



Development of SRD 63416 “Ethical Considerations of AI when Applied in the AAL Context”

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Population ageing and the value of AAL

- **The global population is ageing.**
- *“United Nations World Population Prospects 2019”*
- *In 2018, for the first time in human history, persons aged 65 years or over outnumbered children under five years of age worldwide.*
- *In 2050 the 1.5 billion people aged 65 years or over worldwide will outnumber adolescents and youth aged 15 to 24 years (1.3 billion).*
- Reducing the burden of long-term care for older persons becomes a major policy issue in every country. **Active Assisted Living (AAL) systems help older persons' daily living so that they can live independently as long as possible.** AAL can be a solution to population ageing.

What AAL can do

- **For the well, AAL can provide an increase in:**

- Convenience
- Time-saving
- Self-reliance
- Ability to monitor their own health
- Enjoyment of life

- **For the vulnerable, AAL can reduce**

- Fear - of falls, of adverse events, of dying and no-one knowing
- Frustration - the loss of ability to do ordinary tasks
- Forgetfulness - medication, appointments, cooking, location...
- Social isolation

Establishment of IEC SyC AAL in 2015

- The Systems Committee shall:
- Create a vision of Active Assisted Living that takes into account the evolution of the market
- Foster standardisation which: enables usability and accessibility of AAL systems and services
- **Enables cross-vendor interoperability of AAL systems, services, products and components**
- **Addresses systems level aspects such as safety, security and privacy**
- Communicate the work of the SyC appropriately to foster a strong community of stakeholders

Organization and participation in IEC SyC AAL

Chair: U. Haltrich (DE)/Sec.: M. Siket (CO)

- 14 P members: CA, CN, FR, DE, IN, IT, JP, KR, NL, NZ, SE, CH, GB, US
- 12 O Members: AT, BE, HR, CZ, DK, FI, HU, MY, NO, RU, SG, ES
- AG 1: Chair's Advisory Group
- JAG 8: Joint Advisory Group linked to TC 100 and TC 124
- WG 1: User Focus
- WG 2: Architecture and Interoperability
- WG 3: Quality and Conformity assessment
- WG 4: Regulatory Affairs
- WG 5: AAL in the connected home environment
- WG 7: Cooperative multiple systems - Functional safety
- MT 6: IEV - Part 871

AAL use case two-dimensional classification

- **Use case category**
 - Prevention and management of chronic long-term conditions
 - Social interaction
 - Mobility
 - Health & wellness
 - (Self-)management of daily life activities at home
- **AAL care recipient's level of assistance**
 - Level 0: Independent
 - Level 1: Some assistance
 - Level 2: Assistance with IADL (transportation, housekeeping, medication management, etc.)
 - Level 3: Assistance with ADL (walking, bathing, grooming and getting dressed, continence and eating, etc.)

AAL use case examples

- **Personal Health check**

- The care recipient wears, or is monitored by, sensors that collect vital signs and transmit these to a monitoring centre. The system uses AI to monitor the incoming data, assesses any changes in ongoing physical or cognitive health or potential concerns, notifies the user and/or physician of these concerns.

- **Wandering Detection and Diversion (WDD) for persons with Dementia**

- In some cases persons with dementia are exit seeking and frequently try to leave their residences. ... A WDD system may interact with the person to dissuade them from exiting (e.g. encourage a return to bed during the night). ...

