**An integrated risk detection based on analysis of different daily behavioural data of older adults using unobtrusive sensors and ICT allows for a more comprehensive risk model available over time which enables the user himself to monitor his current state and early changes of his social, bodily and cognitive state to prevent frailty and associated diseases by a tailored intervention which is suggested and supported by the ICT system and related stakeholders and networks.**

**Derived Information Channels.**
Example data on the intermediate level are split into physiological, cognitive, motor behaviour, social behaviour, and health behaviour related indicators, which included e.g.:

- Disorientation in time and location (smartphone, meme-glasses)
- Physical activity (gait, strength, endurance, others)
- Sleep Patterns (breath, heart rate, cycles, etc.)
- Vital data (blood pressure, blood sugar, weight, others)
- EOG (facial expressions, eye-tracking, etc.)
- Speech Disorders (sighs, prosody, articulation precision,)
- Cognition (memory, attention, inhibition, etc.)
- Social Activities (personal contacts, etc.)
- Nutritional status (malnutrition and comorbidity)
- Psychological health (social activities, mood, emotions, etc.)
- Falls and Falls Risk (strength, balance, others)

**Used Sensor Infrastructure.**
On a raw data level the applied sensor infrastructure includes several wearable, smart phone, and ambient assisted living based sensors devices. Early risk monitoring will take place by collecting data with different applications assessing various functions by: neuropsychological tests; psychological tests for anxiety and depression; diabetes monitoring; physical activity assessments (gait analysis or other simple systems); sleep cycles; mood tests; cognitive activity tests and nutritional intake. This will be achieved by integrating already existing health and active ageing platforms of my-AHA consortium partners to my-AHA. In particular these underlying platforms are:

**Medisana**
Medisana (VitaDock Online developed by Kaasa) is a cloud based solution to maintain and exchange vital data of individuals in a safe and secure fashion. In March 2015 the platform accumulated 120.000 registered users, who primarily reside within Germany, the Netherlands, France, Italy and other European countries, and a smaller numbers from all over the world. The VitaDock Online platform is currently available in six languages, namely English, German, French, Dutch, Italian and Spanish. One core functionality of VitaDock Online is offering a secure backup for a user's vital data and allowing for the safe and secure exchange of data from and to Medisana's VitaDock and VitaDock+ mobile and Desktop PC/Mac applications. In addition to that an existing publicly available application programming interface (API) allows third parties to access vital data for further analysis or use in software applications and services through an authorization process strictly controlled by the user, who's going to share his or her vital data.

**VitalinQ**
Scope of the VitalinQ platform is primary and secondary prevention and support of a healthy lifestyle. VitalinQ is a social media platform for health, including detailed information (scientific questionnaires, (WHO and local) recommendation and guidelines). Main functional areas are: nutrition, exercises, awareness (incl. Quality of Life), community and labour/work. VitalinQ provides lifestyle related content for health, pregnancy, diabetes, obesity, cardiac vascular problems, blood pressure, allergics, and gait. VitalinQ can connect via a separate webserver to platform of third parties and include measurements (like Fitbit, Polar, Garmin, Moves, Withings, etc.) Users of VitalinQ by the end of last year were approx. 30.000 profiles: elderly bonds, publishers, fitness clubs, dieticians and physiotherapists, royal Dutch walking association, etc. VitalinQ is active in France, Belgium, UK, Ireland, Italy, Greece and India. Languages are available in Dutch, English and French for the time being.

**MEME-Glasses**
MEME is the world's first sensing eyewear, developed under the concept of "seeing inside yourself" to register changes in the electric potential generated by eye movements and track body motion. While maintaining the shape of standard eyewear, MEME has 3-point electrooculography sensors and sensors (accelerometer and gyroscope) to capture the slightest change in a user's eye movement and body axis. MEME glasses are connected through Bluetooth to Android and iOS platforms and applications. JIN is already involved in collaborative research programs using MEME with TOU (Prof. Kawashima) and UNITO (Prof. Rainero). MEME glasses are produced by JINS, a Japanese leading company in the eyewear business

**JINS**
Jins is the leading retail company in Japan's eyewear industry, and JINS MEME is the world's first sensing eyewear developed under the concept of "look inside yourself". JINS MEME with its advantage of sitting on human face as a pair of "ordinary" glasses
1) captures eye movement by detecting electric potentials of eyes with the originally developed three-point electrooculography sensors (patented), and
2) detects body axis and movement with its accelerometer and gyroscope sensors. The detected data is sent to iOS, Android and Windows platforms via Bluetooth Low Energy so that users expectedly enjoy or even develop a wide range of services and applications. JIN is already involved in collaborative research programmes utilizing JINS MEME with University of Tohoku (Prof. Kawashima), UNITO (Prof. Rainero) and Siegen University (Prof. Grzegorzek) - See more at:
http://www.activeageing.unito.it/en/technology-use#sthash.vrjA9RFZ.dpuf

**SmartCompanion**
Smart Companion is an Android customization that was specially designed to address goals and needs of older adults. Smart Companion enables more than the common mobile phone tasks, such as calling or sending messages. It aims to be a permanently available companion to support seniors in their daily activities, and bring them closer to their relatives or caregivers. Smart Companion allows elderlies to be remotely connected at all times, hence, caregivers can be aware of health-related hazardous situations and prevent them from happening, improving the seniors' self-confidence and sense of protection, while allowing the caregivers to feel more at ease.

Smart Companion currently features several tools that ease the life of elders and caregivers, such as geofencing and simplified turn-by-turn navigation, medication reminders and fall detection. Moreover, tools for monitoring the status of the user, such as physical activity, fall risk, mood and food intake, have also been developed and will be used to acquire data during this project. Finally, interventions

such as games to promote physical or cognitive activity, a diet plan recommender may also be delivered using this platform in the future.


These already existing basic platforms, which are owned by my-AHA partners, already have more than 250.000 active users in several European countries that will contribute to the project and its outcome. Individual subsets of users will be addressed via dedicated campaigns in the existing platforms, asking them for participation with regard to specific risk assessments and interventions.

**Data collection.**
All real-time risk analysis modules and tailored intervention plans will rely on data provided by the sensors embedded in the used platform and hardware (MEME glasses, activity trackers, sleep assessment, smartphone, other wearables or domotic systems (like iStoppFalls) from the different platforms). Accordingly, our data collection will be based on large-scale collection of data readily available in the daily living environment, and thus we do NOT plan to modify the hardware, or to design new sensors. Rather we will modify firmware and software - if necessary - to facilitate collection and analysis of data.

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