

» Application Story «

M2M



Smart Homecare Gateway to the Call Center

Kontron M2M system supports Sonitor®'s cloud service-based fall detection solution

It is an all too obvious fact that senior citizens would chose to continue living in their own homes where they have often lived for decades, for as long as possible. But with the onset of illnesses and the gradual process of aging – living at home can prove to be an ever-present, continuously increasing risk. This dilemma creates the need for solutions which offer safety and security. New homecare technologies can easily carry out emergency calls when needed or have the capability to detect seniors lying helpless on the floor. Sonitor® offers with its USID homecare package a solution which incorporates these functions. The Kontron M2M platform is embedded as the smart homecare gateway between the Sonitor® sensor tags and the emergency management cloud.

Over the next few decades the number of elderly people will increase dramatically. The number of seniors over 80 will increase by 50 % from 2007 till 2030. And, for the first time in history, this will exceed the number of juniors. The demand for healthcare workers and retirement homes will increase accordingly. This presents a challenge: more seniors need to be taken care of but there will be less manpower working to cope with these increased costs. This challenge forces us to take a look at new ways of caring for seniors. New technologies and new ways of employing technologies are crucial in these upcoming solutions.

Stay home, stay healthier

The fields of embedded information and communication technologies present enormous potential for the intensified support of senior citizens in their homes with reduced manpower. By employing these technologies in the home, senior citizens will be able to live independently for a longer period of time. Research shows that this is beneficial for both the individual and the entire caring society: Seniors who live at home, with the familiarity of their own belongings and surroundings, stay healthier - physically and mentally - than people of the same age living in retirement homes.

Need for safety

So why doesn't every senior stay at home as long as they are physically and mentally fit to do so? The answer is very often a sense of lack of security. It is either their fear or the fear of their relatives that something could happen to them and no-one is around to help. It simply feels safer to be somewhere where there are people and nurses who can help if anything happens, even if the price that has to be paid is the loss of personal independence and freedom. But retirement homes are not the only answer. The combination of technologies which already exist together with new M2M-based cloud applications can offer the necessary safety to offer peace-of-mind both to the elderly residents themselves and their relatives, without them having the feeling of being watched.

Ultrasound measurements

Sonitor® Technologies' ultrasound-based USID technology that is already used in hospitals to locate and track patients can also, for example, be deployed as a homecare solution for activity monitoring and fall detection of the senior resident. The system is almost entirely battery powered and can be installed quickly and cost effectively. The only other thing that is required is a wide area communication interface and the infrastructure to manage emergency calls. This is what Sonitor® Technologies and Kontron have now jointly compiled and demonstrated.

The demo system consists of a small waterproof sensor system that is worn like a wristwatch. Every 15 seconds it sends a positioning signal over standard wireless WLAN connections to the homecare gateway. The ultrasound generated positioning signals are highly precise and deliver three-dimensional data – down to 3 centimeter. The smart homecare gateway is constantly active and monitors these measurements. Due to the local computing intelligence of local M2M gateway, only relevant data will be sent out if help is needed and there is no storage of the measured data unless the users allow it to be stored. As soon as any critical event is detected, the build in wide area network connection is used to send out a notification

Situational awareness

As long as the movements and locations registered by the ultrasound receivers are within the frames of what is defined

as normal, the emergency call system is idle. If a situation occurs which is not considered normal information – or an alert – is automatically sent through the Kontron M2M platform to relatives, a home care or security call center. Typical situations which trigger an alarm are:

- » Fall (resident on the floor for more than a certain amount of time)
- » Irregular movement pattern (leaving home at night, not leaving the bedroom at the usual time etc.)
- » Lack of movement
- » Active alert (resident has pushed the alert button)

Potential for extension

When movement information is combined with other security solutions in the home, a whole range of different user scenarios is imaginable. One example would be warning the resident if leaving his or her home while the stove is still on, or leaving the bathroom while the faucet is running. This presents a great potential for service providers because robust and reliable home care solutions that lend a true feeling of safety, mean that living at home longer will be an easier choice - both for seniors as well as for their relatives.

Ease of installation

One benefit of the highly precise "Home Positioning System" (HPS) for fall detection and upcoming additional functions is the ease of installation thanks to the fact that it is wireless. No physical network connection is needed, neither to the sensor system that is worn by the seniors nor to the wide area emergency management system. The sensor system is battery powered and has a capacity of up to 3 years. The units have no power connection for recharging. This ensures the system's high availability due to the fact that no-one can forget to recharge the system on a daily or weekly basis. Only one service interval for a new battery is required every 2 to 3 years.

Cost-effective field deployment

Another benefit is that the system is already being used in hospitals for asset tracking. That means that the entire range of technologies and physical platforms are already deployed in the field which presents a highly cost-efficient starting point for extended field deployment. The only major new component Sonitor® added was the new central smart gateway for sensor data acquisition and cellular communication, designed by Kontron.

