Robots for Learning - R4L

Inclusive Learning

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ABSTRACT

The Robots for Learning workshop series aims at advancing the research topics related to the use of social robots in educational contexts. The full-day workshop follows on previous events in Human-Robot Interaction conferences focusing on efforts to design, develop and test new robotics systems that help learners. This 4th edition of the workshop will be dealing in particular on the potential use of robots for inclusive learning. Since the past few years, inclusive education have been a key policy in a number of countries, aiming to provide equal changes and common ground to all. In this workshop, we aim to discuss strategies to design robotics system able to adapt to the learners' abilities, to provide assistance and to demonstrate long-term learning effects.

Keywords

Human-Robot Interaction; Robots in Education; Tutor Robots; Child-Robot Interaction

1. INTRODUCTION & BACKGROUND

Recent research in Human-Robot Interaction has seen an increasing interest from the field of education. Robots present attractive features for learners, enhancing the learning experience with physical and/or social interactions.

The current state of the art presents robots used in various learning scenarios related to non-programming curricula. Often involving social robots, these scenario usually investigate the social aspect of the robot-learner relationship (i.e. empathy [4], immediacy [3] or engagement [5, 1]). While certain research focus in one-to-one setup exploiting social and task adaptive systems to individuals [7], others aim to provide a tool for the therapists or educators in their teaching practice or to use the robot as a facilitator in a collaborative learning setup [6].

The Robots for Learning (R4L) workshop is in its 4th series [2], and the focus of this edition is on *inclusive learning*. Robots as educational agents have been studied and deployed in various forms - as tools, mediators, tutors, and peers. In this workshop, we aim to discuss the approaches and challenges of developing these educational robots to be more inclusive, helping learners of different ages, backgrounds, genders, and learning abilities. Learners with difficulties often need more attention or personalised training. With this workshop, we aim at discussing recent advances in empirical and theoretical state-of-the-art research contributions on human-robot interaction in educational contexts on the following challenges: How to design robots to adapt to learners abilities? How to build long-term learning with robots? How can robots engage learners in playful learning activities? How can robots assist learners in multimodal learning scenarios?

2. OUTLINE OF THE WORKSHOP

The aim of this workshop is to engage scholars who wish to gain expertise in education and in robotics. Participants will benefit from hearing from the forefront of field and from discussions on how to move from fundamental research towards the development of market-ready educational robots. The workshop aims will be achieved through presentations and discussions. Prospective participants are invited to submit 4-6 page papers describing work in progress, or containing preliminary results to discuss with the community. In order to stimulate interactions, the workshop will include short position paper presentations and poster sessions. The afternoon will be dedicated to discussion, including both a panel session and semi-structured group discussions.

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List of topics

- Adaptive mechanisms for robot tutors, personalization and adaptation algorithms for tutoring interactions
- Design of autonomous systems for tutoring interactions
- Theories and methods for tutoring (pedagogical and language acquisition)
- Shared knowledge and knowledge modelling in HRI
- Human-robot collaborative learning
- Attachment and learning with a social robot (social and cognitive development)
- Engagement in educational human-robot interaction
- Human-robot relationship assessment
- Designing student models and assessing student's learning
- Playful learning with a robot
- Human-robot creativity
- Kinesthetic and non-verbal communication in human-robot interaction
- Impact of embodiment on learning
- Technical innovation in learning or teaching robots
- Long term learning interactions, design and methodologies for repeated human-robot encounters
- Robots for learners with special needs and special abilities
- Education and re-training for adults
- Rehabilitation and re-education
- Privacy and ethical issues in robot tutoring applications

Organizers

Wafa Johal, École Polytechnique Fédérale Lausanne, Switzerland. Wafa Johal obtained her PhD in 2015 from the University of Grenoble (France) focusing on bodily signals in Child-Robot Interaction. She is a Postdoctoral researcher in the Computer and Human Interaction Laboratory for Learning and Instruction at EPFL. She works within the CoWriter and Cellulo projects dealing with robots for education.

James Kennedy, Disney Research, Pittsburgh, USA. James Kennedy received his PhD from Plymouth University, U.K. in 2017 for his work using social robots to tutor children. During his PhD, he worked in collaboration with the EU-funded DREAM, ALIZ-E, and L2TOR projects. He currently works as part of the Language Based Character Interaction group at Disney Research, focusing on the development of AI characters.

Vicky Charisi, University of Twente, The Netherlands and University College London, U.K. Vicky Charisi is a post-doctoral researcher at the Human-Media Interaction group at the University of Twente. She completed her PhD studies at the UCL Institute of Education, U.K. focusing on child development within computer-supported music-making activities. Currently, she works on the topic of child-robot interaction designing robots for formal educational settings (EASEL) and playful activities (SQUIRREL) for children.

Hae Won Park, Massachusetts Institute of Technology, USA. Hae Won Park is a Research Scientist at the Personal Robots Group at the MIT Media Lab. Her research focuses on personalization of social robots to enable a long-term interaction between users and their robot companions. Her work spans a range of applications including education for young children and well-being benefits for the elderly. Hae Won received a PhD from Georgia Tech where she also co-founded Zyrobotics, an assistive education robotics startup.

Ginevra Castellano, Uppsala University, Sweden. Ginevra Castellano is an associate senior lecturer in intelligent interactive systems at Uppsala University, where she leads the Social Robotics Lab. She was the coordinator of the EMOTE project (2012-2016), which developed educational robots to support teachers in a classroom environment.

Pierre Dillenbourg, École Fédérale Polytechnique Lausanne, Switzerland. Former teacher in elementary school, Pierre graduated in educational science (University of Mons, Belgium). His research on learning technologies started in 1984. He obtained a PhD in computer science from the University of Lancaster (UK), in artificial intelligence applications for educational software. He is currently full professor in learning technologies, head of the CHILI Lab involved in both CoWriter and Cellulo projects.

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