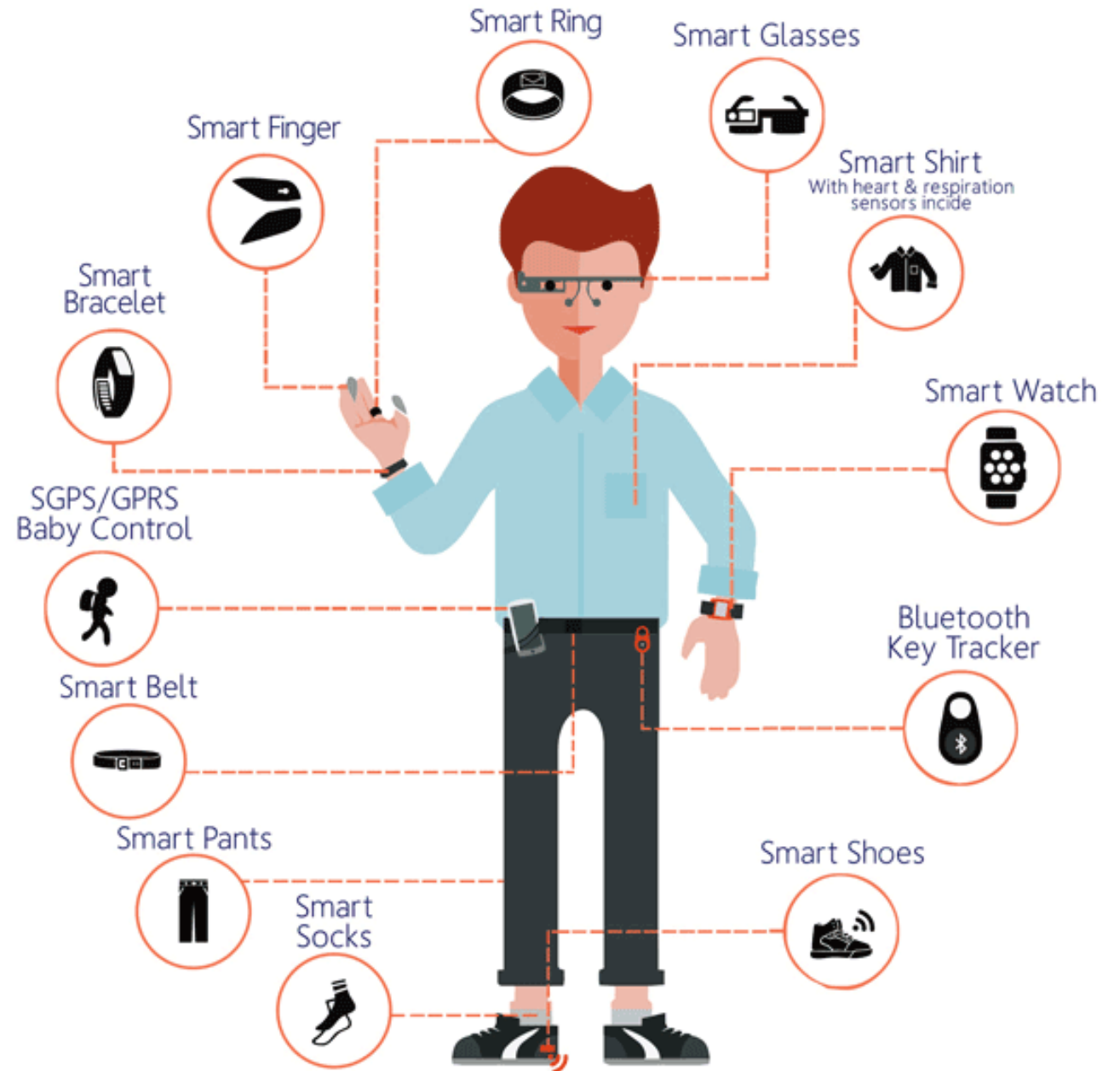
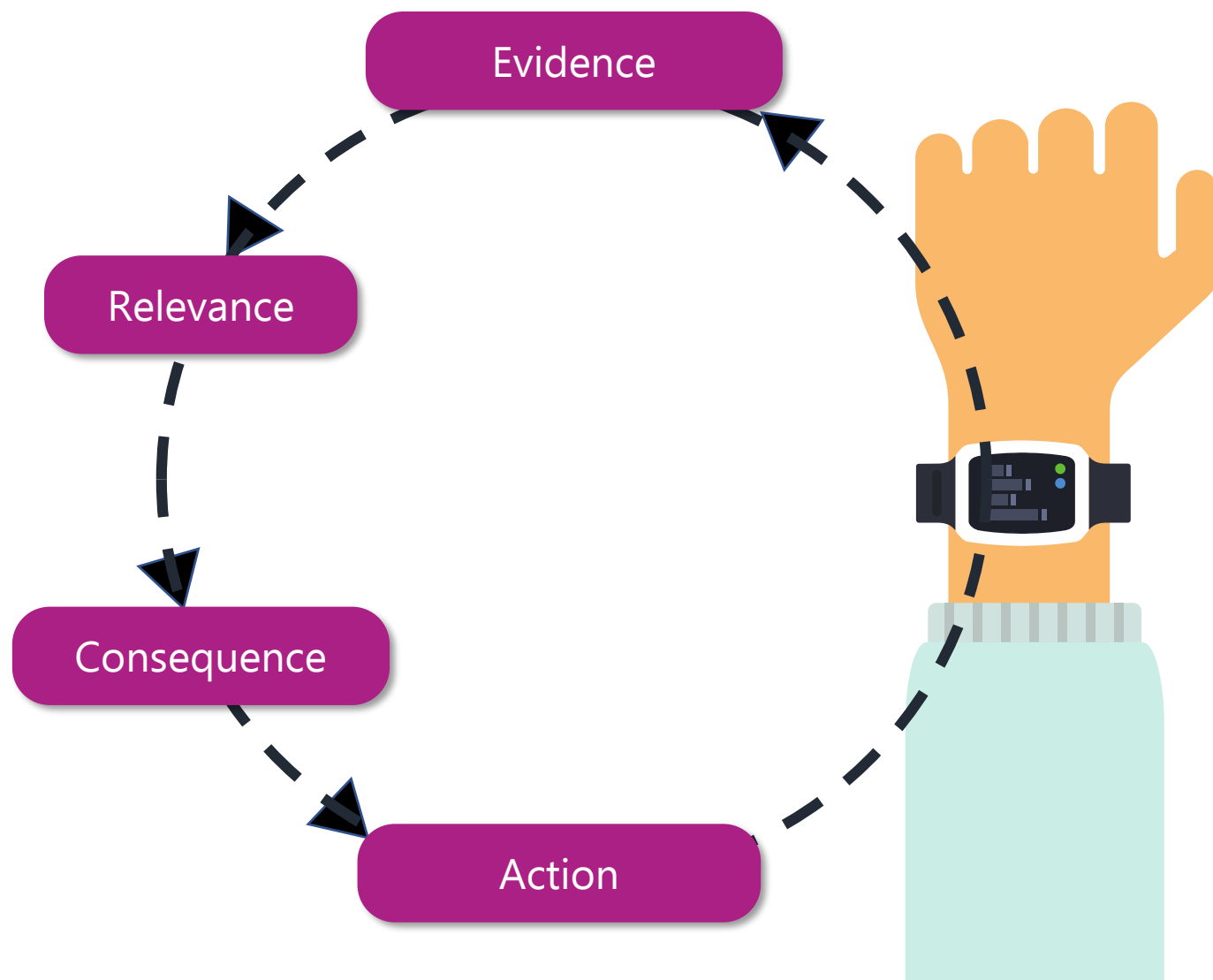


