

Fourth International Symposium on “New Frontiers in Human-Robot Interaction”

21–22 April 2015, Canterbury, UK

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Abstract. The Symposium on “New Frontiers in Human-Robot Interaction (HRI)” is the fourth of a series of symposia held in conjunction with the AISB convention. Its topics cover cutting-edge interdisciplinary research on understanding, designing, and evaluating robotic systems for and with humans. Its main difference to other HRI-related conferences and workshops is its inclusiveness for exploratory research and the amount of time for open discussion. This year’s symposium consists of six sessions covering topics such as verbal and non-verbal interaction, people’s perception of robots, and ethical issues. Moreover, it includes keynote talks by Mark Coeckelbergh and Angelika Peer and a panel on the topic “Robot Perception and Acceptance”.

1 INTRODUCTION

Human-Robot Interaction (HRI) is a quickly growing and very interdisciplinary research field. Its application areas will have an impact not only economically, but also on the way we live and the kinds of relationships we may develop with machines. Due to its interdisciplinary nature of the research different views and approaches towards HRI need to be nurtured.

In order to help the field to develop, the Symposium on New Frontiers in Human-Robot Interaction encourages submissions in a variety of categories, thus giving this event a unique character. The symposium consists of paper presentations, panels and, importantly, much time for open discussions which distinguishes this event from regular conferences and workshops in the field of HRI.

2 HISTORY

The first symposium on “New Frontiers in Human-Robot Interaction” was held as part of AISB 2009 in Edinburgh, Scotland; the second symposium was run in conjunction with AISB 2010 in Leicester, England; the third symposium took place during AISB 2014

at Goldsmiths, University of London, England. These three previously organised symposia were characterised by excellent presentations as well as extensive and constructive discussions of the research among the participants. Inspired by the great success of the preceding events and the rapidly evolving field of HRI, the continuation of the symposium series aims to provide a platform to present and discuss collaboratively recent findings and challenges in HRI.

3 SUBMISSION CATEGORIES

In order to enable a diverse program, the symposium offers a variety of submission categories, which go beyond typical conference formats. The fourth symposium offered the following categories in the call for papers:

**N* Novel research findings resulting from completed empirical studies*

In this category we encourage submissions where a substantial body of findings has been accumulated based on precise research questions or hypotheses. Such studies are expected to fit within a particular experimental framework (e.g. using qualitative or quantitative evaluation techniques) and the reviewing of such papers apply relevant (statistical and other) criteria accordingly. Findings of such studies should provide novel insights into human-robot interaction studies.

**E* Exploratory studies*

Exploratory studies are often necessary to pilot and fine-tune the methodological approach, procedures and measures. In a young research field such as HRI with novel applications and various robotic platforms, exploratory studies are also often required to derive a set of concrete research questions or hypotheses, in particular concerning issues where there is little related theoretical and experimental work. Although care must be taken in the interpretation of findings from such studies, they highlight issues of great interest and relevance to peers.

**S* Case studies*

Due to the nature of many HRI studies, a large-scale quantitative approach is sometimes neither feasible nor desirable. However, case study evaluation provides meaningful findings if presented appropriately. Thus, case studies with only one participant, or a

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small group of participants, are encouraged if they are carried out and analysed in sufficient depth.

**P* Position papers*

While categories N, E and S required reporting on HRI studies or experiments, position papers can be conceptual or theoretical, providing new interpretations of known results. Also, in this category we consider papers that present new ideas without having a complete study to report on. Papers in this category are judged on the soundness of the argument presented, the significance of the ideas and the interest to the HRI community.

**R* Replication of HRI studies*

To develop as a field, HRI findings obtained by one research group need to be replicated by other groups. Without any additional novel insights, such work is often not publishable. Within this category, authors have the opportunity to report on studies that confirm or disconfirm findings from experiments that have already been reported in the literature. This category includes studies that report on negative findings.

**D* Live HRI Demonstrations*

Contributors have the opportunity to provide live demonstrations (live or via Skype), pending the outcome of negotiations with the local organisation team. The demo should highlight interesting features and insights into HRI. Purely entertaining demonstrations without significant research content are discouraged.

**Y* System Development*

Research in this category included the design and development of new sensors, robot designs and algorithms for socially interactive robots. Extensive user studies are not necessarily required in this category.

4 NATURAL INTERACTION WITH SOCIAL ROBOTICS

The Fourth Symposium on “New Frontiers in Human-Robot Interaction” was organised in conjunction with the Topic Group on Natural Interaction with Social Robotics. This Topic Group was launched within the EU Horizon 2020 funding framework⁴, with the strategic goal to keep the topic of interaction prominent in the future calls for European projects. An overview on the list of topics and interests of the Topic Group can be found on the website: <http://homepages.stca.herts.ac.uk/comqkd/TG-NaturalInteractionWithSocialRobots.html>.

As the symposium offers an ideal opportunity to discuss related research topics that are relevant for the Topic Group, we introduced one new submission category:

**TG* Topic Group Submissions on “Natural Interaction with Social Robots”*

Submissions in this category will be discussed in a session dedicated to the euRobotics Topic Group “Natural Interaction with Social Robots”. Topics specifically relevant to the TG are e.g. benchmarking of levels of social abilities, multimodal interaction, and human-robot interaction and communication.

5 PROGRAMME OVERVIEW

This year’s symposium consists of 17 talks, based on submissions in the following categories:

N Novel research findings resulting from completed empirical studies: 5 submissions

E* Exploratory studies: 5 submissions

P* Position papers : 4 submissions

Y* System Development: 2 submissions

TG* Topic Group Submissions on “Natural Interaction with Social Robots”: 1 submission

The talks are structured in six sessions:

1. Ethical issues in HRI
2. Robots’ impact on human performance
3. Verbal interaction
4. Facial expressions & emotions
5. Non-verbal cues & behaviours
6. Robot perception & acceptance

The final session is followed by a panel discussion on the same topic. Two invited keynote talks complete the program:

1. Mark Coeckelbergh: “Human-like Robots and Automated Humans: Socializing and Contextualizing HRI”
2. Angelika Peer: “Towards Remote Medical Diagnosticians”

6 CONCLUSION

In summary, the symposium mainly focuses on novel empirical findings on human-robot interaction and their impact on our everyday life. Moreover, also theoretical aspects and ethical issues are discussed. We hope these articles show some future research directions for fellow HRI researchers and stimulate ideas for future European projects on natural interaction with social robots.

⁴ <http://ec.europa.eu/programmes/horizon2020/>