
He had a two way communicating watch.

The 1st SmartWatch was introduced in 2004. Produced by **SWATCH**, **FOSSIL** and **TISSOT**

But these were discontinued by 2008.



Smartwatch with sport and health apps



Smartwatch with sport and health apps

Elderly



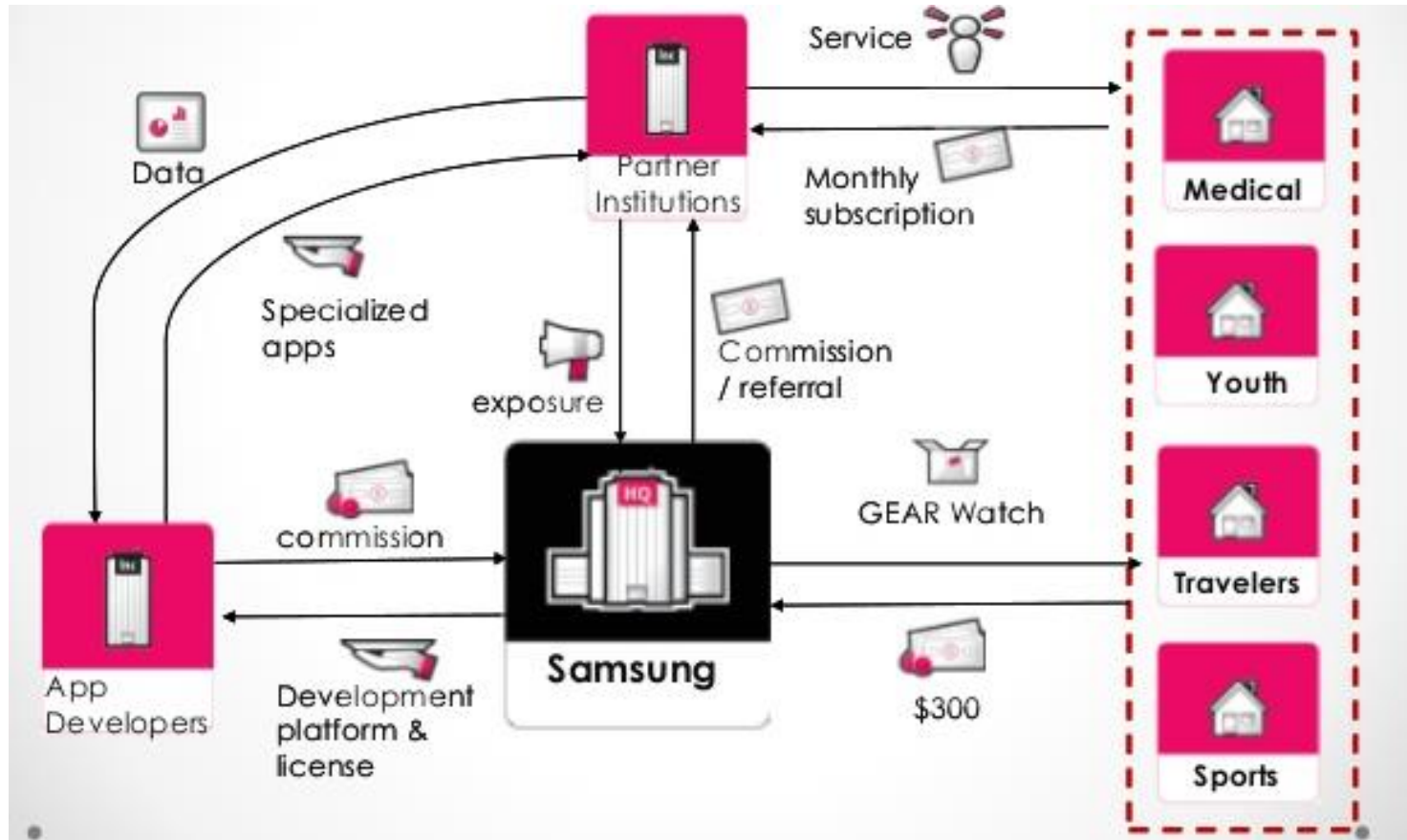
- ✓ Wearable
- ✓ Intelligent alert system
 - ✓ Heart attacks
 - ✓ Parkinson disease
 - ✓ Sudden falls
- ✓ On-the-go care
 - ✓ Health monitor
 - ✓ (heart beat, hydration -> backlogs)
 - ✓ Medicine reminders
 - ✓ Dietary consumption warnings

