

# Video: 'Security guard' robots being developed by UK universities

27 August 2013

Robots which could operate as security guards or care home assistants of the future are being developed in a British-led £7.2 million project.

Researchers working on the STRANDS (spatio-temporal representations and activities for cognitive control in long-term scenarios) project are developing the highly complex computer software needed by robots which would allow them to work usefully in the real world clutter of an office, or a hospital.

The long-term aim of the work is in creating mobile, independent robots with practical real-world applications and which can run unaided for days at a time, although researchers admit this will need "great leaps forward" on current knowledge in the area.

At the moment, even the most cutting-edge examples of such robots are unable to operate for any length of time on their own without human intervention, because their programming cannot cope with changes to its working area, such as people walking around an office.

However the project, involving three British universities as well as European research agencies, is aiming to create a robot which could run for up to 120 days.

In the first stage, researchers are developing the complicated mapping software which the robots would need to "learn from their long-term experiences" and be able to work on their own for long periods of time.

Once researchers have put together required programming, they will begin testing their machines in a care home for the elderly in Austria and in an office in the UK where a robot will function as a security patrol.

The UK-based [G4S](#) Technology Ltd and the Academy of Ageing Research, an Austrian care provider, have both signed up to STRANDS.

Dr Nick Hawes, lecturer in intelligent robotics at the University of Birmingham, is coordinating work at the eight sites taking part in the project including universities in Austria and Germany and the Royal Institute of Technology in Sweden.

He is also leading the research on enabling the robots to effectively map and work around their environment.

Dr Hawes said robots could work in "predictable" environments for short periods, but now the challenge was to go much further.

"Recent advances in robotics and artificial intelligence have enabled mobile robots to operate intelligently in predictable environments for limited periods of time," he said.

"Our challenge is to develop robots which can go way beyond this, running reliably in dynamic real-world security and care environments for as long as they're required.

"This will make these machines truly useful assistants in our workplaces."

He added: "To do this, we must make great leaps forward in understanding how robots can understand their worlds using the information their sensors provide.

"For this problem, long run times are essential as they allow the robots to learn what normally happens around them every day."

Dr Tom Duckett, director of the Lincoln centre for autonomous systems research and a professor of computer science at Lincoln University, will lead the research on creating 4D maps - three-dimensional mapping over extended time periods - of the environment and investigate methods for detecting changes and unusual situations, such as when a piece of furniture is moved.

"The idea is to create service robots that will work with people and learn from long-term experiences," he said.

"What's unusual about any environment depends on the context.

"In a security scenario a robot will be required to perform regular patrols and continually inspect its surroundings for variations from its normal experiences.

"Certain changes such as finding a person in a restricted area may indicate a security violation or a burglary.

"In a care home a robot will be required to act as an assistant for elderly patients, fetching and carrying things while also being alert to incidents such as people falling over."

He added: "It's not just about developing a care home or security robot.

"We are trying to enable robots to learn from their long-term experience and their perception of how the environment unfolds in time.

"The technology will have many possible applications."

Dr Marc Hanheide, also from the University of Lincoln, is charged with gathering research on how robots gather information about their surroundings and then apply this to how they interact with humans.

"The main idea is to deploy robots that run for a long time so they have the chance to develop a [common](#)-sense attitude on how the world should be and be able to spot the deviations," he said.

"The robots are curious to learn about the environment - they will see if something has changed and whether that's a one-off or a regular occurrence."

At the end of the project, which has been funded through the [European Union's](#) Seventh Framework programme, the research team will travel across the continent demonstrating its results and hope their findings will be directly applied across several industries in the future.



[Download the Belfast Telegraph iPad App](#)