Sonitor® chose Kontron as its preferred partner for this new application area because the company offers both embedded computing competence as well as M2M know-how from a single source. Kontron has made substantial investments in the smart M2M gateway market by adding cellular connectivity support to its embedded computing platforms. The goal is to offer application-ready edge nodes for machine to machine communication.

In the near future, device communication over cellular interconnects is expected to increase significantly. Within

the next decade, the Internet-of-Things will transform into a market with billions of connected devices, as different independent market research companies have predicted. Embedded computing platforms are expected to make up for a substantial portion of this market. Kontron's investment in this market is therefore strategic by nature. The enabler of this market is the cellphone infrastructure that has become globally available and that delivers constantly more bandwidth at shrinking costs.

Cellular connectivity

The professional grade M2M platform from Kontron is used to deliver the connection into the cloud using the 3G/2G cellular connection as a standard or fallback functionality for wired telecommunication connection. This connection is integrated and application-ready in a versatile embedded computing box that includes all the required drivers and protocols and highly flexible configuration options in terms of applications and operating systems.

Pre-qualified M2M platform

Beside this flexibility the platform convinces R&D engineers with its pre-qualified set-up for mobile network operators. The system has a PTCRB certification and is approved for use in cellular networks by global carriers such as Vodafone. This saves R&D time as well as costs because, for companies such as Sonitor®, it streamlines the process of carrier approval and their own certifications before the application can be launched on a carrier network. For use as a part of a medical device, it also can be manufactured accordingly.

Flexible device interfaces

Locally the system provides direct access via WLAN (WiFi) to the Sonitor® platform. For integration of additional local sensors and other terminal devices the system carries in the Kontron M2M Smart Services Developer Kit configuration a range of interface options including 802.11a/b/g/n WLAN (Wireless Local Area Network) and 802.15.4 WPAN (Wireless Personal Area Network) as well as a mini PCI Express slot for custom-specific extensions. Even face-to-face communication is possible with the optional extension of a smart video and audio module. Additionally, custom configurations are available if required by the OEM. With its modular approach and custom design options, the M2M developer kit enables OEMs and smart services developers as well as independent software suppliers (ISVs) to reduce development costs and risks, thus ensuring a rapid introduction to the market.

The eHealth Cloud

To show how the system can be used in real cloud environments, the demo system is connected to the Sheperd ehealth cloud of Telenor Objects. This cloud platform is designed for assisted living and other eHealth-related use cases and can deliver data to nurses' tablets that can also show the patients' journals. In Norway, the Shepherd platform is part of a major assisted living project together with Visma. Insurance companies that will use these new technologies will be able to win new customers as well

as saving retirement home costs.

Alarm-triggered services can also help to provide billing transparency in homecare services because service time accounting is as precise as a telephone bill. Homecare service providers will benefit from reduced false alarms and increased customer satisfaction and consequently customer loyalty. Finally it is a win-win situation for everyone, for insurances and homecare service providers as well as for the senior citizens themselves and their next of kin, because it delivers this most important feeling of safety in the home, sweet home.

How does the Sonitor® sensor detect the position?

The patented Sonitor® Real Time Locating System (RTLS) uses a wristwatch sized tag and the Kontron M2M platform as a receiver to automatically track and locate objects inside a building. At preset intervals the tag device carried by the seniors will be located with high accuracy by using ultrasound waves. The M2M platform that uses Sonitor® patented Digital Signal Processing (DSP) algorithms picks up the signal and identifies it as a location. Due to the unique attributes of ultrasound there is no risk of electromagnetic interference with or from other equipment. The Sonitor® RTLS is fully, easily and quickly scalable. The small footprint tags have optional communication buttons for custom configuration.



Pictures



Photo 1: Kontron offers different application-ready M2M platforms with pre-integrated cellular communication interfaces. Professional grade systems for indoor usage as well as industrial grade systems for usage under harshest environmental conditions such as outdoor or in vehicles are available. Custom-specific configurations for mass field deployments are always part of Kontron's M2M services.