Sport



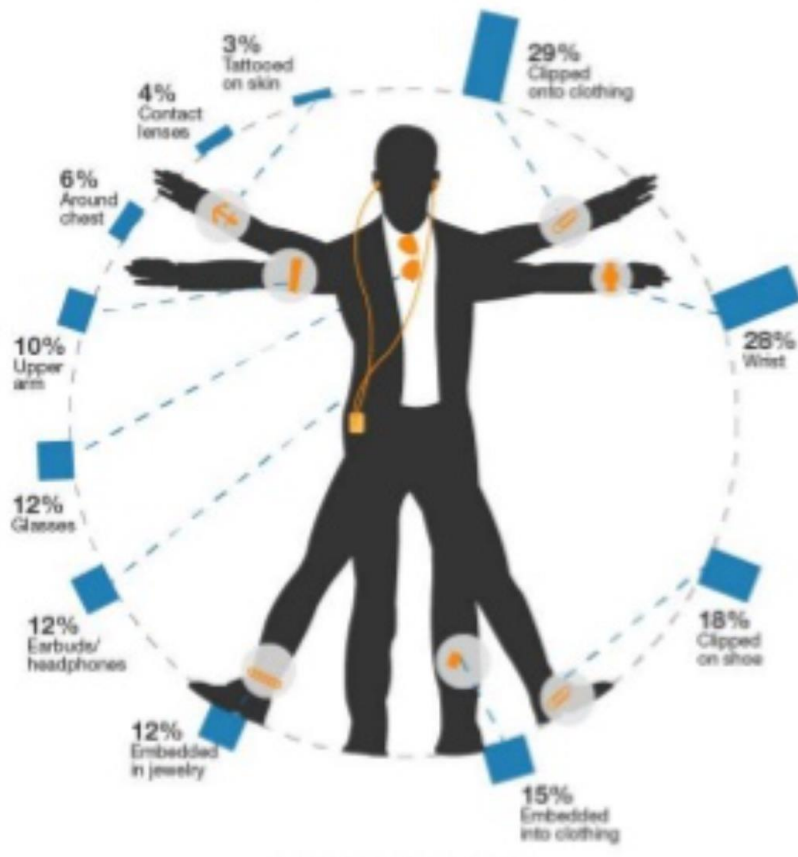
- ✓ Wearable (ergonomic)
- ✓ Waterproof
- ✓ Athlete performance feedback
 - ✓ Instant & real-time
 - ✓ Intelligent & integrate-able to gestures
 - ✓ Monitor & keep track
- ✓ Dynamic training enhancer
 - ✓ Audio-based, On-the-fly coach suggestion

