



Human Computer Interaction

Discussion Session 10: Wearable Technology

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Machine Learning & Data Analytics (MaD) Lab
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A Computer on the body that is:

- 🔌 Always on
- 👉 Always accessible
- 🌐 Always connected



Steve Mann
PHOTO: RYAN ENN HUGHES

Which wearable devices do you know, and which ones do you wear?





**Which sensors have we seen in the lecture?
What's their use?**

Accelerometer, gyroscope, magnetometer

Pressure sensors

GPS

Heart rate sensors

Pedometers

Temperature sensors

“EmpkinS” (a Collaborative Research Centre) focusses on capturing human motion parameters remotely in a minimally disturbing and non-invasive manner and with high resolution.



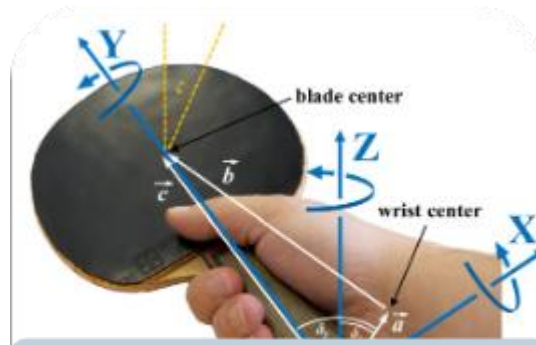
<https://www.empkins.de/about/crcempkins/>



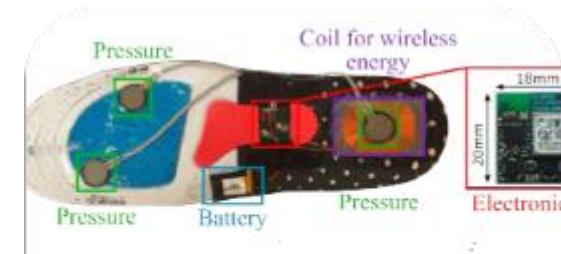
Can you name the examples of activity recognition that apply to out of laboratory contexts seen in the lecture?



Real-Time Ski Jumping Tracking System, Link et al., 2021 [4]



Ball speed and spin estimation in table tennis, Blank et al., 2017 [5]



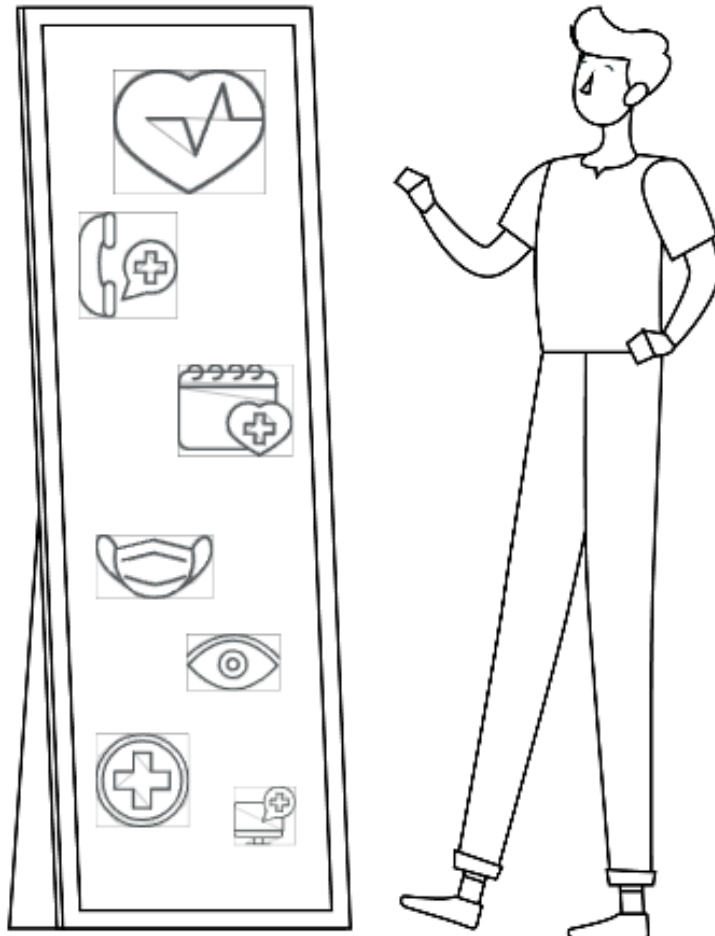
Sensor Insoles for Gait Analysis, Roth et al., 2018 [6]

Mirror, Mirror on the Wall

Exploring Ubiquitous Artifacts for Health Tracking



Machine Learning
Data Analytics



To explore the impact of ubiquitous artifacts on a person's fitness tracking routine, **a smart mirror** visualizes a wide range of **tracking parameters for physiological data** gathered by an Empatica E4 wristband.

