

UC-eHealth-02 Elderly Monitoring

12.11.2024

Gregor Liebscher (MCS)

Nils Lahmann, (Charité)

Andreea Corici, Hemant Zope (FOKUS)



6G-Path



6G-PATH project has received funding from the Smart Networks and Services Joint Undertaking (SNS JU) under the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101139172.



"We are getting older"



- increases risk of physical impairments (for example: sarcopenia) and/or diseases (risk of fall or decreased mobility) and being dependent on medical and nursing care

continuous monitoring of activity/mobility in wearable watches



a moderate training program on a regular basis



is effective against frailty and muscle loss and thus possibly prevents a fall and improving mobility for the elderly people

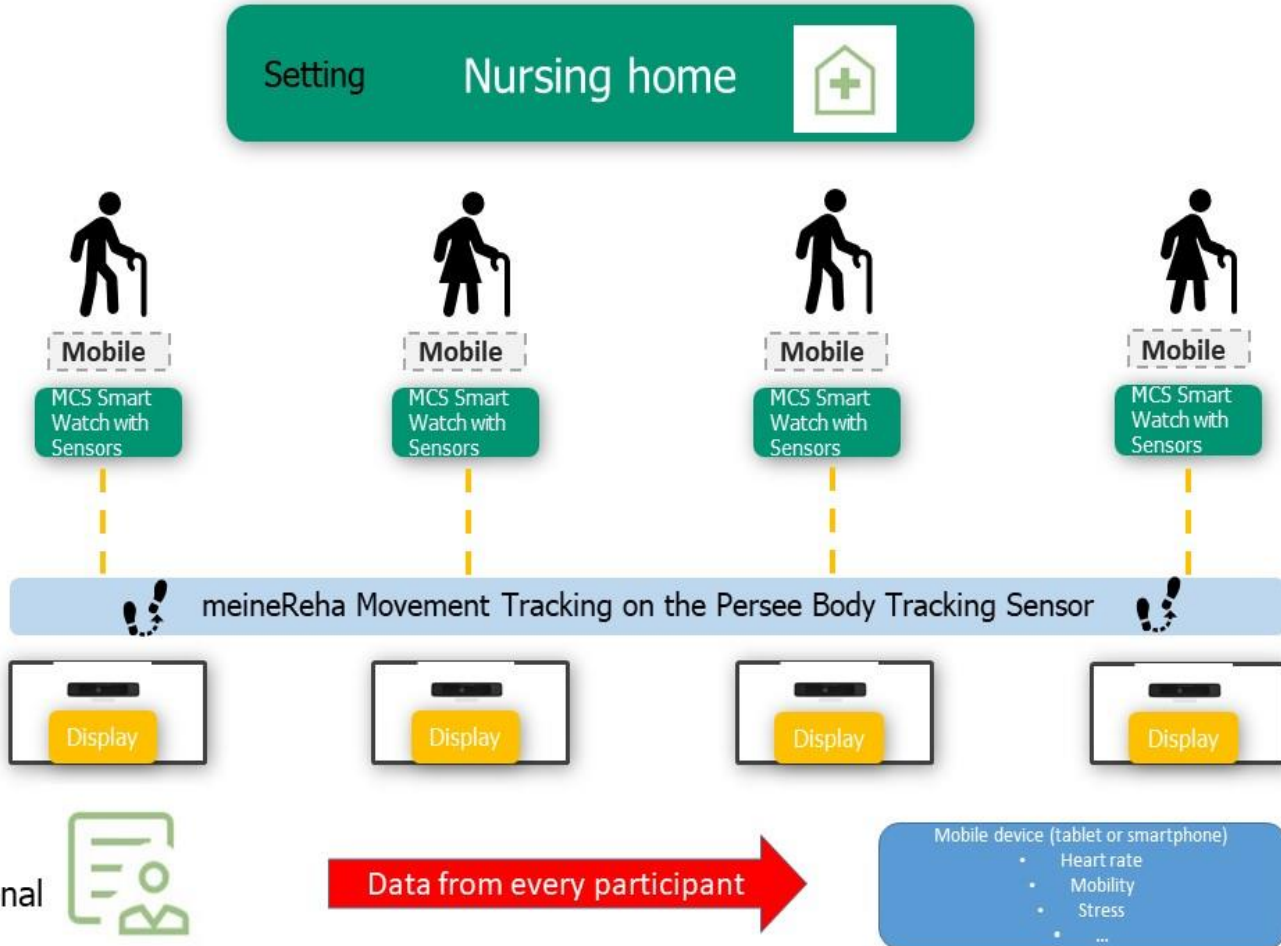
- The combination of regular exercise and smartwatch usage has the potential to improve sleep quality, increase motivation, and provide several other quality-of-life benefits for elderly individuals.
- Sensor based information and a digital exercise program, combined with an AI driven recommendation on individual base intervention is extremely beneficial.