Samsung vision of healthcare



Healthcare/sport vs sensors

Sensors position



Market for mobile electronic devices: \$35 millions in 2019

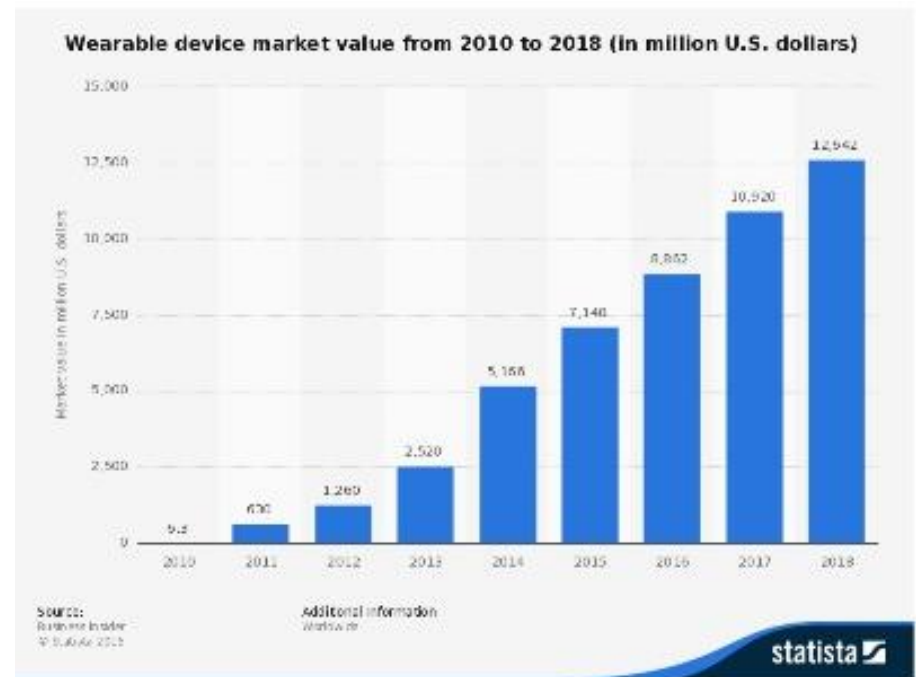
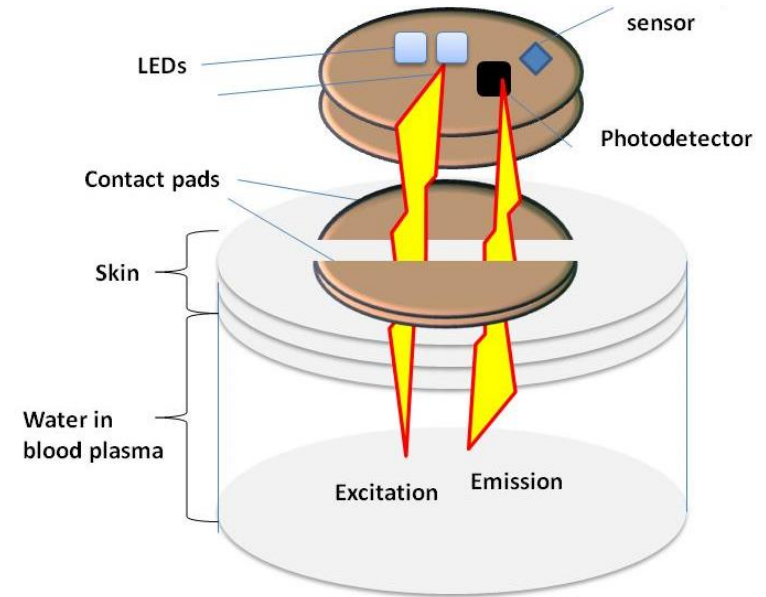
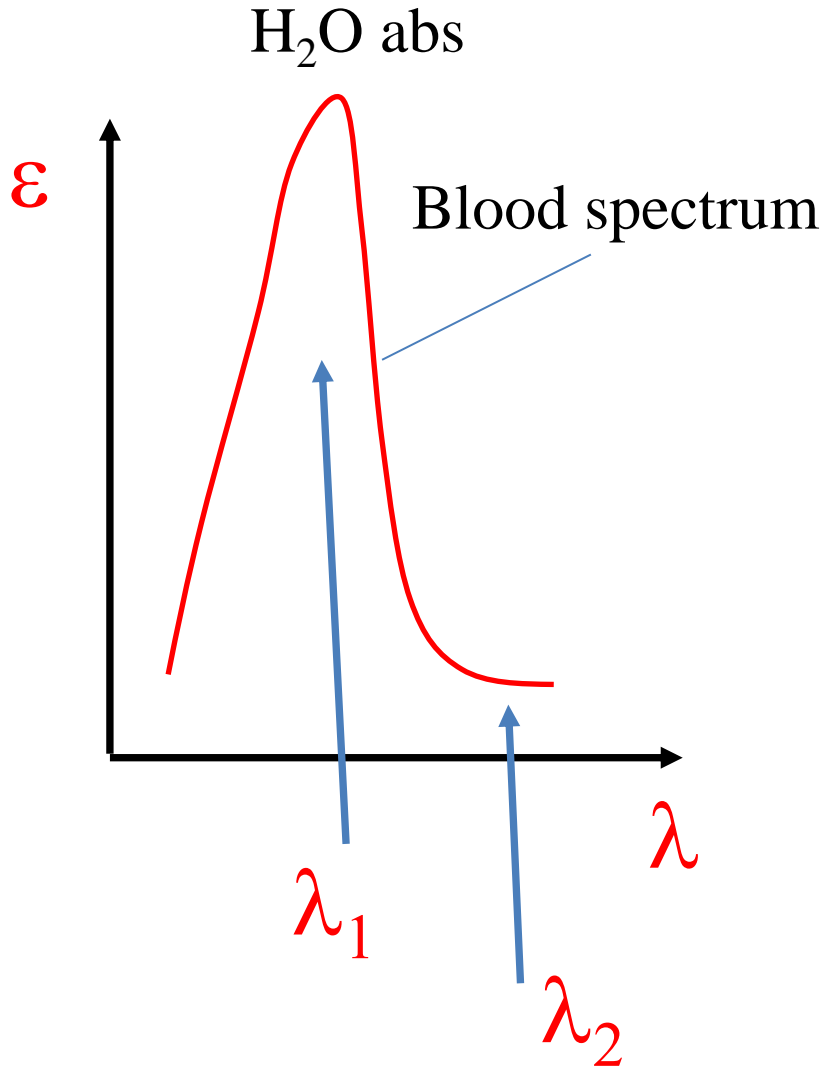