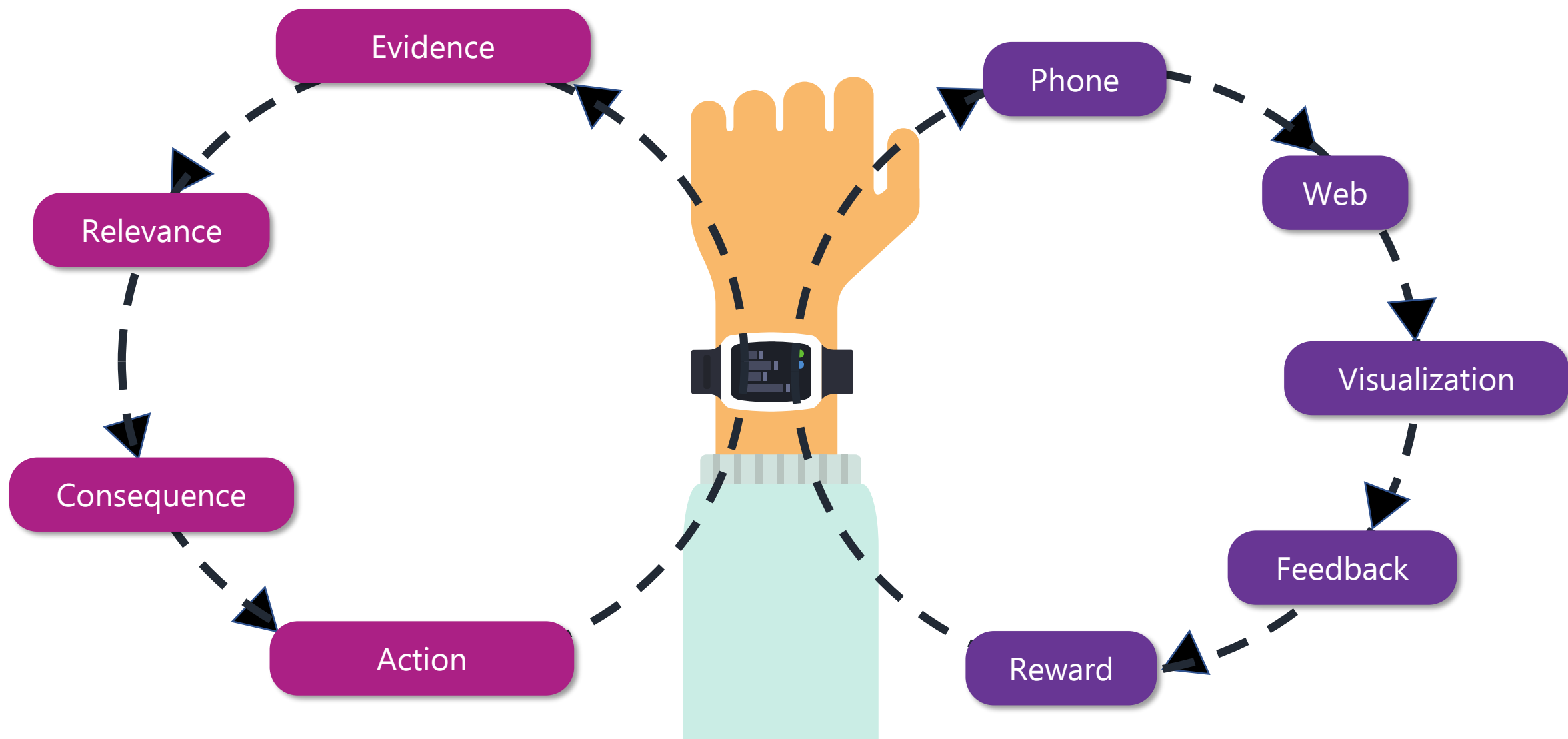
Seven minutes to Jade Palace

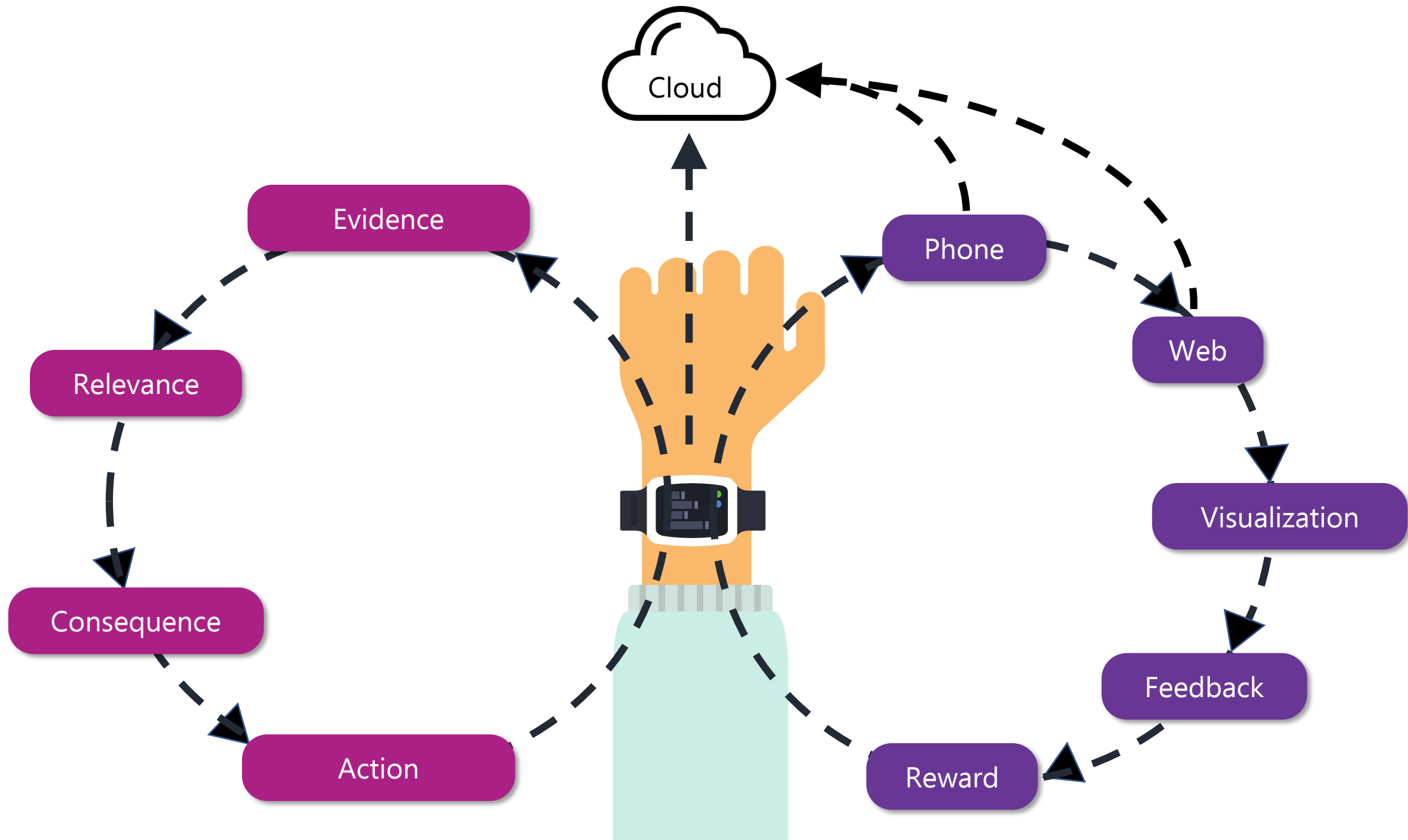
Robert Furberg
@medicfurby

What are wearables?