The goal of such system is to keep users engaged while providing adequate information. Therefore, users are exposed to their health data and the question of how to optimally present such data is a recognized challenge in the HCI field.

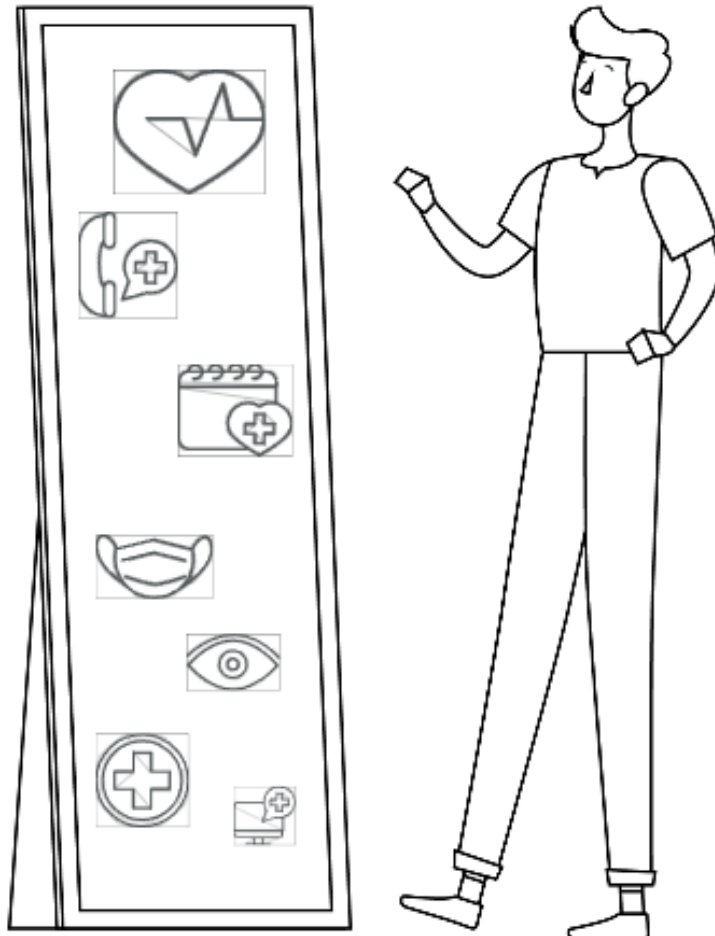
Jakob Karolus, Eva Brass, Thomas Kosch, Albrecht Schmidt, and Pawel Wozniak. 2021. Mirror, Mirror on the Wall: Exploring Ubiquitous Artifacts for Health Tracking. In 20th International Conference on Mobile and Ubiquitous Multimedia (MUM 2021). Association for Computing Machinery, New York, NY, USA, 148–157. <https://doi.org/10.1145/3490632.3490671>

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RQ1: How useful is a smart mirror with regard to health tracking?

What are the benefits when deploying a smart mirror to display health data that would increase the user's understanding of their physical activity?

RQ2: What are the design requirements for visualizing physiological data on a smart mirror?

Which strategies are especially fit to be fulfilled by a smart mirror? Which additional requirements need to be considered? Is there a trade-off between ubiquitousness and informativeness?

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To think about the target people of this system, **personas** are created. Choose the right statements in the context of interaction design for this use case.