Scenario description



6G-PATH: usecase scenario elderly monitoring

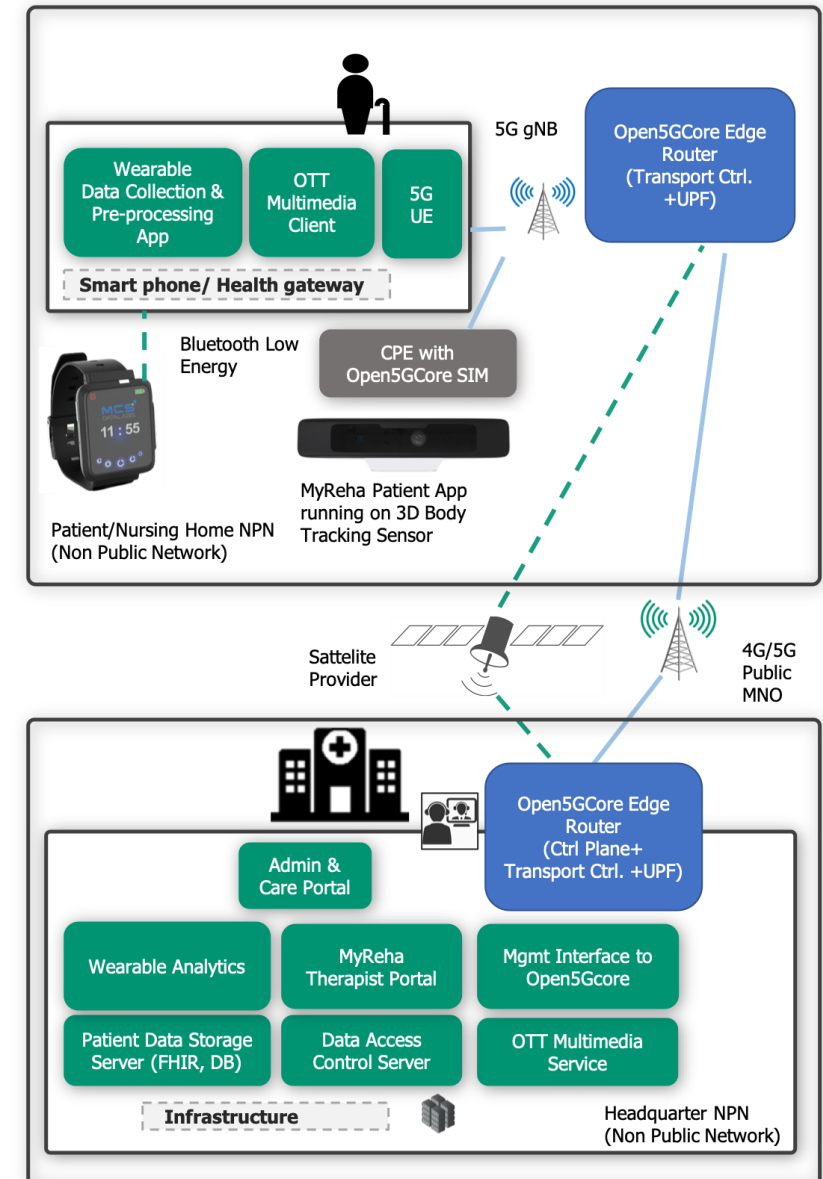
Up to four participants can train at once



- **Elderly monitoring usecase**
 - Continuous vital signs monitoring
 - Fall detection
 - Training with 3D boy tracking
 - Data analysis for health check
- **Target**
 - Validate prototype in daycare center at Charité
 - Evaluate in a nursing home

Partner Roles

- **Charité**
 - Medical Expertise
 - Requirements Definition
 - Co-creation of the Tools interacting with the medical personnel
 - Evaluation by medical personnel
- **FOKUS**
 - Requirements analysis
 - Extensions towards 6G & development of use case related Apps (myReha, Admin & Care Portal), backend eHealth services
 - Provide setup for validation and evaluation
- **MCS**
 - Develop and provide smart watch and related Apps
 - Data analysis of collected vital signs (Wearable Analytics)
- **Together:** Validation and dissemination events

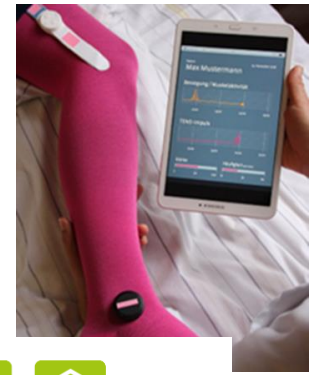


Why using 5/6G is important for ehealth nursing?