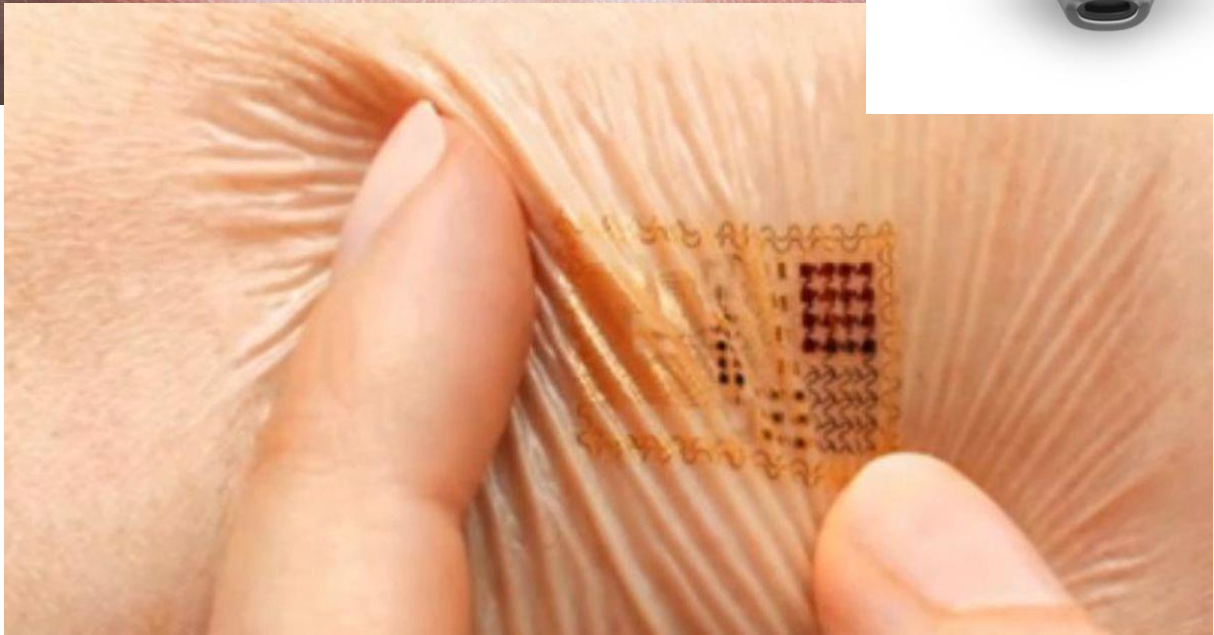
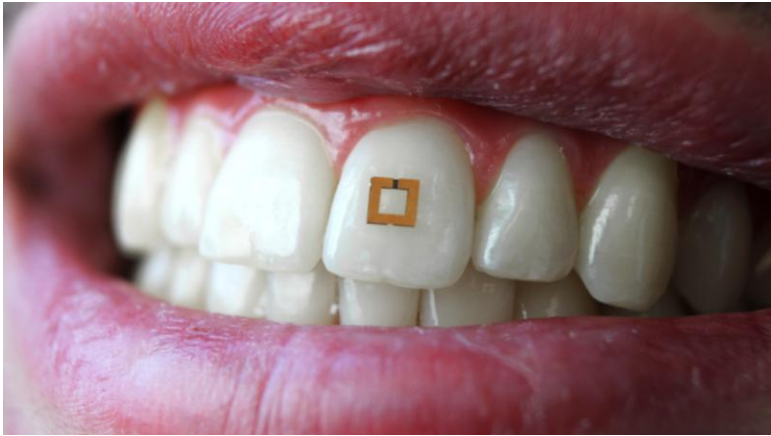
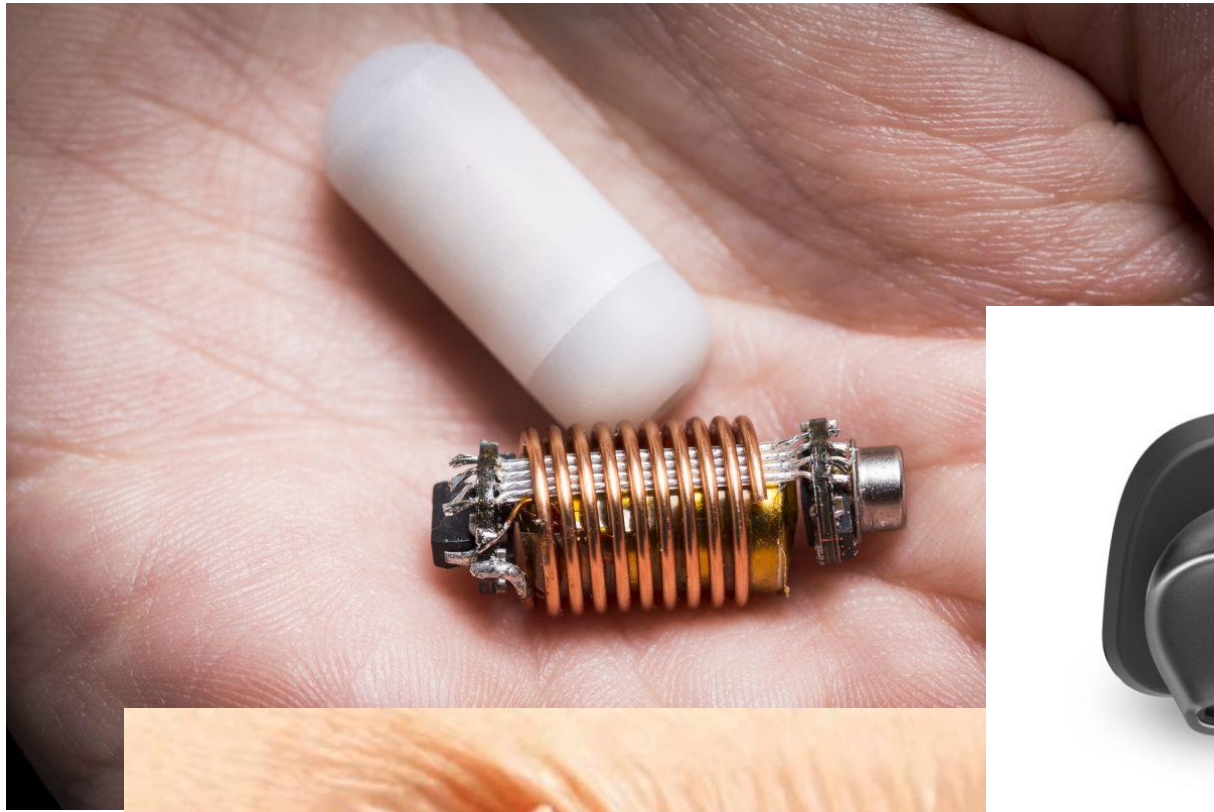




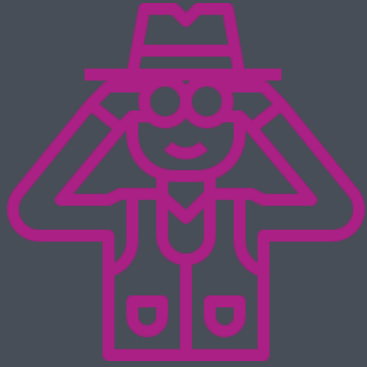








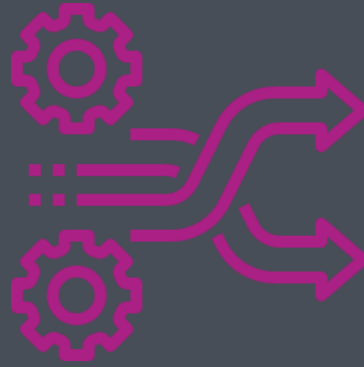
Personal sensor data enable distributed, low-burden, and longitudinal measurement of human behavior and physiology.