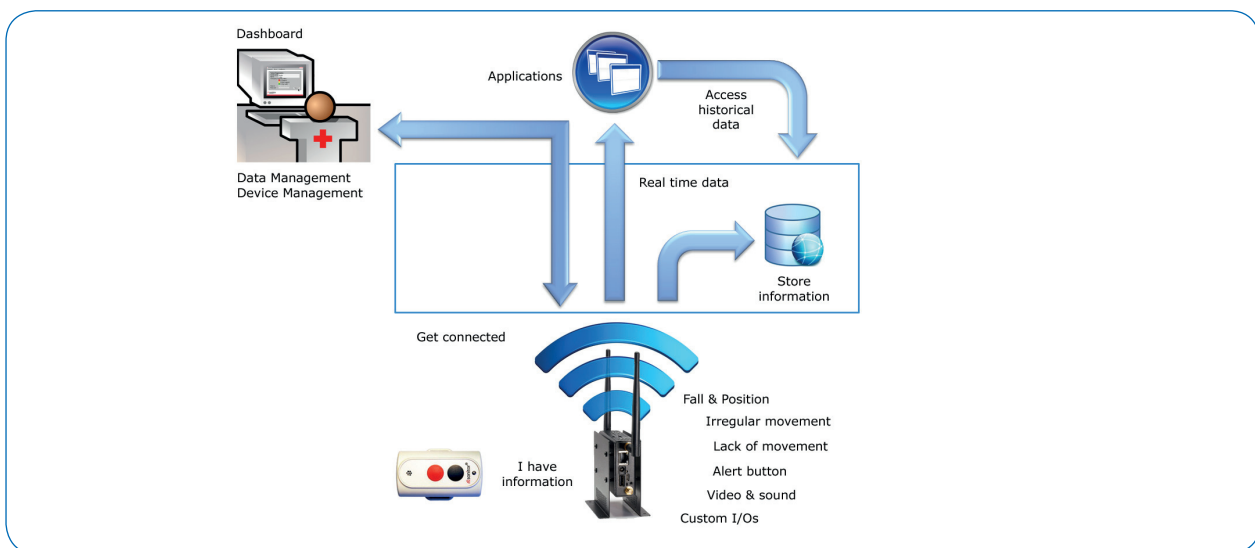


Photo 2: Shepherd from Telenor Objects is a managed service platform allowing quick and easy deployment and operation of new M2M solutions based on a device library and generic service enablers.

Further product information on Kontron M2M Smart Services Developer Kit:

<http://www.kontron.com/industries/communications/m2m+smart+services+developer+kit.html>

About Telenor Objects

Telenor is Norway's leading supplier of telecommunications- and data services, distributed over both fixed and mobile network infrastructure. The Telenor Group is one of the world's largest mobile operators with 140 million mobile subscriptions. As part of the Telenor Group, Telenor Objects delivers a managed service for connected objects. Our aim is to increase the number of devices connected to the network infrastructure so that our customers can benefit from real time information on their assets. Telenor Objects has over the past three years been running several successful pilots with Norwegian corporate customers, connecting their sensors devices to our platform. Information from these devices have been processed and forwarded to third party applications. From 2012 a core initiative for The Shepherd platform is eHealth. Telenor Objects is partnering up with several eHealth device partners and can offer a complete device offering for assisted living and other eHealth related use cases. In Norway Shepherd is part of a major assisted living project together with Visma. See this page (Norwegian language) for more details about the project.

About Sonitor®

Sonitor® Technologies is a leading provider of Real Time Location System (RTLS) solutions and develops, manufactures and supplies a hybrid WiFi and ultrasound indoor positioning system (IPS) that automatically tracks with 100% room or sub-room accuracy the real-time location of moveable equipment and people in complex indoor environments, such as hospitals and in homecare. Sonitor® Technologies' RTLS technology is designed for seamless integration with third party applications software and integration solutions. The First hand clinical care environment experiences prompted Ole B. Hovind MD, M.P.H., founder and chairman, to establish Sonitor® Technologies in 1997. Dr. Hovind was frustrated by wasted hospital staff time spent searching for active patient charts and mobile equipment and wanted to create an efficient technology-based system to address these well-documented problems. Under Dr. Hovind's guidance, Sonitor® Technologies embarked on a mission to identify and further develop the most suitable technology for a precise real-time indoor tracking system. In doing so, Sonitor® associated itself with the most advanced expertise in indoor wireless communication technology. After extensive research, the Sonitor® R&D team concluded that airborne ultrasound is the best communication platform to accurately locate moving objects by room (or by defined zones inside rooms) in complex buildings. Based on Digital Signal Processing technology, Sonitor® is continuously refining its proprietary ultrasound real time location system (RTLS) technology to ensure the ultimate performance in large and complex indoor environments, such as hospitals. The complexity of managing hospitals will continue to intensify due to increasing pressure for cost containment, a continuing shortage of qualified staff, the high pace of medical technology improvements, revisions in reimbursement rules, increasing focus on risk-management and the need for improved quality assurance to ensure the best patient care and outcome. Consequently, the healthcare industry needs and is seeking efficiency and productivity-improving solutions. The Sonitor® Ultrasound RTLS is designed to meet or exceed the tough needs and demands of the hospital industry as well as the upcoming homecare industry.

About Kontron

Kontron is a global leader in embedded computing technology. With more than 40% of its employees in research and development, Kontron creates many of the standards that drive the world's embedded computing platforms. Kontron's product longevity, local engineering and support, and value-added services, helps create a sustainable and viable embedded solution for OEMs and system integrators.

Kontron works closely with its customers on their embedded application-ready platforms and custom solutions, enabling them to focus on their core competencies. The result is an accelerated time-to-market, reduced total-cost-of-ownership and an improved overall application with leading-edge, highly-reliable embedded technology.

Kontron is listed on the German TecDAX stock exchanges under the symbol "KBC". For more information, please visit: www.kontron.com

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