Groups in Human-Robot Interaction

Marlena R. Fraune (mfraune@indiana.edu), Ricarda Wullenkord (rwullenk@cit-ec.uni-bielefeld.de, Friederike Eyssel (feyssel@cit-ec.uni-bielefeld.de), and Selma Šabanović (selmas@indiana.edu)

***Abstract*—With more robots entering our lives every day, many interactions will include multiple robots and/or multiple humans – yet most human-robot interaction (HRI) research still focuses on a single human interacting with a single robot. Studies in social psychology (e.g., [1]) and HRI (e.g., [2, 3]) indicate that inter-group interaction varies crucially from inter-individual interaction. First, groups modulate the effects found in dyadic HRI – for example, inter-group interactions are often more aggressive and negative than inter-individual interactions. Second, groups introduce variables that are not possible to study in dyadic HRI – for example, the cohesiveness (entitativity) of an outgroup increases perceived threat from them. To have a better understanding of HRI as it will occur in real life, we must enhance our understanding of the effects of inter-group interaction depending on situations and robot characteristics. This can also inform robot design, including the development of appropriate interaction frameworks and modalities, robot appearance and autonomous capabilities, and functions of robot groups in everyday human environments.**

I. Aims and Objectives

The main aim of the workshop is to raise awareness of differences between inter-individual and inter-group interaction as they relate to human-robot interaction (HRI), and provide an overview of previous human-robot intergroup interaction research and research on human-robot heterogeneous teams. This workshop will also serve as an outlet for intergroup interaction research, and a venue for researchers to share knowledge and ideas of how to build and program robots for intergroup interaction. We will brainstorm and discuss aspects of intergroup interaction that are critical to HRI, including questions such as, "When are robots considered a group or grouped together," "Are robots, by definition of not being human, an outgroup to humans?" "How to coordinate robots (e.g., by programming)?"

II. Topics and Invited Speakers

Workshop participants are invited to engage with us on topics including the following:

- Intergroup interactions in HRI
- Ingroup/outgroup effects
- Multiple robots interacting with one or more humans
- Multiple humans interacting with one or more robots
- Programming coordination for robot swarms or groups
- Ethical implications of robot groups

The workshop program will include invited panel talks by Brian Scassellati (Yale Univ.) on group interaction in HRI, Julie Shah (MIT) on human-robot teaming, and Maria Paola Paladino (Univ. of Trento) on attitudes and intergroup relations. You can view the workshop website for further schedule details: https://grouprobot.wordpress.com/home/

III. Intended Audience

Because this topic broadly affects people who will work with or live near robots, we invite people from all domains, from practitioners to researchers of HRI. We especially invite researchers of various backgrounds (e.g., social psychology, sociology, swarm robotics, human-robot teaming) to share their diverse perspectives on intergroup relationship and interaction.

IV. Paper Guidelines

Papers should be 4-6 pages (including citations), and can be on research that the authors have already conducted. We also encourage submissions on research that the authors plan to conduct; feedback can be given during coffee breaks or discussions. Paper format should be according to the RO-MAN 2016 paper guidelines. Each paper will receive a minimum of two reviews. Accepted papers will be made publically available on the conference website. Papers that are selected will be presented in 15 minutes in lecture format and be discussed further at a poster session during a coffee break. Accepted papers will require that at least one author register for the workshop.

Workshop participants will be invited to submit extended versions of their papers for a special issue on Groups in *Interaction Studies: Social Behavior and Communication in Biological and Artificial Systems* (https://benjamins.com/#catalog/journals/is/main).

References

[1] Wildschut, T., Pinter, B., Vevea, J. L., Insko, C. A., & Schopler, J. (2003). Beyond the group mind: a quantitative review of the interindividual-intergroup discontinuity effect. *Psychological Bulletin, 129*(5), 698. http://dx.doi.org/10.1037/0033-2909.129.5.698

[2] Fraune, M. R., Kawakami, S., Šabanović, S., de Silva, P. R. S., & Okada, M. (2015). Three's company, or a crowd?: The effects of robot number and behavior on HRI in Japan and the USA. In D. Hsu (Ed.). *Proceedings of the 12th Annual Robotics: Science and Systems Conference, Rome, Italy*.

[3] Leite, I., McCoy, M., Lohani, M., Ullman, D., Salomons, N., Stokes, C., ... & Scassellati, B. (2015, March). Emotional Storytelling in the Classroom: Individual versus Group Interaction between Children and Robots. In *Proceedings of the 10th Annual ACM/IEEE International Conference on Human-Robot Interaction (HRI'15)*, pp. 75-82. *ACM*.