

Designing Interactions with Robots

Methods and Perspectives

Edited by Maria Luce Lupetti, Cristina Zaga, Nazli Cila,
Selma Šabanović, and Malte F. Jung



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Dr. Cristina Zaga is an assistant professor of Human-Centered Design group and DesignLab at the University of Twente (NL). Cristina's research aims to foster societal transitions toward justice, care, and solidarity, with a focus on the future of work and care with robots and AI. They lead the Social Justice and AI networks, working toward mitigating the dehumanizing effects of AI and promoting social and environmental justice. Their award-winning work has received many accolades, including the NWO Science Prize for DEI initiatives (2022), the Dutch High Education Award (2022), and the Google Women Techmaker Award and scholarship (2018).

Nazli Cila is an Assistant Professor at the Department of Human-Centered Design at Delft University of Technology (NL). Her work seeks to understand how to design symbiotic relationships between humans and AI while preserving individual, ethical, and societal values, such as autonomy, enrichment, and justice. In addition to investigating design qualities and societal implications of human-AI collaborations, she is also fascinated by how designers and design researchers produce knowledge. This occasionally zeros in on studying the complex landscape of robot design, at times, expands its focus to embrace design epistemology and methodology at a broader level. She is in the steering committee of the TU Delft AI Labs program and the co-director of the AI DeMoS Lab, investigating how to facilitate responsible design and use of AI for a meaningful democratic engagement.

Selma Šabanović is Professor of Informatics and Cognitive Science at Indiana University Bloomington. She studies social robotics and human-robot interaction, with a focus on exploring how robots should be designed to assist people in various use contexts, including mental health, wellness, education, and social participation. She works with current and potential robot users of all ages, from children to older adults, and in various cultures, including East Asia, Europe, and the US. She served as the Editor in Chief of the ACM Transactions on Human-Robot Interaction from 2017 to 2024, and currently serves as an Associate Vice President of the IEEE Robotics and Automation Society Educational Activities Board. She received her PhD in Science and Technology Studies in 2007 from Rensselaer Polytechnic Institute.

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BOX 4.1 CONVERSATIONS WITH AGENTS

Iohanna Nicenboim and Elisa Giaccardi

Conversations with Agents supports designers and researchers in exploring and reimagining intelligent agents such as conversational interfaces (e.g., AI-powered artifacts and robots) by taking a **more-than-human perspective**. It integrates several design techniques, including interviews, enactments (role-playing), and speculation. More precisely, it builds upon the technique known as Interview with Things (Reddy et al., 2021) and expands it toward more performative speculations.

When used in the ideation phases of a design process, this technique can help to frame (or reframe) the design challenge, by revealing more complex and nuanced aspects of the design space that were perhaps not initially considered. When used for evaluating the implications of existing technologies, it can help to understand and question the existing imaginaries associated with a particular product, or the harmful biases that might have been embedded in its interaction design. For example, in research on conversational interfaces, this technique has illustrated how the interactions of devices such as Alexa and Google Home exacerbate gender, racial, and anthropocentric biases (Nicenboim et al., 2020); and how those stereotypes can be particularly harmful when coupled with a lack of positionality—when the agent’s knowledge, ownership, and biases are not accounted for or explained in its interaction. Later, the technique has been proven to be useful in ideating alternative interactions that are more situated and inclusive (Nicenboim et al., 2023; Reddy et al., 2021).

Conversations with Agents situates the imaginaries and shortcomings of existing technologies within the vast infrastructures that underlie the complex socio-technical systems in which current agentic technologies are embedded. As a **decentering technique**, it not only reveals overlooked human and nonhuman perspectives that are useful in the design of intelligent agents; it also defamiliarizes the designer’s perspective, inviting them to be accountable for their position and limitations, such as the social and political context that shapes the designer’s view of the world, and how that influences and biases their research. In doing so, it provides more than a critique to existing interaction designs—it actively suggests alternatives. It proposes different interactions the agent might have, it points at perspectives that can be included, and actively explores new affirmative relations based on values such as inclusion, care, and reciprocity (Nicenboim et al., 2020; Reddy et al., 2021).



FIGURE 4.1 The second activity of the workshop was to interview a robot. To do that, one participant asked questions, another participant enacted the robot's responses with voice and movements, and a third participant took notes.

WORKSHOP “IN CONVERSATION WITH ROBOTS”

Conversations with Agents were used in several workshops. At the conference Designing Interactive Systems (DIS) in 2020 and the Mozilla Festival in 2021, we worked with conversational agents; at the Research Through Design Conference (RTD2019) and in several classes at the Delft University of Technology between 2020 and 2023, we worked with intelligent agents more generally; and at the conference Thingscon in 2022, we worked with robots.

In the workshop “In Conversation with Robots,” human participants were first invited to interact with different devices: Cosmo (a toy robot), a vacuum cleaner, and an Amazon Alexa. Then participants conducted interviews with the robots and enacted their responses with voice and/or movements by using speculation and role-play tactics. Based on the insights that emerged from the interviews, participants prototyped alternative interactions with the robots.

The prototypes challenged the pervasive narratives of efficiency and gender stereotypes that often accompany the design and development of robots. For example, it unveiled assumptions of “cleaning” as an activity that is easy to do and thus easy to replace, and the imaginary of “the home” as a flat and enclosed space. It also helped them contest the anthropocentric notion that robots need to be functional tools for people by highlighting autonomous interactions that do not involve humans at all.

Furthermore, the technique unsettled traditional imaginaries of gender, efficiency, and automation by enabling emancipated interactions and by reconfiguring agency and control in HRI. To contest the existing narratives with alternative ones, the workshop’s outcomes expanded the design space to consider failures and misunderstandings as potential areas in which designers could make the robot’s limitations and infrastructures visible, supporting more responsible and explainable interactions.

A key takeaway of the workshop was that along with designing interactions with robots that are more efficient, it is of paramount importance that the interaction is able to communicate the robot’s limitations—to allow people to develop their own sense of trust—and to reveal the socio-technical infrastructures in which the robots are embedded, to get a sense of what are the broader implications of interacting with them beyond everyday contexts.