

INNOVATION REPORT

Fostering active safety in the home



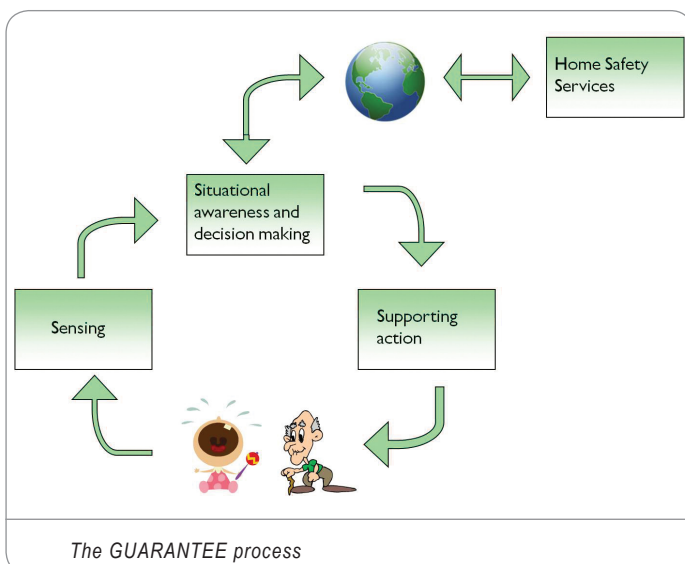
Keith Baker, Philips Research

As more and more people live relatively independent lives, home safety represents a major challenge to public planners. Accidents in the home are one of the biggest causes of hospital treatment in the EU and the associated costs have risen accordingly. ITEA 2 project GUARANTEE set out to develop new 'active-safety' systems that can take a much more pro-active approach to risky situations, offering automatic in-home support or involving external support services, with the potential of a whole new market in software-based home-safety solutions.

Leveraging capabilities

Such home-safety software solutions leverage the capabilities of existing sensor components, connectivity and communications infrastructures. GUARANTEE has developed signal-processing and decision-making algorithms for specific home-safety situations as well as software architecture for in-home safety systems. Concentrating particularly on the needs of young children, the elderly and the disabled, the work involved three phases:

1. Sensing what is happening to people using sensor-technology software together with devices such as video cameras, microphones and pressure sensors;
2. Processing the resulting signals using situation-awareness analysis algorithms;



3. Decision making on what actions are necessary, such as switching on lighting when an elderly person is trying to climb the stairs, or activating/alerting remote-monitoring services provided either by a support service or family and friends.

The innovative aspect of this approach lies mainly in the development and experimentation of several technologies and processes (sensors, decision-making and services) geared towards elderly people and children whereby new services are combined for the home safety and care domain. As such, therefore, GUARANTEE represents an attempt to develop 'active-safety' products and services for the residential environment. The potential of a range of new software-based home-safety solutions could open up a whole new market as well as bring real innovation to the consumer, especially in terms of supporting independent senior citizens. With larger numbers of people living to a ripe old age, a concern for many is to keep their ability to master the minutiae of everyday life. Here active-safety services can help, for example by warning elderly homeowners if the cooker is overheating or a sink is flooding in the bathroom. Such products can also function as a memory aid for people, enabling them to keep their independent living standards for longer. Another market is home security where traditional home-security systems are simply intrusion-detection systems. GUARANTEE goes much further, developing the automatic operation of home-security systems using industrial-grade techniques that add individual identification, activity detection, scenario analysis and decision making.

Young and old

Young children can be particularly vulnerable to accidents in the home environment, often exploring their surroundings and risking hazards like falling, burning, drowning or swallowing small objects. They are not able to react effectively to external threats. By revealing the safety of young children in the kitchen, depending on the presence of adults and on the use of devices (e.g., a stove, water boiler, etc.), the demonstrator depicts how the well-being and safety of young children can be maintained and safeguarded. This is something that not only assists parents in the upbringing of their offspring but also the children themselves to identify potential hazards faster and more effectively.

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As for the elderly, the development of 'smart' homes has a profound and obvious relevance. Advances in medicine, public policy and technology not only enable people to live longer but also significantly boost self esteem in living independently, to be able to handle complex mediations, to be active without stress, avoiding being a burden. Smart-home technology may even enable people with dementia to remain living at home for a longer period. The demonstrator provides support to elderly moving about the house and negotiating potentially hazardous locations such as the staircase and the front door. It also shows how commercial and neighbourhood assistance can support the elderly in this respect.

The benefits of collaboration

The benefits of working within the umbrella of an ITEA programme were essentially twofold: the need for trust and reliability in the very sensitive domain of care and the productive collaborative mix that was created by the range of project partners that included not only high-tech and ICT players but also a player from the behavioural psychology domain. Indeed, it was a core element of the project to create a high level of trust, something that is essential to being able to demonstrate that the technology delivers a high level of utility to the users, is not intrusive and can be trusted. This was central to establishing the project's consortium. A key feature of the project was the strategic insight of a large industrial company like Philips guiding a 'fleet' of SMEs. A general consensus subscribed to the view that it is important to be sensitive to where the future is heading rather than adopt the notion that the future can be changed.

