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How to perceive ‚acceptance':

Effects of a Museum Guide Robot's conduct on humans' actions

Bringing a robot to the real-world with lay users is a challenging task. Especially the acceptance of robot systems became a central issue in Human-Robot Interaction (HRI). We assume that a human who decides to engage in an interaction with a robot thereby also shows that the robot is accepted as temporary interactional partner. In that process the humans' act of ascribing agency to the robot is central and becomes apparent in their coordination with the robot. This leads to a set of essential research questions in the field of designing a robot that is functional in exchange with humans: (1) How do lay users react on the robot's conduct and treat the robot's actions as interactional meaningful? (2) To what extend could we assume the agency of a robot? (How) can a robot's conduct shape the users' behavior? - To study such questions a robot as museum tour guide is an appropriate setting as it allows to investigate the actions in both the real-world and an environment with reasonnably predictable circumstances.

Recently, there has been growing interest in understanding how humans perceive and potentially accept a robot's conduct. Considering evidence for robot's agency Pitsch et al. investigated a learning scenario (HRI) and found that the robot's gaze has effects on the actions of verbalization [5] and on the manipulation of objects [6]. Bohus and Horvitz developed a turn-taking model in order to shape participant roles [1] and Heerink et al. investigate the participants' course of actions [2].

Undertaking fine-grained sequential analysis (inspired by Conversation Analysis) of the videorecordings from a real-world Museum Guide Robot study, we revealed how the robot's conduct (talk, head orientation, gestures) causes effects on the interpretation of participation statuses ([3][4]): we found both visitors disengaging from an encounter as well as engaging in an ongoing interaction.

In this paper we build on these findings [3, 4]. We consider the complex multimodal resources the humans use to dynamically shift space requirements and observe the micro-dynamics emerging between the robot and the humans as well as among humans. Besides gaze also the robot's verbal actions have impacts on the humans actions depending on their interpretation of the robot's conduct. We can observe, that participants interpret the utterance „as all the painters in this room" as an invitation to orient also to other paintings in the exhibition room. They leave their position in front of the robot to inspect further paintings. Thereby the space in front of the robot becomes available and another visitor, who has prevously been an observing bystander, approaches the robot and becomes part of the group of addressees.

Hence, the analysis of the relationship between the robot's and the humans' actions and their sequential structures provides an appropriate approach to investigate the user's acceptance of a robot system. The users' engagement in an interactional exchange with a robot can be treated as evidence for the user's acceptance of the robot.

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