Integrating 5G/6G technologies into healthcare, particularly eHealth nursing, will improve patient care and operational efficiency.

Here are some examples:

- Real-time Data Sharing and advanced Monitoring and Diagnostics in nursing care:
 - **Immediate Access to Patient Data:** access up-to-date patient information instantly at the point of care (for example home care)
 - **Enhanced Patient Monitoring:** continuously patient monitoring allows early detection of potential health issues
 - **Improved Clinical Decision-Making:** Data enables informed nursing decisions on patient care.
 - **Reduction of Errors:** An unsuitable supply can be avoided and a supply tailored to the **patients needs.**



Current and Future Functionalities

- Measure mostly raw health and environment data, for analysis on our backend or that of our research partners, and to train AI algorithms.
- When the SmartWatch is not connected to the backend, measurements are stored on the device until a connection is established again.
- **Adaptation to the UseCase:**
 - Aggregate raw data to detect and monitor long term changes in the lives of elderly people.
 - Support the health of elderly with workouts through meineReha, but since this is a higher risk situation, collect raw data in real-time during and after workouts for alerts and detailed analysis in case of problems.
 - Investigate the possibility to predict the risk of falling.

SMARKO[®]
health



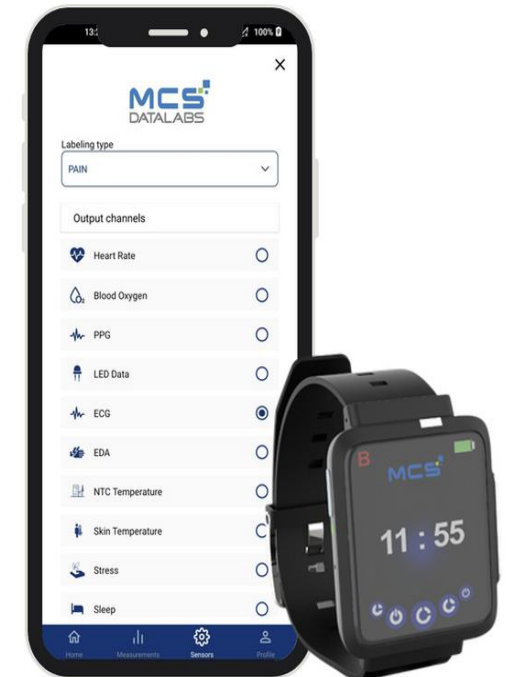
Data Analysis

- Fall detection: existing algorithm needs retraining to reliably detect falls of older people, since it was trained on younger people, who fall differently.
- HRV analysis for detection of the stress level (with focus on elderly people).

eHealth Gateway

- Develop a gateway that collects data from multiple SmartWatches, to facilitate the usage of them in group settings, like instructed group workouts.
- Improve existing and develop new algorithms on the data we get in the testing phase.

SMARKO[®]
health



- The access to the eHealth backend services will be tested using Postman and the Admin and Care Portal itself.
- The benchmarking tool of the Open5GCore will be used to simulate the workload generation.
- Impact of the applications on the elderly: Barthel Index for Self Care and a fall risk assessment will be collected at the beginning and the end of the study. Also using the NRS- Scale for Pain and the Borg Scale.
- Questionnaires targeted to medical personnel participating in the study will evaluate the non-technical KPIs, like the public health and social impact as well as the user friendliness.
- The App will check if the watches are connected and charged. If the watches are not connected via Bluetooth or the battery state is too low a warning is sent to the backend to inform the nurse or caretaker to take necessary steps.

Use Case KVIs description



KVI	Description	Objective
Public health	Providing a better health service to the patients' through using privacy centric patient tracking	Use devices to track and to customize the patients' exercises to the specific needs
Societal Upgrade	Better adoption of the elderly care services through digital communication	Provide an integrated wireless system across public and private network domains
Societal Acceptability	Self- elderly care	Provide digital elderly care services without having individually reserved physiotherapy personnel
Technology Adoption	Providing secure and reliable small nomadic networks designed for eHealth	Showcase a use case for rehabilitation exercises
Sustainability	Reduce the number of travels of the physiotherapy	Use home digital services to cover a very large number of patients
Cost Reduction	Use case cost reduction	Provide the rehabilitation use case with a reduced number of trained personnel
Medical	Patient side: movement to reduce the risk of falling or to ensure that the fall can be detected quickly	Showcase a use case for rehabilitation exercises

Thank you for you attention!



Company Name



Presenter & position



Email



Company website



6G-Path