BHRP:
Biometric Healthcare Research Platform

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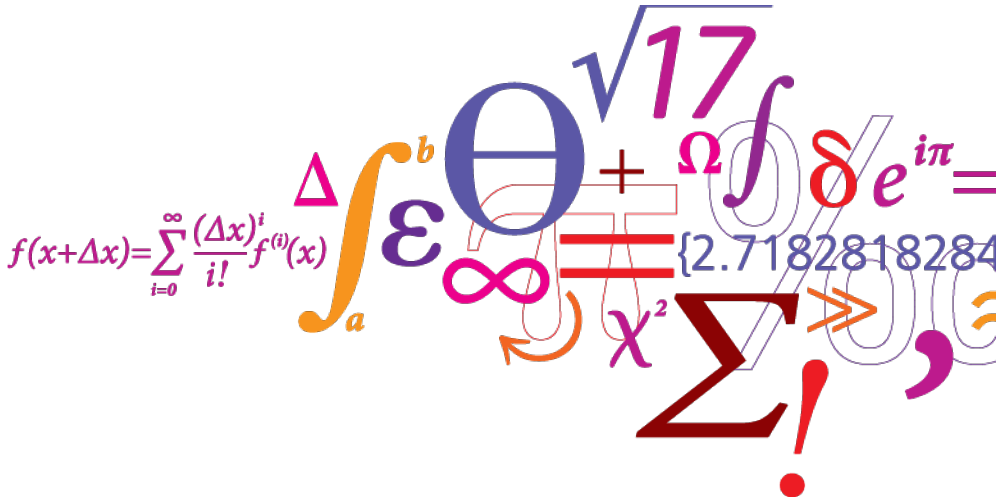


DTU Compute
Department of Applied Mathematics and Computer Science

Goals and main ideas

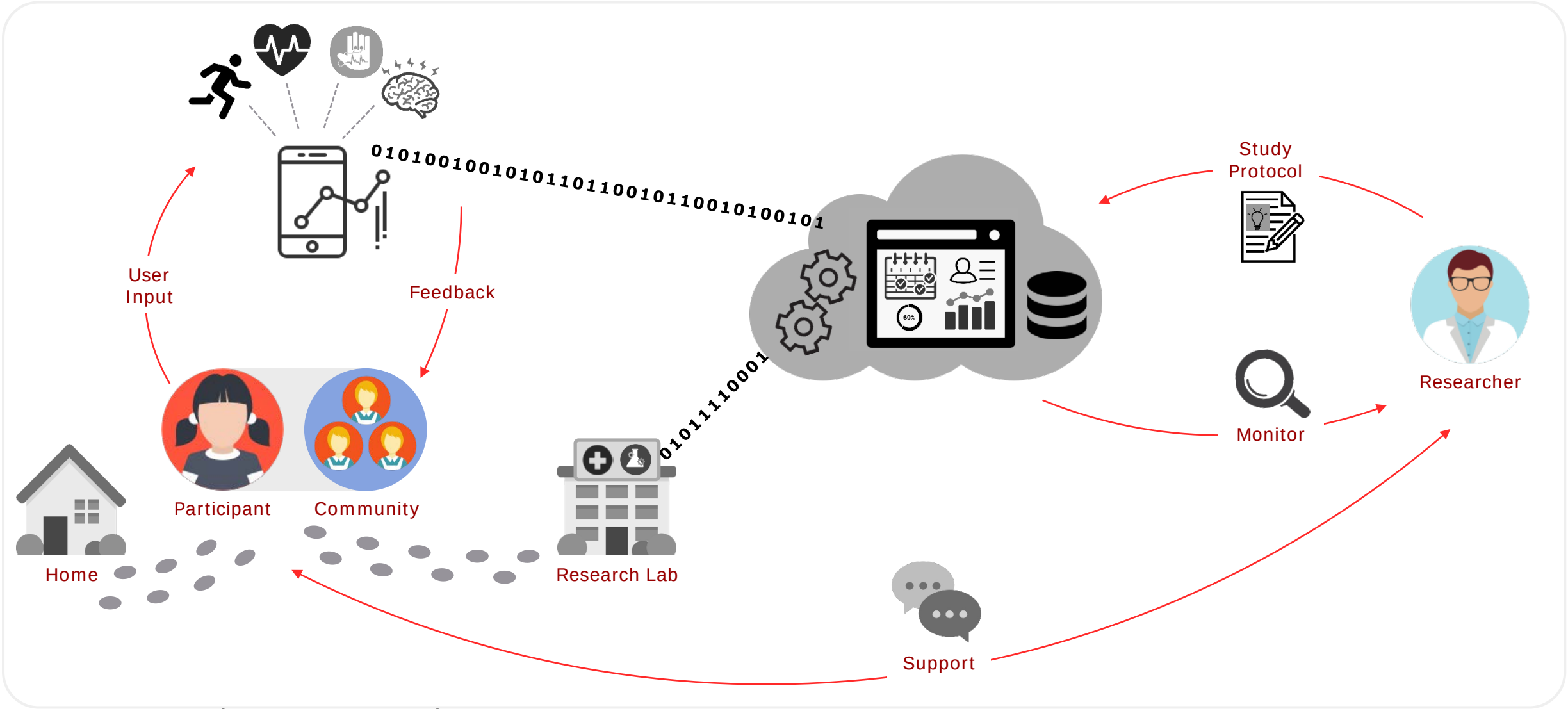
- Long-term monitoring of neuropsychiatric diseases through the use of wearable sensors
- Leverage the broad (and ever-increasing) range of readily-available low-cost sensors
- Focus on multi-modal
- Collect data in the patient's natural environment, during their daily life

