

Einladung zum Vortrag

## **(Brain Computer Interface) BCI – Tele Operated Androids A Platform for Discoveries on Body Ownership Mechanism and Short-term Neuro-feedback Techniques**

von

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### ■ **ABSTRACT**

We introduce a brain computer interface (BCI) for controlling a very humanlike android robot (Geminoid) using non-invasive EEG signals. BCIs have been developed and implemented in many areas as the new communication channel between human brain and external devices. However the effects that the BCI users may experience through this interaction have not received much attention. In our work, we show that by leveraging advances in robotics, an EEG-based BCI-operated android could be used to induce a sensation of body ownership and agency in users. Operators experienced an illusion of embodiment into the robot's body only by imagining a movement (motor imagery) and watch the robot perform it. Also using the same setup, we could further discover that during BCI-operation of the android, by biasing the timing and accuracy of the performance feedback, operators' modulation of brain activities for the motor imagery task was improved. Our experiments showed that the motor imagery skills acquired through this technique were not limited to the android robot, and had long-lasting effects for other BCI usage as well. Therefore, by focusing on the human side of BCIs and demonstrating a relationship between the body ownership sensation and motor imagery learning, Our BCI-teleoperation system offers a new and efficient platform for general BCI application.

### ■ **BIOGRAPHICAL INFORMATION**

Maryam Alimardani was born in Tehran, Iran (1987). She received a Bachelor's Degree in Electrical Engineering at the University of Osaka in 2010. She continued her master and PhD course at the Intelligent Robotics Laboratory (directed by Prof. Hiroshi Ishiguro), University of Osaka. Meanwhile, she worked as an intern researcher at the Advanced Telecommunication Research Institute International (ATR) during the years between 2010 and 2015. In April 2015, she started a JSPS post-doctoral fellowship at the Department of General System Studies, University of Tokyo. Her research involves the interdisciplinary merge of BCIs and robotics for developing non-invasive human-adaptive interfaces and understanding the cognitive mechanism of embodiment and body ownership.

### ■ **WEITERE INFORMATIONEN**

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