Figure 2.4: Annual Market Size Projections(Statista 2014)

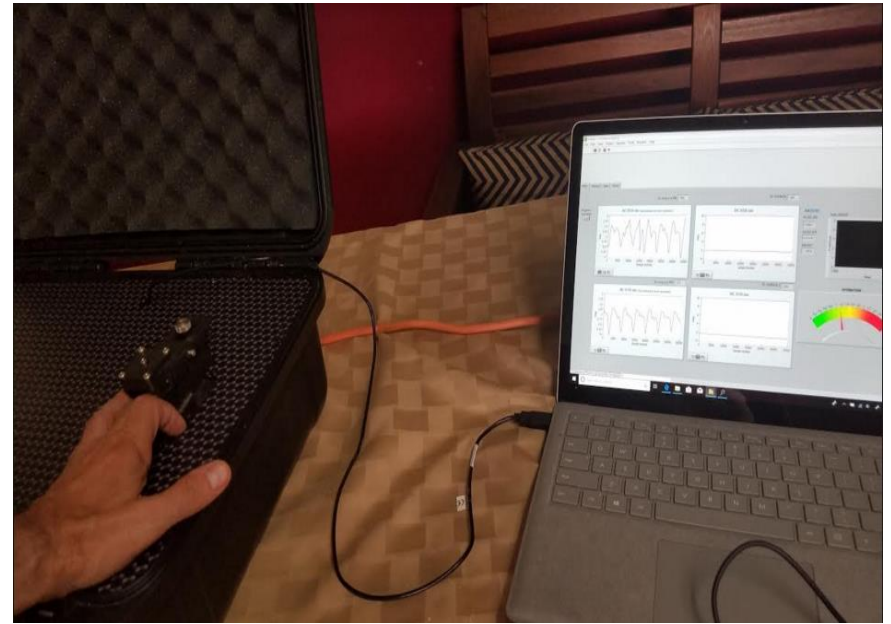
Market verticals

- Measurements of body hydration in ER, hospitals and clinics
- Biomedical devices and wearable electronics
- Smartwatches, Healthwatches and health insurance market
- Navy, AF, Army and NASA
- Runners, cyclists, professional and armature athletes.
- Narrow population groups: parents of infants, people with metabolism problems, autism etc.
- Elderly population and assistance living management
- Owners and users of gym equipment, sauna, jacuzzi
- Owners of daycares, parents of obesity kids, school authorities
- Producers of power drinks, water products and supplementary product.

