

## **Toward a framework for joint action, what about common ground ?**

### **Abstract**

For more than a decade, the field of human-robot interaction has generated many valuable contributions of interest to the robotics community at large. The field is vast, going all the way from perception (e.g., tactile or visual) to action (e.g., manipulation, navigation) and decision (e.g., interaction, human-aware planning). However, when it comes to the development of future robot assistants or robotic team-mates in mixed human-robot teams, there is a need for a deeper understanding of human-robot joint action that could provide a framework for the different contributions and studies.

It is interesting to observe, from a roboticist point of view, that human joint action is a topic of intense research in cognitive psychology and philosophy. This observation led us to start a multi-disciplinary initiative to create a unique opportunity for scientific exchange. Psychologists and philosophers can present recent developments in joint action research, while roboticists are able to discuss the challenges they face with regard to human-robot interaction and more precisely human-robot joint activity.

Our goal is to bring various aspects of existing work together and examine how they can help us define the kind of integrative framework needed for the design of an autonomous robot that can engage in long-term interaction with a human partner. This framework should be able to serve two complementary purposes. On the one hand, it should help us define with precision what a robot needs to understand about the human it interacts with for the interaction to be successful and thus what capacities the robot should be equipped with to ensure it can build this understanding. On the other hand, the robot also needs to be understood by its human partner and this framework should help us clarify how this understanding operates and what is needed to enable the robot to behave appropriately and in a way that manifests what it is doing to the human partner.

More precisely, during this workshop, we will study the common ground needed around joint action execution, its components, its representation and installation and the way it evolves during joint action (e.g. alignment issue, coordination).

### **List of speakers**

Herbert Clark (Stanford University, USA)  
Rachid Alami (LAAS, CNRS, Toulouse, France)  
Tamara Lorenz (Univ of Cincinnati, USA)  
Charles Rich (WPI, Worcester, USA) - tentative

### **List of panel moderators**

Julie Shah (MIT, USA)  
Maya Cakmak (Univ of Washington, USA) - tentative

## **Schedule outline**

The full-day workshop will be organized around keynotes presentation followed by collaborative feedback/questions sessions. Talks will be taken as starting points to jointly brainstorm next steps, thus providing feedback and new ideas and initiating discussion at the same time.

Furthermore, there will be a poster session just after lunch to enable workshop participants to share their research concerns and achievements (we plan to organize a call for extended abstract, each contribution will be reviewed by the committee).

We plan also to organize two panel discussions led by selected panelists (incl. our invited speakers). The first one (led by Maya Cakmak) is dedicated to the common ground needed around joint action execution, its components, its installation and the way to model it in a human-robot context. The second one (led by Julie Shah) is dedicated to the evolution of common ground during joint action execution and particularly to coordination and alignment issues that need to be taken into account. The overall aim of this workshop is to determine what information needs to be shared between human and robot and how a common basis between human and robot can be achieved in order to enable smooth joint action.

## **List of topics**

common ground needed for joint action and its management

joint goal establishment and negotiation

planning when the goal is a joint goal

joint goal / joint action description and modeling

joint goal / joint action execution, monitoring, turn-taking and timing management

skills for collaborative task achievement

agents world modeling and management

agents commitment

communication during joint action