A persona is used to role-play through an interface design

A persona is a real person

A persona represents a particular type of user

A persona represents the average German person

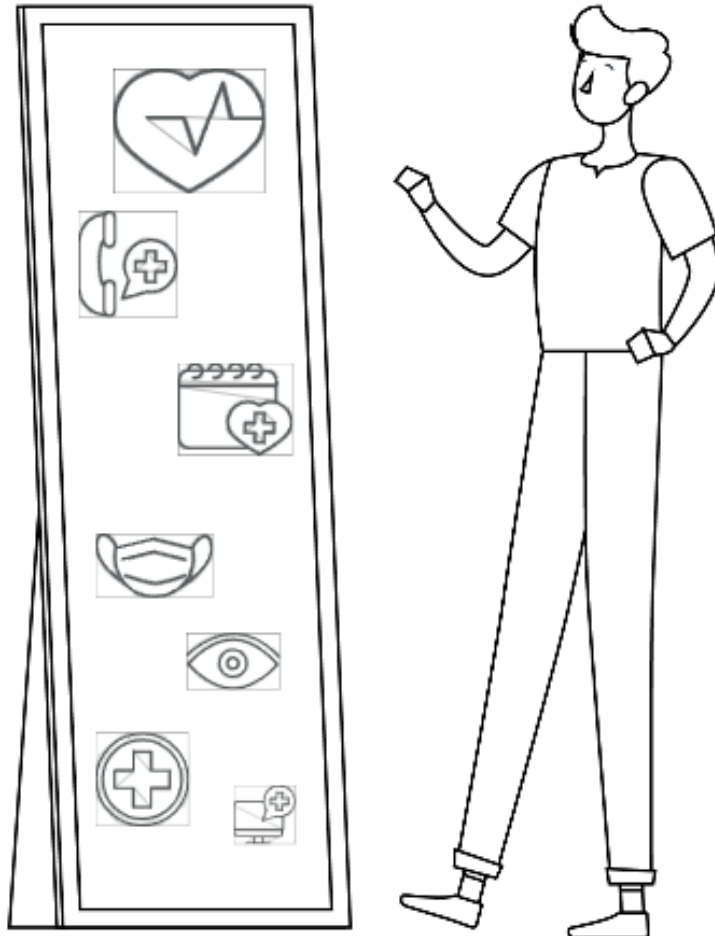
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To evaluate two different prototypes, a **within-group experimental design** is chosen.

Choose the applicable statement(s) for this use case:

Each user tests each prototype

Half of the users test only prototype A, the others test prototype B

Half the users test prototype A first, then B. The others test B first, then A

Individual variability between users is a major problem

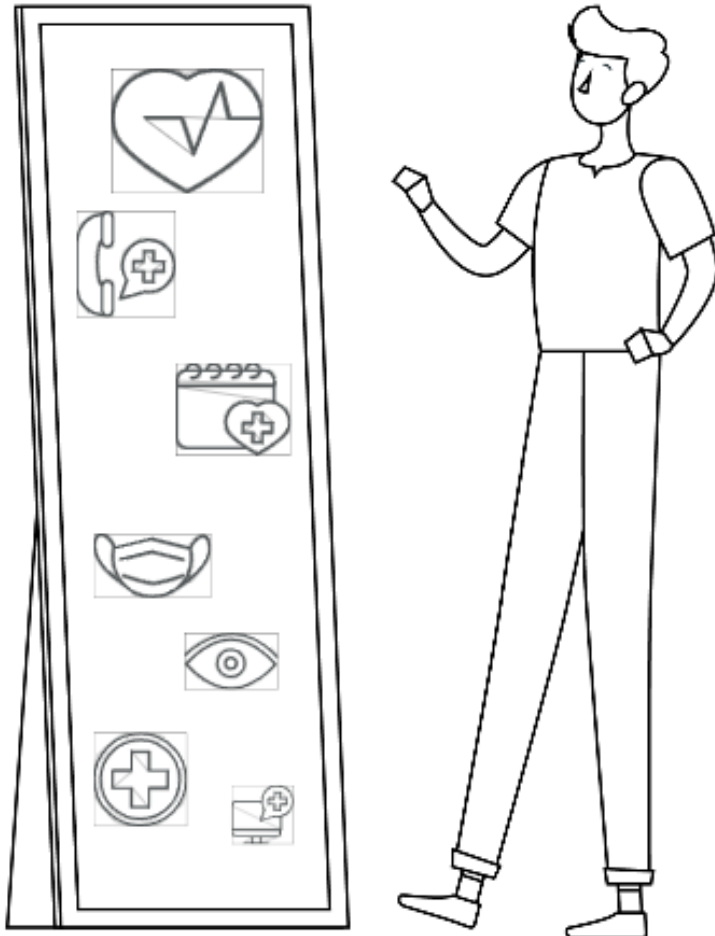
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Thank you for your attention!

Are there questions

