

Scientific/Clinical Workshop

Workshop Title

Robot Tutoring in Human Motor Learning: Challenges and Opportunities

Workshop Responsible

Edwin Johnatan Avila-Mireles (Jozef Stefan Institute)

Luka Peternel (Delft University)

Speakers

Georg Rauter, Laura Marchal, Elmar Rueckert

Attendee Engagement

After each 15 minutes invited talk the organisers will encourage a 15 minutes discussion and exchange of ideas among speakers and attendees by asking provocative scientific questions related to the talk. To ensure the participation of the attendees, the organisers will proactively ask them for their opinion or ideas on the topic.

Abstract

Several studies have demonstrated the efficiency of Robot Tutoring in a cognitive learning context, which has been mainly exploited by Social Robotics. In this context, the robots serve as languages, writing, or dancing instructors by providing verbal or visual instructions, as well as feedback on their performance. However, many tasks go beyond social aspects and involve complex motor skills, such as: rehabilitation, sports and specialized industrial tasks. The challenges of robot tutoring increase when teaching physical skills, since motor learning is considered an heuristic process that does not necessarily follow sequential steps. Furthermore, social instructions alone are typically inadequate and physical guidance is required. To address these challenges, haptic devices have been implemented in order to add this missing physical component, which require appropriate artificial intelligence and control strategies to create an efficient Sensorimotor Robot Tutor.

This workshop is tailored to gather the experts in the field and approach the ongoing problems in creating Sensorimotor Robot Tutor through interdisciplinary discussion approach. The speakers and the organisers together cover the aspects of human motor learning, robot control and artificial intelligence. During the workshop we will 1) examine the state-of-the-art on the use of robots as tutors during the motor learning process, 2) identify the methodology and implementation gaps, and 3) discuss the alternatives for future research in the topic. The workshop format includes 15-minute interactive sessions followed each 15-minutes invited talk. During these interactive sessions attendees will have to opportunity to discuss the content of the talk with the speakers. To further stimulate the discussion, the organisers will ask provocative scientific questions. To engage the attendees, the organisers will proactively ask them for their opinion on the discussed topics.