TIMELINE

May 2017 — April 2021

Innovation Fund Denmark

Project Platform Overview



Project partners

- DTU Cognitive Systems (DTU-CS)
  (Tobias Andersen and PM)
- DTU Embedded Systems / Cachet (DTU-ESE)
  (Steven Jeuris, Jakob Bardram)
- iMotions A/S
  (Ambrose Soehn, Ulrik Jensen)
- Zealand University Hospital (ZUH)
  (Ivan Zibrandtsen, Troels W. Kjær)
- Gillberg Neuropsychiatry Centre (GNC)
  (Jakob Åsberg Johnels, Nouchine Hadjikhani)

cachet | Copenhagen Center for Health Technology

IMOTIONS
BIOMETRIC RESEARCH PLATFORM

REGION ZEALAND
ZEALAND UNIVERSITY HOSPITAL

Gillberg Neuropsychiatry Centre
Sahlgrenska Academy

The more data, the better?

“old” medicine

Modern conventional healthcare

- State-of-the-art medical equipment
- Few high-quality data points
- Expensive
- Foreign environment

Pervasive healthcare

- Consumer-level devices
- Many (lower) quality data points
- Inexpensive
- Familiar environment

BHRP: Principles and challenges

Design principles

- Consumer-level devices
- Multi-modal
- Open platform (can integrate other devices)
- Focus on flexibility
- Mobile-centered, with integration of other devices

Challenges

- Ease of use
- Synchronization issues / different sampling rates
- Missing data
- Establishing a ground truth?

Two main studies

Epilepsy (Zealand University Hospital)

- Monitor epileptic patients using EEG and other modalities (movement, ECG, …) with the primary goal of tracking and counting seizures and epileptic activity.

Autism (Gillberg Neuropsychiatry Centre)

- Monitor Autism Spectrum Disorder individuals tracking activity, stress levels, and social interaction (e.g. eye-tracking while looking at faces)

Challenges and perspectives

- **Maximizing probability of obtaining continuous, high-quality multimodal data** over long periods of time while minimizing resources and complexity:
  - Battery power, computational resources, wireless transmission bandwidth
  - Number of sensors, data transfer and storage components

- **How to ensure high compliance and data quality?**

  → Streamlining the user experience for research participants.
  E.g. EEG recording mainly during sleep at participants home for epilepsy study