

## Workshop at ICSR 2013

### Taking Care of Each Other: Synchronisation and Reciprocity for social companion robots

#### Abstract

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Recent studies of compassion argue that in human-human interaction actual compassion exists which is not inherently motivated by self-interest. This research suggests that compassion is based on reciprocity and synchronisation and is rooted in our brain and biology as well as in our socialisation and culture. In a nutshell compassion can be considered as one of the building blocks for sociality. When we are developing robots as companions we have to wonder in how far we can integrate synchronisation and reciprocity in our systems in order to achieve a perceived compassionateness, which leads to mutual care between the user and the robot, as this fosters a sustainable long-term interaction with the system accompanying the user.

Companion robots are considered for various application areas, such as school education, elderly care, therapy etc. and in all these contexts we are aware that a give-and-take relationship can be crucial for the success of the individual. Therefore, companion robots must communicate a feeling of social coupling, relate to the human counterpart, share perceptions and intentions and thereby achieve synchronized and reciprocal behaviour to be considered an actual companion.

Addressing these aspects demands joint effort from the HRI community of various disciplinary backgrounds, such as amongst others cognitive sciences, sociology, and social/ behaviour-based robotics. We believe that this workshop can offer the space to discuss companionship in/for robotics as an interaction pattern of give-and-take and create the much-needed interdisciplinary network to explore this unifying social HRI theme.

#### Organizers

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**Astrid Weiss** is a postdoctoral research fellow in HRI at the Vision4Robotics group at the ACIN Institute of Automation and Control at Vienna University of Technology (Austria). She holds a master degree in sociology and a PhD in social sciences from the University of Salzburg. Her current research focuses on user-centered design and evaluation studies for Human-Robot Interaction, with a special interest in the impact technology has on the everyday life and what makes people accept or reject technology. She was involved in the organization of two workshops on social acceptability of robots at Ro-Man2008 and HRI2009, as well as in the HRI Pioneers workshop 2010.

**Tamara Lorenz** is a senior PhD student at the Institute of Information-oriented Control at Technische Universität München and the Experimental Psychology Institute at Ludwig-Maximilians University Munich, Germany. She holds a diploma (master equivalent) in mechanical engineering with a major in human-machine interaction. Her research focuses on joint action and dynamical systems and how these principles emerging in human interaction can add to improve human-robot interaction. Especially, she is interested in how acceptance and safety in HRI can be improved in repetitive interaction tasks (i.e. pick and place tasks) by improving the predictability of robotic movements. Currently she is involved in the organization of the HRI Pioneers Workshop 2014.

**Ben Robins** is a Senior Research Fellow in the School of Computer Science at the university of Hertfordshire, UK. Ben has qualifications and many years of work experience in two disciplines: Computer Science (since 1980) and Dance Movement Therapy (since 1992). Ben has completed his PhD research degree in 2005 focusing on assistive technology for children with autism. His publications have won several best conference paper awards. Ben's research, which started in 2002 in the AUROA Project and continued in the FP6/7 European projects IROMEC and ROBOSKIN, investigates the potential use of robots as therapeutic or educational tools, encouraging basic communication and social interaction skills in children with autism. In recent years Ben was program co-chair, committee member and special session organiser in several international conferences and has been an invited speaker in workshops, seminars and symposiums in various countries.

**Vanessa Evers** is a Professor of Human Media Interaction in the Department of Computer Science at the University of Twente. Vanessa Evers received a M.Sc. in Information Systems from the University of Amsterdam, and a Ph. D. from the Open University, UK. After her Ph.D. she has worked for the Boston Consulting Group, London and was a visiting researcher at Stanford University (2005-2007). Her research interests focus on interaction with intelligent and autonomous systems, Human-Robot Interaction as well as cultural aspects of Human-Computer Interaction.

**Markus Vincze** received his diploma in mechanical engineering from Technical University Wien (TUW) in 1988 and a M.Sc. from Rensselaer Polytechnic Institute, USA, 1990. He finished his PhD at TUW in 1993. With a grant from the Austrian Academy of Sciences he worked at HelpMate Robotics Inc. and at the Vision Laboratory of Gregory Hager at Yale University. In 2004, he obtained his habilitation in robotics. Presently he leads a group of researchers in the "Vision for Robotics" laboratory at TUW. With Gregory Hager he edited a book on Robust Vision for IEEE and is (co-)author of over 250 papers. Markus' special interests are computer vision techniques for robotics solutions situated in real-world environments and especially homes.

