

Robots – the talented caretakers of the future

Robots are taking on more and more rehabilitation and support tasks, relieving nurses and doctors. Some of these applications the EU project Echord ++ will present at the Medica trade fair on November 12-15, in Dusseldorf in hall 12 (booth F 37).

Older patients often have limitations in organic, personal and social areas and these documented changes determine the therapy. A thorough history requires much more time with seniors, because they cannot collaborate as younger patients and tire out more quickly. A comprehensive geriatric examination, however, offers the opportunity to help the patient early and in a qualified manner, thus enabling him to lead a self-determined life.

Support for doctors

Some of these examinations may not necessarily require a doctor or caregiver. A robot like the ASSESSTRONIC prototype can take over some of these tasks. It can understand, interpret and classify voice, gestures or touch of the patient.

ASSESSTRONIC collects this data independently, processes and saves it so that they are always available. The doctor saves a lot of time and the innovative product is also inexpensive, because it relies on standard hardware.

The CLARC prototype is designed to allow clinicians to save time by driving several standard tests of a comprehensive geriatric assessment without human supervision. The robot captures the responses, monitors the patient's motion, records all data (video and audio) and scores the tests. The clinician can subsequently analyse all these multimedia information, edit the scores and evaluate the evolution of the patient over time. Since the robot can move freely in the care centre, patients love him. CLARC already receives them at the entrance and guides them calmly to the examination room – a great relief, because they only have to follow it.

Robotics intensifies rehabilitation measures

Intense and assisted rehabilitation therapies plays an important role in the recovery process after stroke. The prototype LINarm++ supports the patient in the rehabilitation of the upper limb. It adapts the difficulty and support levels to the abilities of the patient by monitoring his performances and physiological state. A visual feedback motivates him and keeps his attention. LINarm++ is compact and affordable, and the patient can easily use it at home, unlike other training systems.

The training device MOTORE ++ helps patients after head injuries or stroke to rehearse everyday movements and train their upper limbs. With only 15 kilograms of weight, a large data storage and batteries, patients can practice with it at home and get to see the training success itself through the graphically processed data. The therapist can adapt the training to these successes; the robot itself permanently measures force, acceleration and speed and adapts itself to the patient's performance.

The *MAK Active Knee* orthosis helps patients after stroke or a knee operation to train this joint as effectively as possible and to make it movable again. It includes an intelligent detector system that automatically adjusts to the patient's gait and strength, allowing him to even climb stairs and descend slopes.

Spinal muscular atrophy is a genetic disease, which comes in various forms that are hitherto incurable. Movement is limited, if at all. At the same time, exercise is very important to reduce the side effects and course of the disease and to increase the quality of life of those affected. There are already a number of exoskeletons on the market, the ExoTrainer, however, was specially developed for children and is now commercially available as ATLAS 2020. It contains 10 actuators and an optimized design with only 14 kg weight. The exoskeleton lets children move on their own and improves their quality of life significantly. By the way, the health insurance companies save annually high amounts, which arise from the prevented side effects of the disease.

About ECHORD ++

ECHORD ++ aims to enhance knowledge transfer between science, industry and users in robotics and to support their collaboration. The five-year EU-funded project (2013-2018) supports small research projects, so-called "Experiments", Innovative Robot Technologies in Public Institutions "Public End-User Driven Technological Innovation" (PDTI) and "Robotics Innovation Facilities" (RIFs), open laboratories equipped with the latest hardware and software and offering scientific and technical support. The ECHORD++ project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 601116.

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Contact:

Christine Kortenbruck
Public Relations - Echord ++

Technical University of Munich
Schleißheimer Str. 90 A
85748 Garching-Hochbrück

Phone: 0049-89-289-18101
Email: c.kortenbruck@in.tum.de