A Kinect-based system to aid motor learning in humans

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Abstract

The Kinect sensor, initially intended for enhancing user experience in video games, has been gaining increasing interest from the scientific community, primarily in disciplines related to biomechanics. Since it is capable of real-time spatial localisation of human body joints in a 3D scene, it represents a powerful tool in a range of experimental paradigms aimed at studying various aspects of human body kinematics. The low cost of Kinect makes it a very interesting alternative to expensive systems for motion tracking.

I will address the question as to whether Kinect can be an efficient aid in motor learning with the key mechanism being observational learning, in which individuals copy an action, e.g., when they match their movements to those of others. In this context, the critical advantage of the presented system is the real-time visual feedback, as well as the post-hoc feedback.

I will discuss improvements in spatio-temporal accuracy during execution of complex body movements in a simple paradigm designed to study short-term practice effects. In addition, I will briefly discuss possible fields of application.

About the presenter

Cezary Sielużycki received the Ph.D. degree in biocybernetics and biomedical engineering from the Faculty of Mechatronics, Warsaw University of Technology, Poland in 2003 and the habilitation degree in biocybernetics and biomedical engineering from the Faculty of Automatic Control, Electronics and Computer Science, Silesian University of Technology, Poland in 2019.

From 2004 to 2013, he worked in the Noninvasive Brain Imaging Lab of the Leibniz Institute for Neurobiology in Magdeburg. Next, he joined the Control of Normal and Abnormal Movements Team at the ICM Brain and Spine Institute and Pierre and Marie Curie University in Paris. In 2015, he moved to the Wrocław University of Science and Technology, where he first worked in the Department of Computational Intelligence and from 2016 in the Biomedical Signal Processing Group of the Department of Biomedical Engineering.

His research interests focus mainly on biomedical signal processing with emphasis on magnetoencephalography.