A transdisciplinary approach to healthy aging research

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Healthy aging and real-world evidence

- The aging population is rapidly accelerating worldwide. **Maintaining health in old age** has become a priority in the global agenda (UN, 2019; World Economic Forum, 2016).

- The Decade of Healthy Ageing (2020-2030): **Improving measurement and research** on healthy aging (WHO, 2015).

- Using **digitally powered real-world evidence** to supplement traditional information on biology and health-care practices in making health-care decisions (Seyfert-Margolis, 2018).

- Real-life audio data

- Electronically Activated Recorder (EAR)

- 30 - 50 seconds

- About 500 healthy older adults

A transdisciplinary approach to data analytics

Projects

- **Reminiscence and well-being**

(Demiray, Mischler & Martin, 2017; Ferrario et al., in prep.)

- **Language complexity and cognitive health**

(Luo, Robbins, Martin, & Demiray, 2019; Luo, Schneider, Martin & Demiray, 2019)

- **Machine learning and automatic classification**

conversation partner, location, activity, mood (Yordanova, Demiray, Mehl & Martin, 2019)

- **Automatic detection of human voice**

(Cheetham, Demiray, Martin, Battegay & Londral, under review)

- **Pilot: Sounds of Citizen Scientists Study**

Expert workshops

- International Interdisciplinary Workshop on **Semantic Analysis of Multi-Scale Health Dynamics** (2017, 2018, 2019)
- DSI Workshop on **Text Analytics for Health** (Sep 2019)
- **Audio Data Processing** Workshop (Upcoming)

Individualized activities profile for healthy aging

Reconstruction of Daily Spatio-Temporal Lifelines

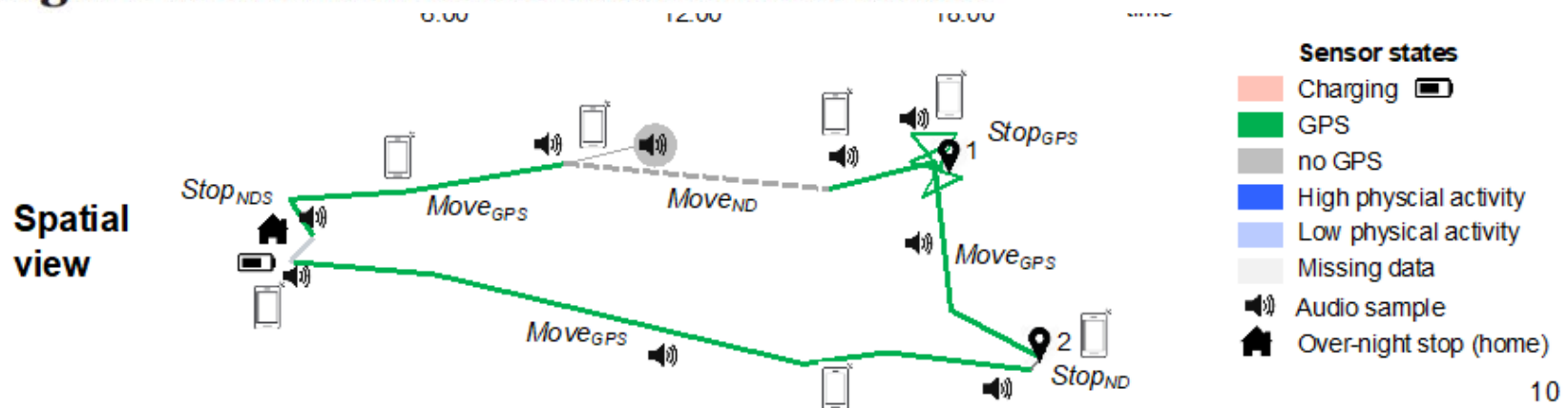|	Sensor	Variable
Spatial mobility	GPS	timestamp, latitude, longitude
Physical activity	IMU	timestamp, acceleration (x,y,z), step counter
Social interaction	EAR	timestamp, sound sample (30 secs)

Figure 1. Overview of the uTrail mobile sensor

(Bereuter & Weibel, 2016; Röcke, Katana, Fillekes, Martin, & Weibel, 2018)