

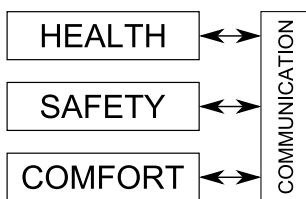
What is Assistive Technology?

Assistive Technology is often also referred to as **Ambient Assisted Living (AAL)**. It aims at enabling (senior) fellow human beings to maintain their independence from any help (e.g. home care services) they might not appreciate.

In short, our conception of AAL can be summarized as follows:

“A concept to enable (senior) fellow men and women to maintain an independent life style in their accustomed homes and to support their sustained integration within their social environment by means of assistive technology”

Identification of **four major areas of interest** for the relevant persons:

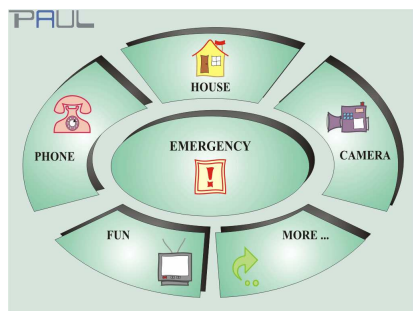


While comfort, safety, and health each constitute an individual field that is important for the user of AAL technology, communication is seen as a trans-sectoral element interconnecting the other three fields. Moreover, focussing on the health aspect only does not come up to our understanding of a holistic AAL approach. In order for any AAL solution to be readily accepted by the end user, health issues must be addressed but may not be too prominent a function. It is assumed that if the health monitoring aspect is too apparent, the entire solution might be perceived as stigmatizing, thus leading to disapproval by the end user. Instead, functionalities such as controlling home automation devices (→ comfort), TV, radio, and Internet access (→ entertainment), or a door camera (→ safety) can contribute to the acceptance of our AAL solution.

PAUL

Personal Assistant Unit for Living

Currently, an AAL pilot project is conducted in Kaiserslautern, Germany. A block of flats, comprising 20 units, had been gutted and modernized afterwards.



Screenshot of PAUL's start page

Each of the 20 flats is equipped with about 30 sensors and actuators, e.g. motion detectors, light switches, electrically driven roller blinds, a water flow sensor etc.

PAUL is a tablet-PC based personal assistant that supports the user in his daily activities and monitors his health status. The former will be achieved by allowing the user to control the home automation devices (roller blinds, lights, door opener etc.) and providing entertainment and communication options etc. For the latter task, PAUL collects the data of all the sensors mentioned above and processes these data using various algorithms.

However, there are three different types of potential danger levels in the health domain that cannot be detected equally well:

- Non-life-threatening situations emerging by degrees: **easy detection**
- Sudden, non-life-threatening situations (e.g. fall): **delayed detection**
- Sudden, life-threatening situations (e.g. stroke): **limited detection**

Data Processing/Alarm Generation

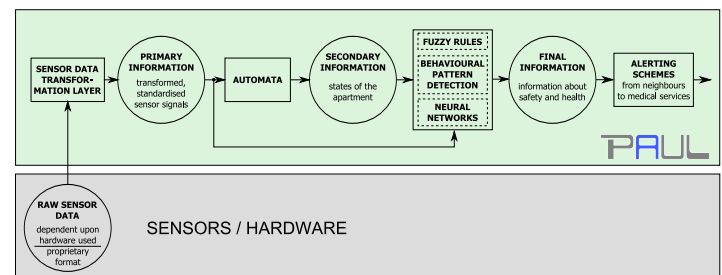
Due to the design of our AAL-enabled flats, we can categorize four different types of information that PAUL needs to process:

1 RAW SENSOR DATA. Wall switches, door sensors, motion detectors etc. provide a plenitude of different signals that PAUL collects.

2 PRIMARY INFORMATION. The raw data are converted into standardized primary information by the sensor data transformation layer. These primary data are written to a data base. Primary data does not yet contain any particular information about the user or his environment.

3 SECONDARY INFORMATION is derived from primary data by automata. E.g. the presence of a person in the flat can be determined by feeding the primary information of three motion detectors and two door sensors (open/closed; unlocked/locked) into an automaton.

4 FINAL INFORMATION is obtained by processing primary and secondary data with various data mining algorithms, e.g. fuzzy rules, pattern recognition, neural networks, or statistical classification.



Depending on the severity of the case of emergency detected by PAUL, various measures can be taken. In a low priority case, PAUL will prompt the user for instance by phone. If the inhabitant responds, the alert is acknowledged by the user and no further steps will be taken. In a high priority case, also relatives, neighbors, or ultimately an emergency hotline will be called. This phone chain will be gone through consecutively.

Project Funding:

