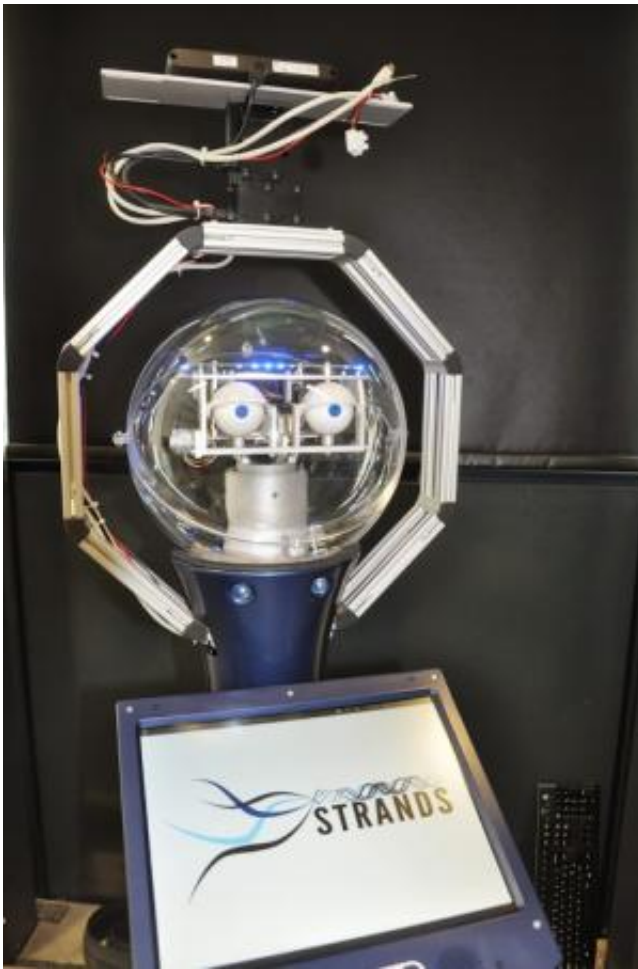


The next generation of carers and security guards

August 27 2013



STRANDS robot.

Specialist robots will learn how to act intelligently in real-world environments, supporting security guards or care home assistants, in a

multi-million Euro project.

The aim of the research is to create [mobile robots](#) that are able to operate intelligently and independently, based on an understanding of 3D space and how this space changes over time, from milliseconds to months.

The £7.2 million STRANDS collaborative project involves security company G4S Technology Ltd and the Academy of Ageing Research, an Austrian care home provider, where the technology developed throughout the four year venture will be tested.

Funded by the European Union's Seventh Framework programme and led by the University of Birmingham, Dr Tom Duckett and Dr Marc Hanheide from the University of Lincoln's School of Computer Science have been awarded £750,000 to help develop the software to process the sheer volume of experiences the robots will encounter.

Dr Duckett, who is Director of the Lincoln Centre for Autonomous Systems Research, will lead the research on creating 4D maps (3D mapping over extended time periods) of the environment and investigate methods for detecting changes and unusual situations.

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

"It's not just about developing a care home or security guard [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."

As well as mapping the environment the robots will require capabilities for person detection, tracking and activity recognition. Dr Hanheide, whose background is in Artificial Intelligence, will lead the research on how the robots gather information about their surroundings, and use this learned knowledge to interact appropriately with human users.

Dr Hanheide said: "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. 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. Our robots will be active for long periods in dynamic and changing environments.

"Currently industry robots can run for 24 hours a day and are incredibly reliable in well-controlled environments, but they don't use long-term experience to adjust or improve in any way. Cognitive robotics systems can learn and adapt, but most are used for just one experiment. We want to build a bridge between the two by creating robots that can run for long periods of time and also make use of life-long learning capabilities to adapt to the needs of different users."

The project was officially launched at a recent coding camp held at the University of Lincoln.

Following the research period the team will perform demonstrations of their systems at science museums, public events and trade shows. It is hoped the software solutions and theoretical concepts produced will be

exploited by a variety of industries.

Provided by University of Lincoln

Citation: The next generation of carers and security guards (2013, August 27) retrieved 7 August 2024 from <https://phys.org/news/2013-08-carers.html>

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