### **Overview of the workshop**

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As defined by Dautenhahn "a robot companion is a robot that (i) makes itself 'useful', i.e. is able to carry out a variety of tasks in order to assist humans, e.g. in a domestic home environment, and (ii) behaves socially, i.e. possesses social skills in order to be able to interact with people in a socially acceptable manner". Companion robots are intended as "useful" in a variety of fields e.g. teaching children, taking care of elderly, therapy, household assistant etc. However, in all these areas we know from human-human interaction that a give-and-take relationship, based on concepts such as synchronisation and reciprocity benefits the interaction and long-term success of the individual. The challenge for the development of a user-companion relationship with a robot is the integration of convincing social interaction skills. Core concepts from human-human interaction to achieve social relationships are synchronicity and reciprocity, which let us assume that mutual care could be beneficial for social HRI. In other words it is not only the robot accompanying the user, but also the user is taking care of the robot. The proposed workshop should offer an interdisciplinary arena to discuss this topic and its relation to research in social robotics. Thereby we expect contributions from a wide range of disciplines, such as social and behaviour-based robotics, cognitive sciences and psychology, sociology and philosophy etc.

The organizing team is very well positioned to lead this interdisciplinary discussion and attract a broad participation. All of the organizers have been active members of the HRI community playing organizing roles at various levels and all have their focus on social robotics.

### **Workshop format**

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As our main goal for the workshop is to initiate a discussion about how mutual care interaction with companion robots can be enabled by means of synchronicity and reciprocity we want to foster vivid networking and discussion among the participants.

We will therefore open the workshop with a brief statement from the organizers regarding the expectations for the day. We then move into a series of short position statements from a selection of workshop participants on their interests in and perspectives on companion robots. All in all we will spend two hours on the position statement presentations and discussion and another half hour on summarizing highlights and by that facilitating a discussion covering existing research on the topics of synchronicity, reciprocity and mutual care for companion robots.

Next, we will begin to generate a framework of influencing factors for social interaction behaviour patterns for companion robots. Moreover, we want to propose a catalogue how the successfulness of such behaviour patterns can be measured. Potential future use cases for compassionate companion robots will be discussed towards the end of the workshop.

The detailed planning of the workshop is as follows:

9:00 – 9:15 Introduction to the general topic of the workshop and the participants

9:15 – 10:30 Position statements and discussion towards common grounding (all participants)

10:30 – 11:00 Coffee Break

11:00-12:00 What are the building blocks for social interaction with companion robots? Discussion on the characterization of “social interaction” and influencing factors (break out groups)

12:00-12:30 Bringing the discussions together (all participants)

12:30 – 13:30 Lunch

13:30 – 15:00 From influencing factors to success measures (break out groups)

14.30-15.00 Bringing the discussions together (all participants)

15:00 – 15:30 Coffee Break

15.30-16.30 Potential future interaction use cases for compassionate companion robots (all participants)

15:30 – 17:00 Wrap-up, summary of the topics, conclusions, definition of follow up

### **Target audience**

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The workshop aims to bring together people interested in social robotics and HRI from a variety of different backgrounds, including (but not restricted to) social and behaviour-based robotics, cognitive sciences and psychology, sociology and philosophy.

### **Position paper requirements**

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Participants who want to attend the workshop must submit a position paper to the workshop organizers. The position paper will form the basis for the position statements at the beginning of the workshop. The position paper (min 800 words, but no longer

than 4 A4 pages in Springer LNCS format) about their research and viewpoints on the topics should be send to the organizers at [astrid.weiss@tuwien.ac.at](mailto:astrid.weiss@tuwien.ac.at)  
The maximum number of participants should be 30.

### **Important Dates**

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- 31 August 2013, Full / short paper submission
- 20 September 2013, Notification of acceptance
- 27 October 2013, Workshop at ICSR 2013

### **Potential (but not restricted) paper topics**

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#### Companion robots

- Household companion robots
- Elderly care companion robots
- Companion robots for therapy
- Companion robots for education

#### Synchronicity

- Joint attention
- Joint action
- Action observation and imitation

#### Reciprocity

- Perceived intentionality
- Human-robot relationship
- Social acceptance of robots

### **Approach for recruiting participants**

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The workshop will be advertised on the ICSR2013 website, on the robotics-worldwide, euron and AISB mailing list. Additionally, the organizers will personally invite a series of speakers and participants.

### **Plan for documenting the workshop**

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We will collect all papers and presentations. Additionally we will capture the whole-group discussions in notes in an additional presentation. After the event, we will create a summary webpage that will be available publicly. Additionally, we plan to apply to the International Journal of Social Robotics for a special issue devoted to this topic. We would expect that many participants would submit finalized versions of the work they present at the workshop as articles for this journal. We hope that this workshop and the subsequent journal issue will serve to broaden the view on the topic companion robots.