Cost effectiveness of AAL system

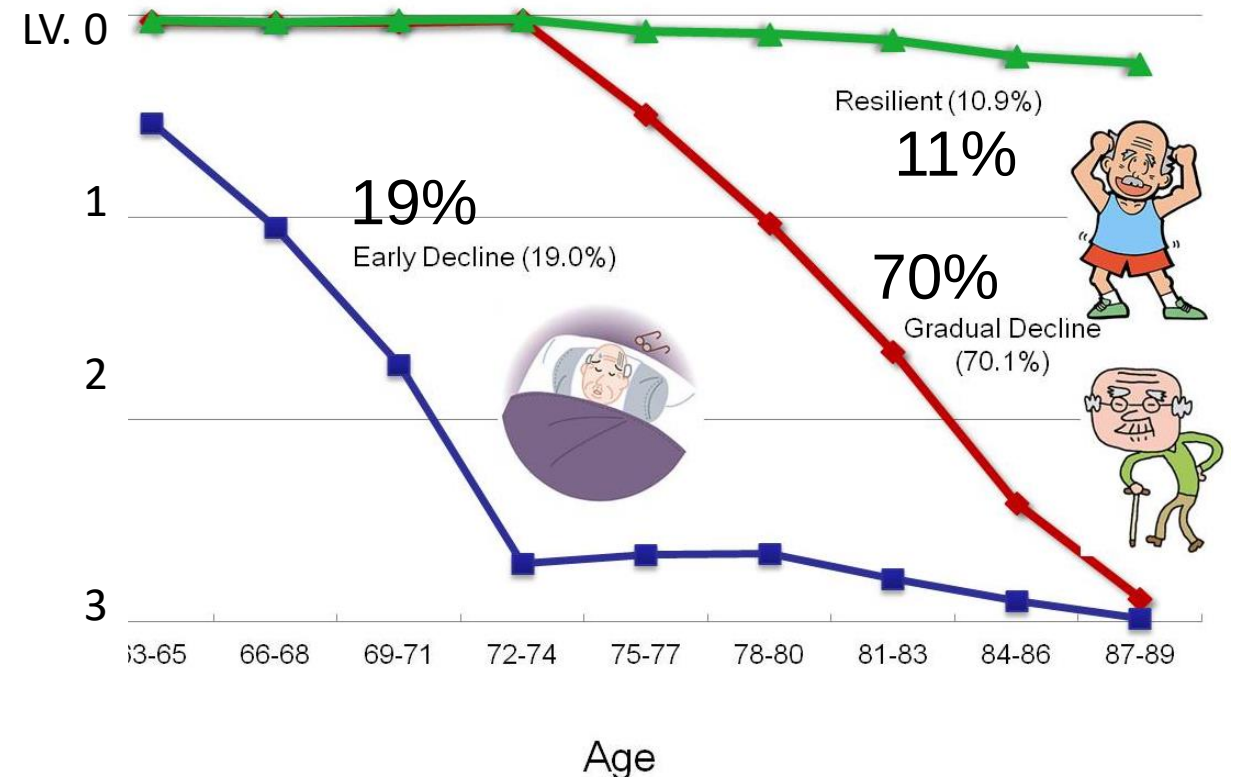
(IEC SRD 63234-2:2020)

- In case of potential concerns, “Personal Health check” system displays an ‘Alert’ to a Clinician/Nurse at the centre.
- If deemed appropriate, the Clinician/Nurse will contact the patient or dispatch a homecare nurse to visit the patient.
- Cash Flow Analysis Scenario A – **Ramp up to 100,000 patients in five years demonstrates Return on Investment of 172%.**
- Cash Flow Analysis Scenario B – Ramp up to 10,000 patients in five years demonstrates Return on Investment of 147%.

Changing conditions of AAL care recipients

- The AAL care recipients' conditions change over the years.
- With this change, **the degree of physical activity may decline and simultaneously their cognition and self-judgment ability may also decline.**

- *Cluster analysis on aging of Japanese male (H. Akiyama)*



Considerations necessary in the context of AAL: Prior consent

- Since many AAL systems use the user's personal data to provide services to the AAL care recipient, the consent should be obtained in advance regarding the use of AAL system.
- **No matter what level the AAL care recipient is, the principle of protecting the dignity of that person shall not be violated.**
- For level 0 AAL care recipient, the prior consent of the user can be obtained without problem.
- In the case of Level 3 AAL care recipient, it is appropriate to seek the **consent of not only the AAL care recipient but also of designated parties such as family members or other substitute decision makers.**

Considerations necessary in the context of AAL: Autonomy or safety

- All individuals have the right to engage in activities that may put themselves at risk.
- However, as cognition declines, users may make a request of a system that puts their own safety at a higher level of risk and the **AI must determine if the level of risk is still appropriate before acting while maximizing the user's autonomy.**
- The AAL care recipient requests assistance to go for walk outside on a cold day,
- **the AI system must decide:**
 - to allow this request without notification to other family members (respecting autonomy and privacy); or
 - to reject this request for the safety of the AAL care recipient.

Considerations necessary in the context of AAL: Fail safe

- When the “Personal Health check” system asks to dispatch a homecare nurse to visit the patient,
 - At the same time if the Wandering Detection and Diversion system locks the door of the person’s house,
 - What will happen?
- Multiple AAL systems operate simultaneously for the AAL care recipient **must not be independent but communicate each other and operate based on the principle of Fail Safe.**

Conclusions: The Needs of developing guidance document for the use AI in AAL

- The use of AI in AAL must consider ethical considerations such as privacy, accountability, safety and security, transparency and explainability, fairness and non-discrimination etc. that are provided by various standards and consortia activities.
- In addition, the use of AI in AAL must take into account declines of physical, cognitive and/or self-judgment abilities of AAL care recipients.
- **SyC AAL needs to develop an ethical document treating issues such as who to ask prior consent, balance between safety and autonomy, and fail safe.**



Thank you!

