MoreGrasp: Getting a better grip on things

September 18 2018, by Barbara Gigler

Research success for the MoreGrasp consortium: with the help of reprocessed brain signals the mental control of neuroprostheses will be considerably simplified in future Credit: MoreGrasp

The goal of the MoreGrasp project was to develop a sensoric grasp neuroprosthesis to support the daily life activities of people living with severe to completely impaired hand function due to spinal cord injuries. The motor function of a neuroprosthesis was to be intuitively controlled by means of a brain-computer interface with emphasis on natural motor patterns. After three years, the breakthrough was reported by the members of the project consortium led by Gernot Müller-Putz, head of

the Institute of Neural Engineering at TU Graz, which include the University of Heidelberg, the University of Glasgow, the two companies Medel Medizinische Elektronik and Bitbrain as well as the Know Center.

Gernot Müller-Putz says, "In tetraplegia, all the circuits in the brain and muscles in the body parts concerned are still intact, but the neurological connection between the brain and limbs is interrupted. We bypass this by communicating via a computer, which in turn, passes on the command to the muscles." The muscles are controlled and encouraged to move by electrodes that are attached to the outside of the arm and can, for example, trigger the closing and opening of the fingers. The key was the sufficient distinguishability of the brainwaves to control the neuroprosthesis. For instance, if the participant thought about raising and lowering their foot and the signal measured by the EEG opened the right hand, the subject then—for instance—would think of a movement of the left hand and the right hand would close again.

The MoreGrasp consortium developed this technique further. This mental 'detour' of any distinguishable movement pattern is no longer necessary, as Müller-Putz explains: "We now use so-called 'attempted movement.'" In doing so, the test subject attempts to carry out a movement like grasping a glass of water. Due to the tetraplegia, the brain signal is not passed on, but can be measured by means of an EEG and processed by the computer system. Müller-Putz is extremely pleased with the success of the research. He says, "We are now working with signals that only differ from each other very slightly. Nevertheless, we have managed to control the neuroprosthesis successfully. For users, this results in a completely new possibility of making movement sequences easier—especially during training. A variety of grips were investigated in the project: the palmar grasp (cylinder grasp, as for grasping a glass), the lateral grasp (key grasp, as for picking up a spoon), and opening the hand and turning it inwards and outwards.

Large-scale study

End users can register on the special online platform to enter a large-scale feasibility study intended to check compatibility of the technique in everyday life. Participants eligible for the study will be tested according to a complex procedure. Afterward, each subject will be provided with a tailor-made BCI training course which must be completed independently in sessions lasting several hours each week. In this way, brain signals will be gathered and the system itself will learn during each experiment.

Provided by Graz University of Technology

Citation: MoreGrasp: Getting a better grip on things (2018, September 18) retrieved 3 May 2024 from https://medicalxpress.com/news/2018-09-moregrasp.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.