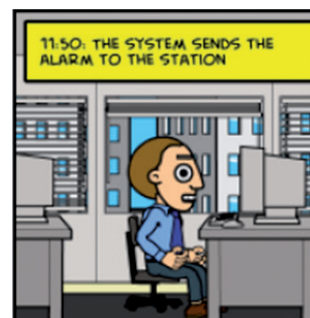
Deliverables and exploitation

As already indicated, GUARANTEE set out to use technology to enable a more pro-active approach to dealing with risk situations by employing 'active-safety' systems. A very good example of how the project's output has been quickly exploited comes in the

shape of baby cry algorithm developed by Sound Intelligence and licensed to Belkin, a major American company. Belkin has integrated this algorithm in its baby listening product of which substantial units are expected to be sold in 2013. In childcare Philips will also be making use of the GUARANTEE deliverables to explore implementation of baby monitoring system along as part of expansion the Philips Mother & Child Care (Philips Avent) business. In addition, Philips will be exploiting the need for using the Cloud to support clinical in health care products such as medication control for children's lung diseases, COPD and heart-disease.

In other, care-related fields, Comento intends to exploit the results in a home automation solution, offering consultancy in this domain, and is in contact with caregiver institutions to advise them on how they can extend their range in respect of alarm services while Ibermatica will be exploiting an alarm system for elderly people in 2013. TPVision is focusing its efforts on developing smart TV applications, such as baby monitoring and health monitoring.

The Finnish partners in the project will be spearheading Active Life Village, an integrated home care system, which combines the data flows of the different home care applications into a common shared activity and health records database. The database is integrated into a web-based service portal, which allows individually tailored service packages to be combined and activated, and thus operated through a single sign-on solution and a shared user front-end. Active Life Village has also set up a demonstration apartment, where the operation of these different elderly homecare applications can be demonstrated from both end user and care provider perspectives. The environment showcases different solutions and also acts as a development environment. Contacts have already been established with Chinese customers.



Characterisation of elderly behaviour

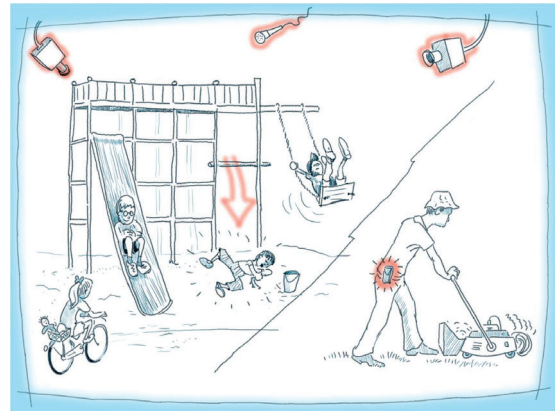
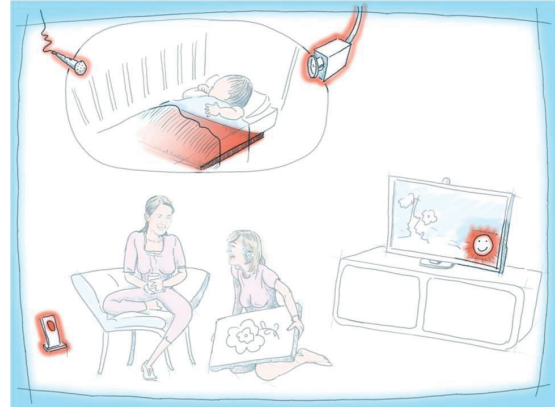
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Eagle Vision Systems BV has developed the Eagle Eye, a device that enables non-invasive people tracking with 3D information where anomalies suggestive of danger or hazard are detected. This information is transmitted in real time to another system or person via the network. Such an approach has application in crowd situations, for example, at shopping malls, sports venues and major events as well as at concourse areas like airports to ensure that groups of people are 'shepherded' to specific locations. For Noldus Information Technology, a behavioural analysis company and a close collaborative partner in the development of Eagle Vision's video monitoring device, the GUARANTEE project opens the way to a broad range of new products, from 'The Observer', a tool for behavioural research based on observation and annotation by human observers, to RT-MMC, a generic behaviour measurement, reasoning and control software tool that will be released commercially as a versatile workbench for researchers, engineers and students.

The number of technologies mastered and integrated within the GUARANTEE project is both considerable and impressive, facilitating the set of different objectives to be capably achieved. The project has clearly extended the horizons of the active safety domain with the ultimate and very tangible pay-off in respect of creating a safer society and greater quality of life.

More information:

www.guarantee-itea2.eu



Baby and child safety