Observation

Consumer

- Effectively unregulated (health & fitness)
- No regulatory filing (510k exempt)
- Self-directed
- Low cost
- Heavily processed data
- User feedback



Intervention

Research

- Class II Devices (e.g., vital signs monitors)
- Premarket Notification [510(k)]
- Investigator-directed
- Higher cost
- Raw data available
- Feedback controls



Prediction

Clinical

- Class III Devices
- Premarket Approval (PMA)
- Physician-ordered
- Highest cost
- Raw data available
- May include user feedback

Fitbit Versa 2

\$229.95

Smartphone integration
Physical activity
Sleep tracking
Heart rate
Goal setting
Feedback / reminders
Personal fitness
FDA exempt fitness product



Apple Watch (S5)

\$399.95

Smartphone integration
Physical activity
Sleep tracking
Heart rate
Goal setting
Feedback / reminders
Personal fitness
Female health
FDA Class II Medical Device
18h battery life

Omron HeartGuide

\$499.95

Smartphone integration
Physical activity
Sleep tracking
Heart rate
Blood Pressure
Companion app for goal setting and MD review
FDA 501K FDA Cleared



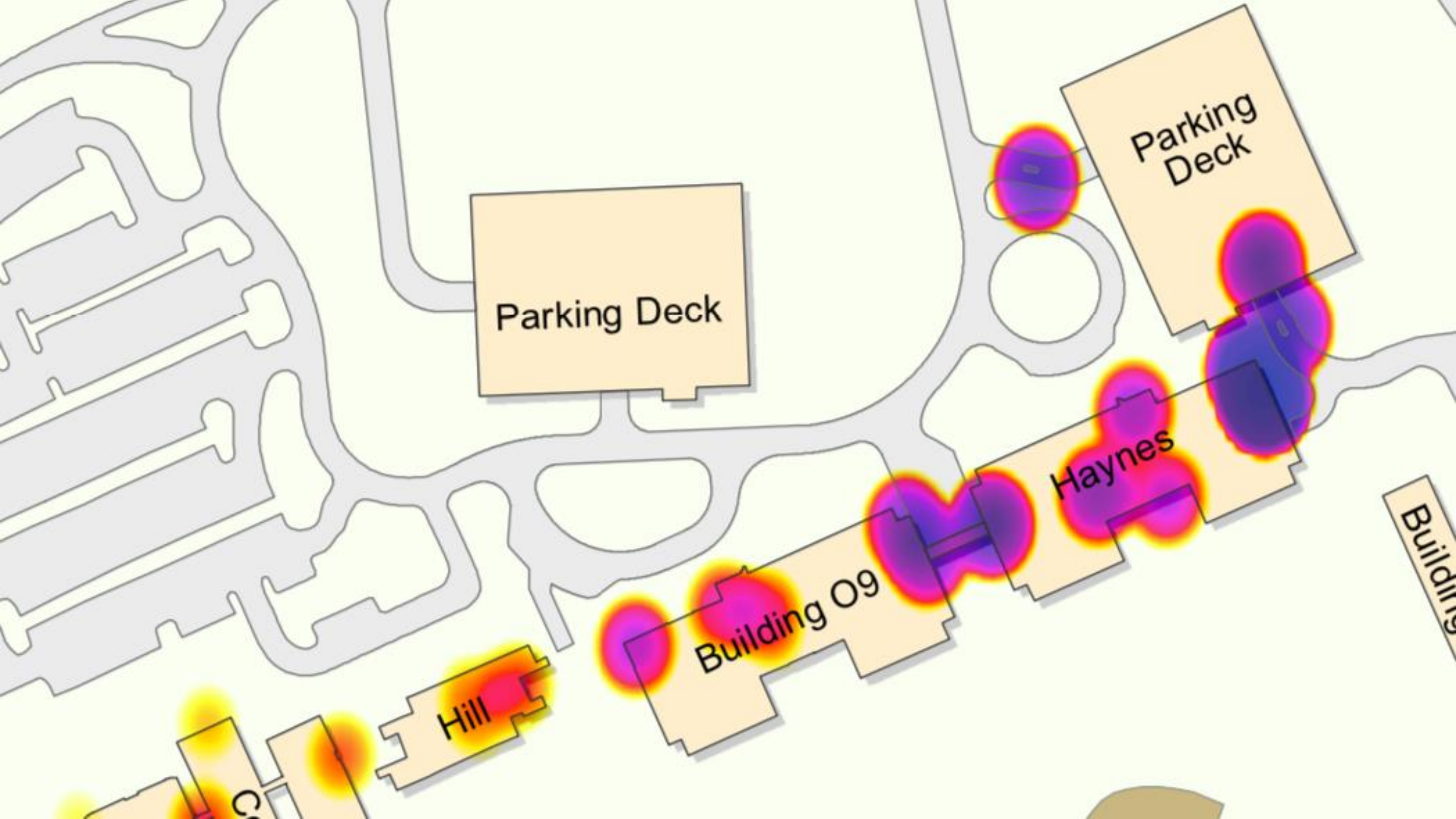
ActiGraph CentrePointe

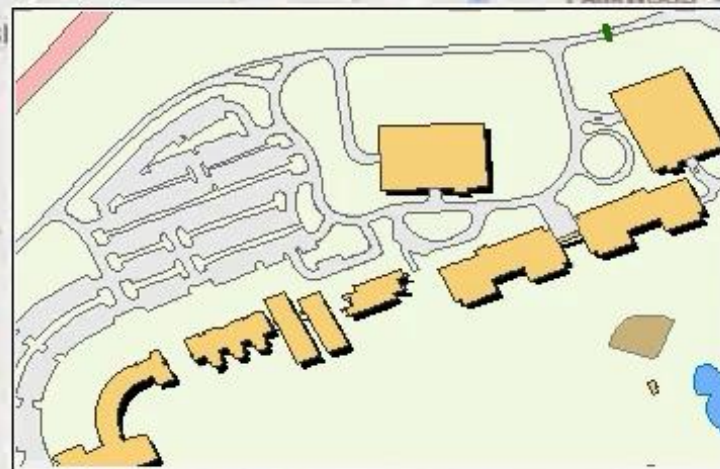
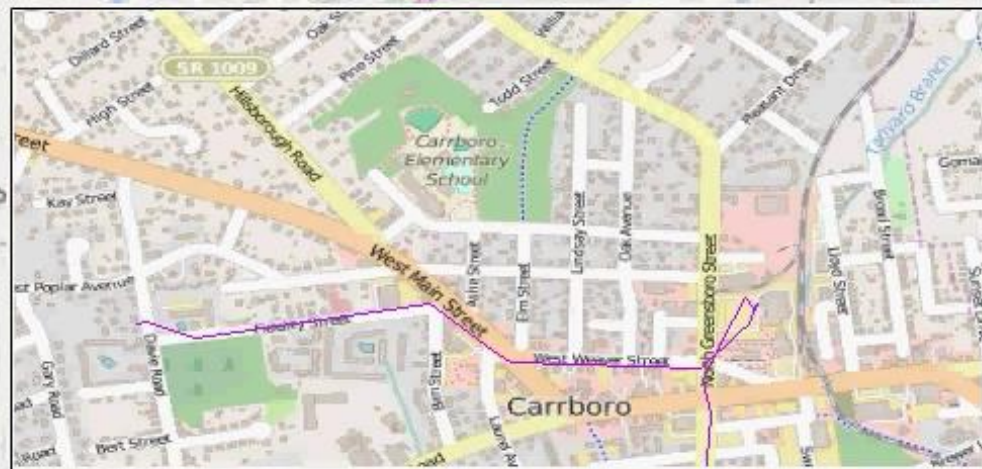
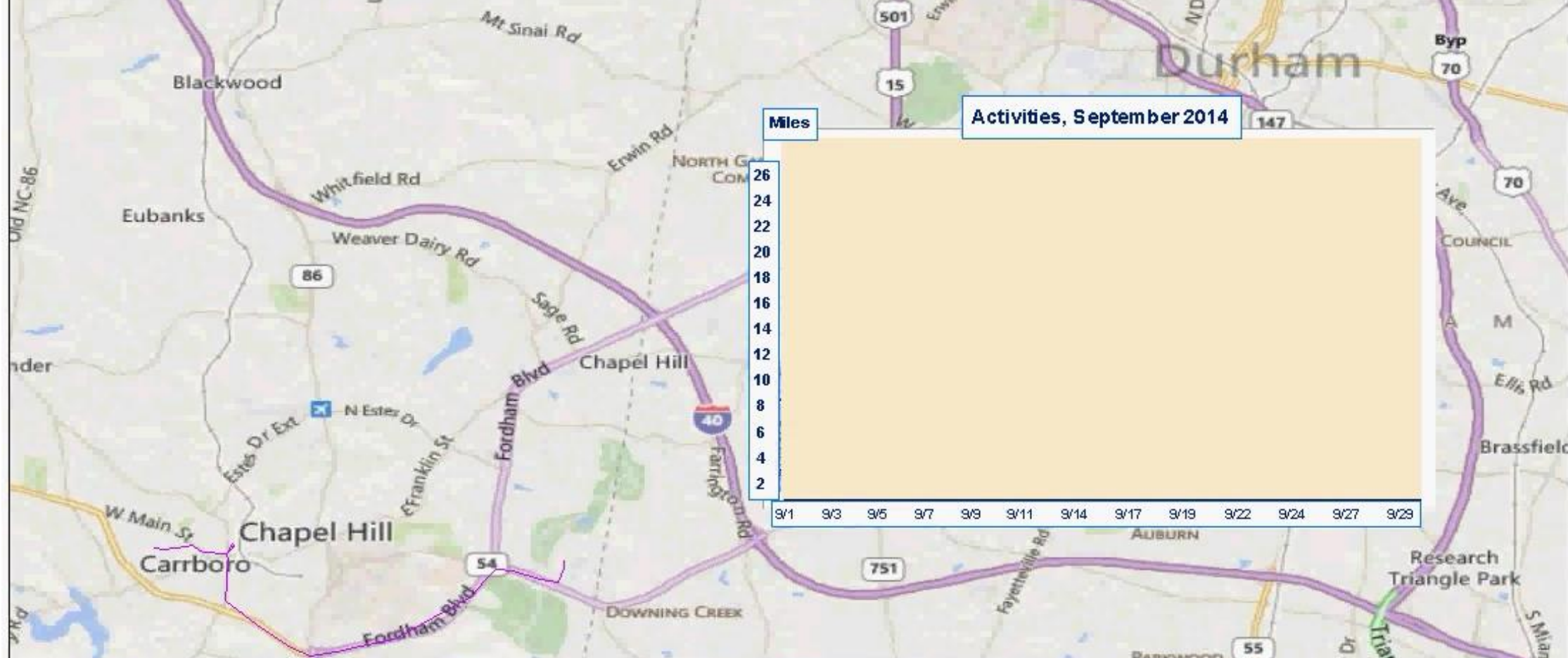
\$\$\$

NO smartphone integration
Raw acceleration
Energy Expenditure
METs
PA intensity
Sleep actigraphy
Regulated data management
30d battery life



seven minutes to jade palace







Do Not Disturb While Driving

Your iPhone can detect when you may be driving and automatically silence your incoming alerts and notifications.

Turn On While Driving

Not Now

AT&T



64%

10:55

Thu, Aug 15

DO NOT DISTURB WHILE DRIVING

You will not receive
notifications while you are
driving.



