Cybathlon practice session a success

August 3 2015

The various challenges are designed to resemble daily tasks as closely as possible. Credit: ETH Zurich / Alessandro Della Bella

Slicing bread in the morning, pouring a cup of coffee and sitting down at the kitchen table are a part of everyday life for most people. But for people with physical impairments such as amputated limbs, the tasks so many of us take for granted are anything but a matter of course - and they are often difficult to accomplish without help. According to the World Health Organisation (WHO), around 15% of the world's population is physically impaired to some degree. In order to overcome the hurdles of everyday life, many disabled people use assistive technologies. This is where the Cybathlon comes in: it aims to drive forward the development of these technologies in a fun and competitive

environment.

Day-to-day hurdles the measure of success

Unlike events such as the Paralympics, the Cybathlon is aimed at non-athletes with physical impairments. The various courses are deliberately designed around day-to-day tasks.

"These technologies are already highly advanced in some areas," explains Robert Riener, professor at ETH Zurich and founder of the Cybathlon. "But if we judge them according to their suitability for everyday life, it becomes apparent that research and development still have a long way to go."

Challenging teams while engaging spectators

The practice session was a great success both for the participating groups and the Cybathlon organisers, as it helped them to see what works well and what changes still need be made before 2016. They paid particular attention to the course design: the tasks need to be relevant to participants' daily lives, pose a challenge for the participating teams and create a competition that will engage spectators. During the practice session, there were significant differences between the five different disciplines: for example, participants were able to complete the obstacle course for motorised arm and leg prostheses with relative ease and speed. The competitors, known as pilots, successfully completed the balance beam challenge and set the table for breakfast. However, there were some difficulties with the electric wheelchairs: none of the four participating teams was able to complete all of the hurdles, and only one wheelchair was able to climb steps. Several prototypes exhibited a sort of "savant syndrome" - in other words, they were able to complete one of the six course challenges particularly well, but have room for improvement in the other challenges.Inhalt.

In the FES discipline, pilots with complete spinal cord injuries take part in a bike race with the help of functional electrical stimulation. Credit: ETH Zurich/ Alesandro Della Bella

Striking a balance between cooperation and competition

The participating teams enjoyed sharing their experiences with other technology manufacturers and research groups. "The test run was an excellent opportunity to meet other researchers and to discuss common interests and possible cooperation," explains Matjaz Mihelj from the University of Ljubljana in Slovenia.

But the Cybathlon is a competition too. Despite the friendly sharing of experiences and pursuit of a common goal - to provide disabled people with better assistive technologies in the future - the competitive spirit of the event was certainly not lacking. Luca Tonin from the University of Padua, Italy, also describes the importance of this reciprocal push among participants: "I believe that the Cybathlon will spur technology providers

on to continue developing new solutions - in turn making it possible to set new standards in research."

Ironically, the architectural barriers and obstacles in the stadium itself also put the organisers and participants to the test, making it apparent once again how they are fighting a battle on two fronts. "As researchers, we must push technology forward, but society as a whole must also ddismantle structural and technical barriers," Riener emphasises.

Ramping up for Cybathlon 2016

Around three quarters of the 54 teams that have signed up for Cybathlon are groups from research labs. These teams will be working hard to improve their prototypes over the next 14 months. "The technology presented at the test run was state-of-the-art, and it looks like next year's competition will be a must for researchers working in the field of assistive devices," predicts Mihelj. But the practice session has also shown that even the best technology doesn't work without an experienced user. It will be interesting to see what clever ideas the teams come up with when they compete in 2016.

BCI involves detecting and then converting brainwaves into control signals, making it possible for participants to use their thoughts to control an avatar in a computer game. Credit: ETH Zurich/ Alesandro Della Bella

Cybathlon

The Cybathlon will be held on 8 October 2016 at the Swiss Arena in Kloten. People with varying degrees of impairment will participate in the unique competition, aided by cutting-edge assistive technologies. Each team is comprised of a technology developer and at least one "pilot" who directs the technological device. The assistive technologies used in the competition are either products that are already available on the market or prototypes from research labs.

The competition itself comprises six different disciplines, each with 8 to 16 participating teams:

- Obstacle course with motorised leg prostheses
- Agility course with motorised arm prostheses
- Powered exoskeleton race
- Obstacle course with electric wheelchairs
- Bike race with electrical muscle stimulation
- Brain-computer interface computer game

The goal of the Cybathlon is to provide a platform to promote the development of assistive technologies that help disabled people in the best way possible. The Cybathlon is also intended to break down barriers between the general public, people with physical impairments and technology developers.

Provided by ETH Zurich