

## PRESS RELEASE

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### ASSISTANCE ROBOTS HELP STROKE PATIENTS

**A study by the AIT Austrian Institute of Technology and the British National Robotarium based in Edinburgh/Scotland has investigated the rehabilitation process and the support provided by robots for patients with partial paralysis.**

Around 19,000 Austrians suffer a stroke every year - that's about one stroke every 27 minutes. After cardiovascular diseases and cancer, strokes are the third most common cause of death in Austria. Although the mortality rate has fallen significantly in recent years, many people's health is severely impaired by the consequences of a stroke. Around 80 per cent of acute stroke survivors suffer from severe mobility impairment or hemiparesis (partial paralysis affecting only one side of the body). This makes targeted rehabilitation measures, which can be well supported by new technologies, even more important. According to experts, social assistance robots can make a good contribution here.

As part of the VITALISE project, the AIT Austrian Institute of Technology in cooperation with the National Robotarium at Heriot Watt University in Edinburgh, Scotland, has now investigated the extent to which people with hemiplegia can be better supported in their upper limb rehabilitation and targeted movement exercises by a combination of social assistive robots (SARs) and brain-computer interfaces (BCI: a device worn on the head with several sensors to measure brain waves). The patients had to raise and lower their arm and the Nao robot imitated their movement exercises, even if the movement was only imagined.

#### **Patients and therapists involved right from the start**

In order to create the most authentic conditions possible in the sense of a living lab, the study was conducted in the new tech2people therapy center for neurological disorders, which was opened in Vienna's Seestadt Aspern in autumn 2023. Both patients and therapists were involved in the study.

"Co-design methods are very helpful and work well, especially in the field of eHealth. It was important for us to investigate the user experience as well as the general implementation of the approach for both people with hemiparesis and physiotherapists," explains Markus Garschall from the AIT Centre for Technology Experience. He has also specialized in AAL (Active and Assisted Living) for years and is currently Vice President of AAL AUSTRIA. "At the same time, the transnational collaboration with the scientists from Scotland was also very inspiring; we need a lot more European collaboration and exchange, especially in the healthcare sector," adds Garschall.

Social assistance robots with human-like characteristics open many possibilities, in particular they can support the independent exercises of those affected. "Especially in neurological rehabilitation, a consistent exercise program with many repetitions is necessary to achieve progress. The aim is therefore to use SARs to support and motivate patients in their independent exercise program. However, to ensure that the technology is actually utilized, it is important to evaluate the interaction between the patient and the robot. It was also important for us to gain a professional therapeutic perspective on the use of such a technical set-up for patients so that we could subsequently adapt it according to their wishes," emphasizes Beatrix Wais-Zechmann, researcher at the AIT Center for Technology and herself a physiotherapist.

"Social robots can act as coaches to increase motivation, but these systems must enjoy the trust of the patient. Mimicking human actions during interaction can have a positive effect on trust. Brain-robot interfaces could facilitate this by enabling a more immediate and direct perception of human states," explains Lynne Baillie, Professor of Computer Science and Lead Human-Robotics Interaction (HRI) at the National Robotarium in Edinburgh, Scotland.

### **Results and outlook**

The study was conducted with patients and therapists over a period of three months. In particular, the aspect of trust was investigated and the characteristics attributed to the robot by the test subjects were recorded. Using the "Emotion Wheel", the patients had the opportunity to assign different characteristics to the robot. Initial results show that the robot is categorized as highly competent and that little "discomfort" is actually felt. However, the robot is perceived as a machine or device, with human warmth falling by the wayside. "Overall, the results of the study are promising and point the way forward for future stroke therapy," summarize Markus Garschall and Lynne Baillie. A further evaluation project involving people with hemiparesis is planned for 2024 in Scotland. "The study has once again shown that the use of robots and new technologies in rehabilitation can significantly increase the efficiency and effectiveness of therapy and, above all, offer personalized and continuous support. This has the potential to improve the quality of life of affected patients, reduce therapy costs and alleviate the shortage of skilled labour in the healthcare sector," emphasizes Markus Garschall.

### **About VITALISE**

The aim of the European research project VITALISE is to harmonize living lab approaches (methods and approaches) and to create tools that enable and facilitate cross-border cooperation for the development of new products or services. The thematic focus of VITALISE is on innovations in the field of eHealth, e.g. in the area of rehabilitation, but also in everyday support for older people. To this end, 19 organizations from ten EU countries and Canada have joined forces to provide personal cross-border access to 17 Living Lab research infrastructures. The AIT Center for Technology Experience is one of the lead project partners in VITALISE and is involved with the Technology Experience Lab (TX.Lab).

### **Living Labs**

Living labs allow new technologies to be tested in practice in a "natural" environment, e.g. in a home, hospital or factory. Living labs are also a methodical innovation approach for the situational involvement of relevant stakeholders in technology development.

## About the AIT Austrian Institute of Technology

The AIT Austrian Institute of Technology is Austria's largest research and technology organisation with 1,527 employees and an operating performance of almost 200 million euros. The AIT focuses on the research areas of "sustainable and resilient infrastructures", particularly in the fields of energy, transport and health, as well as the "digital transformation of industry and society" and cooperates closely with universities, industry and public institutions.



The VITALISE project was funded under the EU Horizon 2020 program under grant no. 101007990. The project ran from April 2021 to March 2024.

### Further information:

Project website <https://vitalise-project.eu>

Project video: <https://www.youtube.com/watch?v=J9GHXt3rS8o>

[About the AIT Austrian Institute of Technology](#)

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[About the National Robotarium/Schottland](#)

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