

Emergency detection systems for senior citizens

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In the future, a new sensor system will automatically detect whether an elderly person is in an emergency situation and will automatically inform a trusted person. Credit: Fraunhofer IESE

Elderly people living alone have a dangerous life: after a fall, they often spend hours lying on the floor before their situation comes to anyone's attention and a doctor is contacted. A new system automatically detects predicaments like this and informs a trusted person. This makes it possible to live an independent life in one's own four walls.

Ms. K. is vision-impaired and can't get around very well any more. Still, the 80-year-old, who lives alone, has no intention whatsoever of moving to a retirement home. Most elderly people think the same way. They want to stay in their accustomed surroundings as long as possible, where

they can lead an autonomous life. What many fail to realize is that they are risking their health in the process. [Cardiovascular problems](#) are more frequent among the elderly, and the risk of falling is more prevalent: one person in three above the age of 65 falls once a year; among those over 80 the ratio is nearly one in two. Many of these accidents occur in private homes in the course of everyday activities, and often at night. Frequently it is hours before the injured are cared for.

Even home emergency-call systems are of limited help when senior citizens cannot sound the emergency signal. They may be injured or disoriented, or may simply not have the emergency button on their person. Help could be forthcoming from an intelligent system that automatically identifies and responds to [emergency situations](#) such as these. One such solution is under development by researchers at the Fraunhofer Institute for Experimental Software Engineering IESE in Kaiserslautern, Germany. Their project is dubbed "ProAssist4Life" – shorthand for "Proactive Assistance for Critical Life Situations." Project partners include the company CIBEK technology + trading, Binder Elektronik and the Westpfalz Klinikum.

IESE scientists are working on an unobtrusive system that provides constant "companionship" to elderly people living in single households or in retirement facilities. Multisensory nodes mounted to the ceiling of a room register an individual's movements.

"Our system records how long a person spends in what part of the home," notes Holger Storf, a scientist at IESE. A radio signal transmits the data to a computer. Software documents the individual's daily activities, constantly learning the person's "normal behavior." The analytical software compares the resident's current activity with the model that has been generated. This is how it identifies situations that deviate from the norm – situations that could be an indication that the person has fallen, is lying unconscious on the ground and is in a helpless

situation. "If a person spends considerably longer in the bathroom, for instance, or in some other place in the home, this is registered. To prevent false alarms, the first response is to prompt the individual," Storf explains.

This can be accomplished with a telephone call, for instance, or by means of a touchscreen monitor with an integrated speaker. The individual can then respond by touching the monitor. Should the elderly person fail to respond, the software sends a text message to a trusted individual such as a family member or caregiver.

"Our solution is not designed to replace home emergency-call systems but is intended to serve as a kind of airbag to give people living in single households a sense of safety," the researcher emphasizes. Unlike comparable competitor products, neither cameras nor microphones are required. [Senior citizens](#) do not need to carry sensors on their person, either. Because the system operates via radio signal, there is no need to install wiring. The system is easy to install.

"To date, there has been no comparable, learning-capable system on the market that constantly adapts to an individual's behavior," Storf notes. The researcher and his team have applied for patents of the software and the multisensory nodes. The experts will be exhibiting a prototype of "emergency detection in the home" at the CeBit 2011 in Hanover, Germany, where they will demonstrate its operation, in a kitchen built for the purpose, at the Fraunhofer joint stand.

Provided by Fraunhofer-Gesellschaft

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