Physics of operation

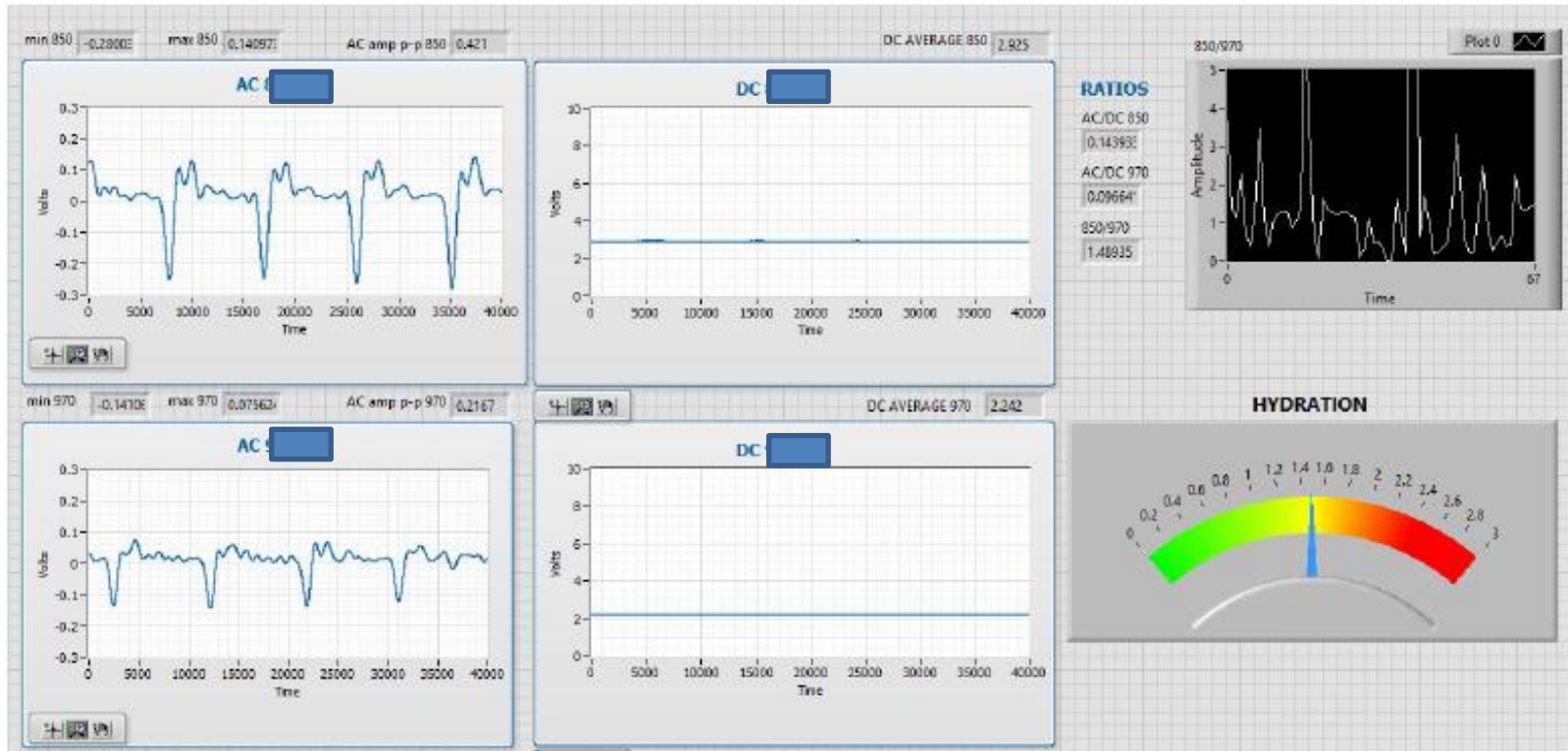


Operation example



Operation example

New Jig - Middle finger, left hand, male, age 48



Advantages of hydration sensor

- We offer clear, unambiguous measurement of the hydration in blood and tissue: direct testing of water amount through the skin, easy and straightforward interpretation without any bulky computation.
- Our on-chip hydration sensor technology utilizes a unique two beams optoelectronic measurement of water peaks in the blood plasma spectrum at selected wavelengths, which is complex and fast enough to include all information to determine amount of water in blood and tissue.
- The hydration sensor technology was developed as on-chip device to be accurate, reliable and easy to integrate into modern technology world. Prototype (Fig. 1) is available for immediate demonstration

Perspective model of hydration sensor



Conceptual design of smartwatch with hydration sensor chip.