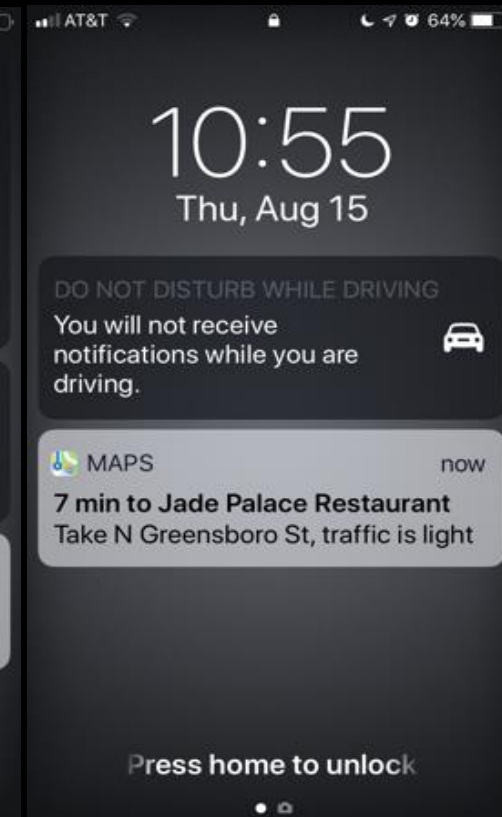
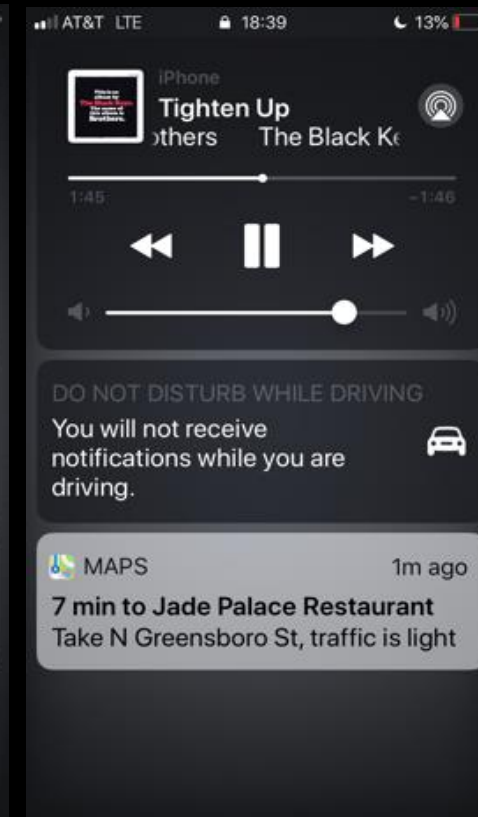
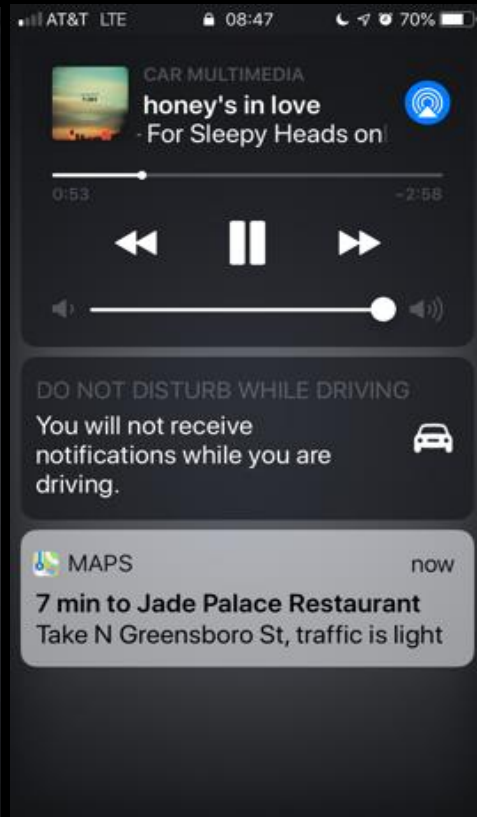
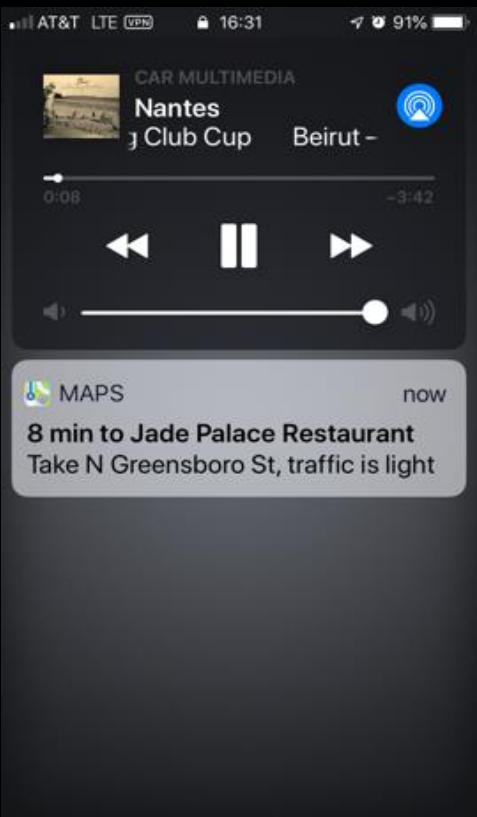
MAPS

