Recognizing Human Intent for Assistive Robotics

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Assistive robots provide direct, personal help to address specific human needs. The mechanisms by which assistive robots provide help can vary widely. Socially assistive robots act as tutors, coaches, or therapy aides to shape human behavior through social interaction. In contrast, physically assistive robots help people through direct manipulation of their environment. While these different types of assistance involve different robot functions, there exist underlying principles that remain constant across all assistive human-robot interactions. For example, robots must be able to recognize people’s goals and intentions in order to assist them, whether that assistance is social or physical.

Identifying human intentions can be challenging, because the mapping from observed human behavior back to the underlying goals and beliefs which generated that behavior if often unclear. However, we can take advantage of findings from psychology, which show that people actually project their intentions in natural and often subconscious ways through their nonverbal behavior, such as eye gazes and gestures.

In this talk, I describe how we can extract human intent from behavior so that robots can assist people in accomplishing their goals. I discuss research across the socially and physically assistive domains, from autonomous robots designed to teach and collaborate with humans on a building task, to a robot arm operated through shared control that helps people with mobility impairments manipulate their environment. Throughout the talk, I show how nonverbal behavior can be incorporated into these systems to improve their understanding of human intentions, which leads to more effective assistance.

Henny Admoni is a postdoctoral fellow at the Robotics Institute at Carnegie Mellon University, where she works on assistive robotics and human-robot interaction with Siddhartha Srinivasa in the Personal Robotics Lab. Henny develops and studies intelligent robots that improve people’s lives by providing assistance through social and physical interactions. Henny completed her PhD in Computer Science at Yale University with Brian Scassellati. Her PhD dissertation was about modeling the complex dynamics of nonverbal behavior for socially assistive human-robot interaction. Henny’s scholarship has been recognized with awards such as the NSF Graduate Research Fellowship, the Google Anita Borg Memorial Scholarship, and the Palantir Women in Technology Scholarship.