Robots in Contexts: Human-Robot Interaction as Physically and Socially Embedded

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ABSTRACT

Robotic technologies are being increasingly integrated into real life settings. The adoption of robots by the society is transcending the initial fascination with novel technology and is gradually entering a new phase, characterized by a massive impact of the technology on various aspects of our everyday lives. These developments emphasize the need to better understand how robotic technologies shape, and are being shaped by, the physical and social contexts in which they are used. The aim of the proposed workshop is to explore possible ways of addressing this issue by bringing together a group of human-robot interaction (HRI) researchers within the ECCE context in order to reflect on a range of methods, concepts, and design approaches that could help understand, anticipate, and deal with HRI challenges associated with the upcoming "robotic revolution".

CCS CONCEPTS

• **Human-Centered Computing** → *Human-Computer Interaction (HCI)*; Collaborative and social computing • **Computer systems organization** → Robotics

KEYWORDS

Human-Robot Interaction (HRI), context, agency, affordances

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1 INTRODUCTION

The adoption of robots by the society is transcending the initial fascination with novel technology and is gradually entering a new phase, characterized by a massive impact of the Social Robotic technology on various aspects of our lives. For instance, autonomous robots and Mobile Remote Presence (MRP) systems, are more and more common in offices, shops, hotels, classrooms, households, and healthcare settings [1,7,10,11,12,13,16].

These developments emphasize the need for a better understanding of how robotic technologies shape, and are being shaped by, the physical and social contexts in which they are used. The aim of this workshop is to explore possible ways of addressing this need by bringing together a group of HRI researchers within the context of ECCE to reflect on a range of methods, concepts, and design approaches that could help understand, anticipate, and deal with new HRI challenges.

2 KEY TOPICS OF DISCUSSION

The discussion at the workshop will be organized around the following sets of key topics.

2.1 Studies of physically/ socially embedded HRI: A critical perspective on the state of the art

The participants will collaboratively create a conceptual map of existing relevant research and identify main findings, open questions, and unexplored areas.

2.2 Issues for future research

The participants will identify and discuss a diversity of research issues that need to be addressed in order to understand and support physical and social embeddedness of human-robot interaction. As a starting point of the discussion the participants will consider the following list of issues

- spacing and orientation,

- agency,
- activity awareness and accountability,
- robot and human identities
- responsibility, rights, and ownership,
- power differences,
- action capabilities and affordances,
- human-robot collaboration,
- perceptions and identities,
- social etiquette,
- social interaction,
- ecosystems of interconnected smart objects.

2.3 Conceptual frameworks

Conceptual frameworks in Human-Computer Interaction (HCI), HRI, and other areas of human-technology interaction research, which have the potential to provide relevant insights and form a theoretical foundation for interdisciplinary studies of "contextually embedded HRI", will be discussed, including (but not limited to) the following ones:

- Embodied interaction (e.g., [4]),
- Activity theory (e.g., [8,14]),
- Proxemic interactions (e.g., [15]),
- Ecological approaches (e.g., [3,5]),
- Sliding autonomy (e.g., [6]),
- Human-robot learning (e.g. [2]).

2.4 Analysis and evaluation methods

Relevant analysis and evaluation methods, which are currently common in HRI, will be identified, discussed, and reappraised. The participants will also consider a wider range of user research and research through design methods in HCI and related fields to see whether they can be usefully employed to address the issues discussed at the workshop.

2.5 Design approaches

Design concepts that can help more efficiently integrate human-robot interaction into physical and social contexts (e.g., double remote interaction, [9]) will be discussed by the participants.

3 PARTICIPANT RECRUITMENT, WORKSHOP FORMAT, AND RESULTS DISSEMINATION

A call for position papers will be distributed internationally through mailing lists and social media. Prospective participants will be asked to submit 2-page position statement papers and will be selected on the basis of the relevance and quality of the papers. We are confident that the workshop will attract a number of participants sufficient for a productive discussion, as several people from Örebro University and Umeå University have already expressed their interest.

The full-day workshop will start with a round of self-introductions and finalizing the agenda. After that the participants will present their position papers. Then each of the sets of key topics, outlined above, will be discussed both in small groups and through a general discussion involving all participants. The workshop will conclude with an attempt to summarize the work conducted by the participants in the form of a conceptual map of research into contextually embedded HRI.

The organizers are considering different strategies for disseminating the results of the workshop. One possibility, which has been discussed, is putting together a special issue of a journal in the general area of human-technology interaction, comprising extended version of position papers.

4 ABOUT THE ORGANIZERS

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