

Smarter Homes for independent living

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Abstract This paper presents adaptable smarter homes constructed in Finland. The principles were developed in the TIDE ASHoRED project. Each home is adaptable to the needs of the inhabitants, as well to needs of young people, a family with children, as to the needs of elderly inhabitants, disabled persons or out-patients. When life situations changes the home should be adaptable to the new situations, according to the principle that future needs, technologies and networks are taken into account already in the planning and that solutions can easily be introduced when needed.

GENERAL

An adaptable smarter home is a home that is built or renovated in such a way that it is easy and cheap to adapt the home to changing needs of the inhabitants. For disabled people, elderly or out-patients this means that for instance devices assisting the activities of daily living and remote health care can easily be installed later on.

ADAPTABLE SMARTER HOMES

Let us take as examples the first 12 adaptable smarter homes constructed in Finland as part of the project ASHoRED (Adaptable Smarter Homes for Residents that are Elderly or Disabled), a project belonging to the first phase of the European research program TIDE (Technology Initiative for Disabled and Elderly).

These were built to comply with the disability requirements as well as the adaptability requirements. The devices were chosen based on the real needs of the actual inhabitants. Note also the connections between the adaptable smarter homes and the service centers as well as to the carers (Figure 1).

The environmental control system can be based on a separate telecommunication bus (optical fibre, coax, twisted pair, radio frequency, power line or IR bus). The system normally includes the network, central unit, IR remote control console (control by whistling, voice etc. could be mentioned), by which control and monitoring of:

- door locks and door motors,
- windows, lights
- television, radio, and telephone.
- security (fire, burglary, water etc)

An example of new devices is the local videotelephone

system by which the inhabitant could discuss and see the person in the service centre or the person at the front door (fig 1).

Infrared locks, paging systems for calling service personnel, included an intercom with conferencing facilities, by which potential helpers could discuss internally and with the caller in an alarm situation.

For the remote care of out-patients

- Teleconsultations are using E-mails and WWW information.

- Telemonitoring of physiological parameters like heart rate, blood pressure, breathing.

The alarms are transferred when needed to the home care center, the hospital, the district maintenance center or district alarm center depending on the alarm in question.

The smart home is primarily designed to meet the needs of the user but it is also supporting the work of home assistants, home nurses, social workers by releasing them from routine procedures that the inhabitant can perform himself, thanks to the intelligence in the home.

Many elderly feel unsafe at home. The videotelephone can be used as a media to support daily living for instance by giving information, advice and by updating memory (eating, taking medicine). The video telephone can also be used for home medical diagnostics (supervision) or for giving physical fitness training instructions, making it possible for a relative or a non trained care person to cope with some medical treatment problems.

The alarm telephone systems including for instance sensors for abnormal situations like getting stuck or falling makes the living at home safer. Wireless telephony (or mobile telephony when far away from home) as part of the alarm system can be used when moving around in the neighborhood of the home. Suitable bathroom equipment, hoist systems, etc using robotics (cheap motorized systems with appropriate sensors) security alarm systems and so on, are solutions that make the home 'friendly' to its inhabitant. The intelligence of the system would adapt it to physical strength of the person, as appropriate.

SERVICE CENTRE

The elderly or disabled inhabitants in adaptable smarter homes need services like alarm services, home care, home health care, teleshopping in order to cope with the activities of daily living.

An alarm telephone system consists of a service centre equipment including telephone, PC, display, printer for communication logging and a data base with information about the clients. The communication to the service centre is automatically built up when the client activates the alarm by pressing the alarm button on the telephone or by pressing the wrist worn alarm button. Information about the calling client is automatically shown on the display when the alarm is received at the service centre. The alarm can also be activated in a passive way by the home network.

REFERENCES

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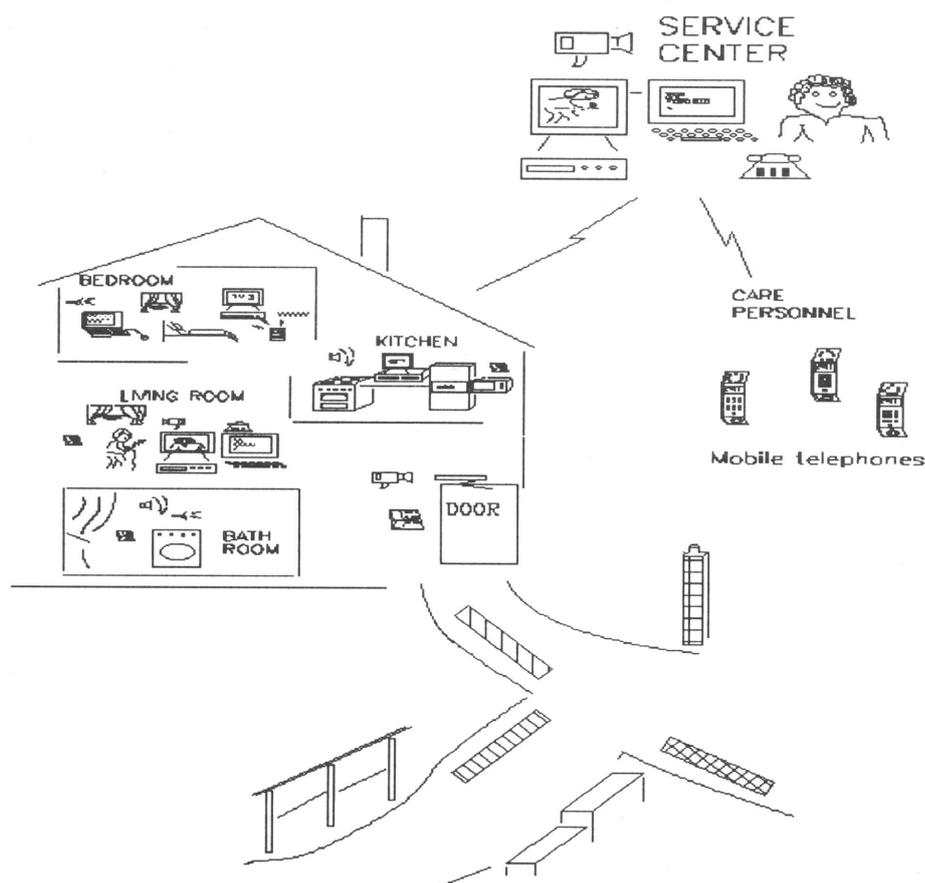


Figure 1. Devices in a smart environment