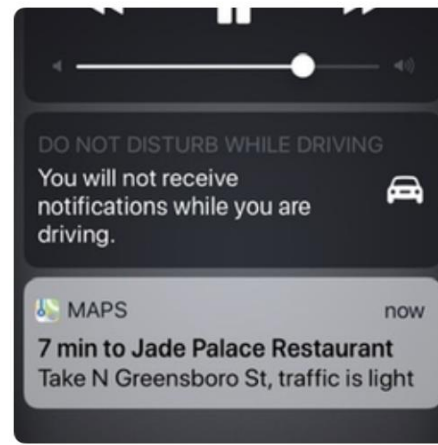
now

7 min to Jade Palace Restaurant
Take N Greensboro St, traffic is light

Press home to unlock







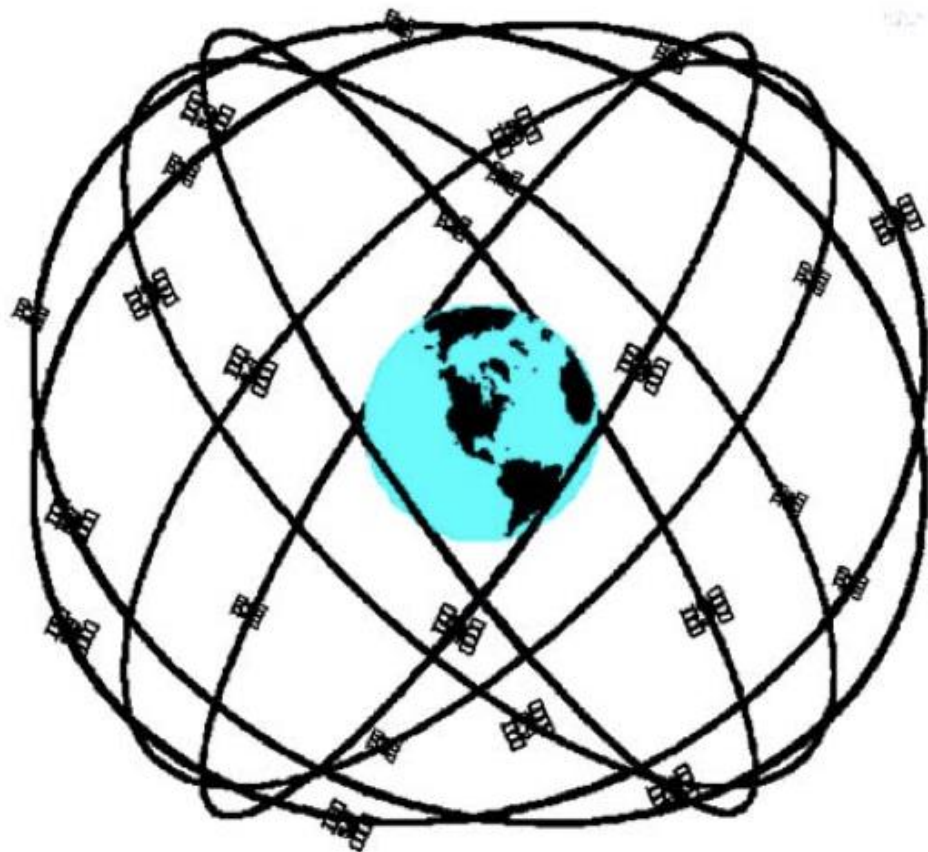
jade palace

109

HOW?

...DID THIS HAPPEN?!

(And what would this look like if not spatial data, but a trusted physiological measure?)



GPS Nominal Constellation
24 Satellites in 6 Orbital Planes
4 Satellites in each Plane
20,200 km Altitudes, 55 Degree Inclination

- Massive infrastructure
 - Cost
 - Standards
 - Governance
- Sustainability
 - \$218 billion
 - Digital transformation
- Risk-benefit
 - Neutral / net-positive
 - FCC fines



Press Release Details

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11/01/2019

[Download this Press Release \(PDF\)](#)

Fitbit to Be Acquired by Google

SAN FRANCISCO--(BUSINESS WIRE)-- Fitbit, Inc. (NYSE: FIT) today announced that it has entered into a definitive agreement to be acquired by Google LLC for \$7.35 per share in cash, valuing the company at a fully diluted equity value of approximately \$2.1 billion.

“More than 12 years ago, we set an audacious company vision – to make everyone in the world healthier. Today, I’m incredibly proud of what we’ve achieved towards reaching that goal. We have built a trusted brand that supports more than 28 million active users around the globe who rely on our products to live a healthier, more active life,” said James Park, co-founder and CEO of Fitbit. “Google is an ideal partner to advance our mission. With Google’s resources and global platform, Fitbit will be able to accelerate innovation in the wearables category, scale faster, and make health even more accessible to everyone. I could not be more excited for what lies ahead.”

Large-Scale Assessment of a Smartwatch to Identify Atrial Fibrillation

Marco V. Perez, M.D., Kenneth W. Mahaffey, M.D., Haley Hedlin, Ph.D., John S. Rumsfeld, M.D., Ph.D., Ariadna Garcia, M.S., Todd Ferris, M.D., Vidhya Balasubramanian, M.S., Andrea M. Russo, M.D., Amol Rajmane, M.D., Lauren Cheung, M.D., Grace Hung, M.S., Justin Lee, M.P.H., et al., for the Apple Heart Study Investigators*

Johnson & Johnson Announces Research Study with Apple Watch to Help Improve AFib Outcomes Including Stroke Prevention

Johnson & Johnson to collaborate with Apple to assess impact of wearable technology on earlier detection of AFib, improved diagnosis and patient outcomes

Up to 30 percent of AFib cases go undiagnosed until life-threatening complications occur, signaling a critical need for more efficient and scalable screening methods

Harnessing wearable device data to improve state-level real-time surveillance of influenza-like illness in the USA: a population-based study

Jennifer M Radin, Nathan E Wineinger, Eric J Topol, Steven R Steinhubl

Summary

Background Acute infections can cause an individual to have an elevated resting heart rate (RHR) and change their routine daily activities due to the physiological response to the inflammatory insult. Consequently, we aimed to evaluate if population trends of seasonal respiratory infections, such as influenza, could be identified through wearable sensors that collect RHR and sleep data.

Press Release Details

[VIEW ALL PRESS RELEASES](#) ➔

08/21/2019

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Fitbit Collaborates with Singapore's Health Promotion Board on Population-Based Public Health Initiative in Singapore

Landmark nationwide health initiative will be powered by Fitbit devices and its new Premium service designed to drive better health outcomes at scale

SAN FRANCISCO--(BUSINESS WIRE)-- [Fitbit](#) (NYSE: FIT), today announced that it will be collaborating with Singapore's Health Promotion Board (HPB) on a healthy population project in support of Singapore's Smart Nation initiative. The HPB is Singapore's government agency that implements policy and programs to improve the nation's health. This is Fitbit's first major integration of a digital health platform and wearables into a national public health program globally. The initiative, named Live Healthy SG, was uniquely designed for Singapore by Fitbit and the HPB to harness technology, behavior insights and analytics to help Singaporeans get healthier through meaningful and sustained behavior change. Live Healthy SG will engage people of all ages and levels of health using Fitbit devices and its new Premium service, which is launching to consumers in select markets around the world this fall.

DJIA **27090.86** 4.53% ▲

S&P 500 **3130.12** 4.22% ▲

Nasdaq **9018.09** 3.85% ▲

U.S. 10 Yr -5/32 Yield **1.048%** ▼

Crude Oil **47.19** 0.02% ▲

Euro **1.1134** 0.34% ▼

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Google's 'Project Nightingale' Gathers Personal Health Data on Millions of Americans

Search giant is amassing health records from Ascension facilities in 21 states; patients not yet informed

seven minutes to jade palace