Critical Reflection on *Designing Human-Robot Relationships*

The chapter *Designing Human-Robot Relationships* written by Scott Stropkay and Bill Hartman in *Designing for Emerging Technologies* explores the considerations of designing robots for the people who will use them. They define a robot as one or more sensors feeding a processor with data that are then analyzed in order for the processor to make a physical action. In other words, a robot is an artificial intelligence that can move through space. According to the authors, the human-robot relationships need to be at the core of the design decisions involving robot making.

Stropkay and Hartman affirm that Isaac Asimov's laws of robotics were probably the first known rules to think the development of robots in an ethical and optimistic perspective. These rules, though useful to respond to basic human safety, do not take into account the way humans can understand their robot counterparts. Therefore, it appears essential for the authors that designers find ways to make these machines communicate their intentions and capabilities since miscommunication can lead to life-threatening consequences in certain contexts such as the healthcare system.

For Stropkay and Hartman, the limits of control, access, and capability emerging from human-robot relationships can be thought through the human-computer framework developed by Jakob Nielsen. These principles involve mainly easing communication between robots and humans as much as possible by giving access to different modes of interaction, by providing a precise documentation, and by making the commands to the robots easy enough for human beings to use and remember. This reflection on communication ties well to the study of cybernetics developed by Norbert Wiener. Theoretically, cybernetics aims towards a better understanding of the interactions between machines and human beings, which justifies the trust in computational technology to regulate society more thoroughly than traditional political power. To communicate properly, one must receive information in a meaningful and ordered way, and feedback, for Wiener, is the only way to exchange information with certainty within a system (1954: 18). This was true at the early stages of reflections on human-machine interactions and must remain a concern for designers today. The understanding of feedback needs to be part of the development process.

These pieces of advice also include supporting humans in their activities rather than replacing them, which can unfold into the Maslow's Hierarchy of Needs. For the authors, robots must first do the dirty and dangerous jobs that humans do not want to execute, but they must also support individuals emotionally and help them achieve very specialized duty through close collaboration. More questions arise, then, when thinking of how people will use these robots: questions about the training required by one to use certain types of robots, about the level of

privacy that will be imposed to robots, and about the people that will have access to the data collected by robots. These inquiries appear quite important to me as their answers will shape the protocols that will be introduced when interacting with these machines. For Alexander Galloway, protocols refer "to the technology of organization and control operating in distributed networks" (2006: 317), which seems appropriate to describe the type of research and development locus that robots evolve in. I believe, therefore, that these questions are crucial as they will allow us to organize human-robot interactions in ways that will encounter for diversity and accessibility.

The authors note that people react usually more positively when robots adopt human-like behaviors since they have been trained to respond to it for years. Certain robots are designed to care of humans and they have been working effectively according to research. People feel comfortable with them since they do not judge and always demonstrate patience and comprehension towards their users. These robots work for their users best interest which inevitably helps creates bounds between both entities. The authors refer to Aristotle's thoughts on persuasion, arguing that robots that show credibility, logic, and emotions will be able to connect more easily with their users. In an article on designing interactive objects, Spadafora and al. affirm that the behaviors of these objects are particularly relevant to the experience of the users (2016: 70) and that the conventional human-computer interaction framework based on efficiency might be overestimated. The authors of this article put forward an alternative paradigm founded on human personality applied to robots. According to their results, adding personality traits to robots benefits no only the participants who interact positively with the sofa-bot from this study but also the designers that can get a better grasp on producing concrete behaviors.

A lot is to be considered when designing robots that will interact with human beings. Communication appears as the principal element to ensure trustworthy relationships, but other social issues need to be taken into consideration in order to develop robots that respect diversity and rights to privacy.

Bibliography

Galloway, A. R. (2006). Protocol. *Theory, Culture & Society*, 23(2-3), 317-320.

Spadafora, M., Chahuneau, V., Martelaro, N., Sirkin, D., and Ju, W. (2016). "Designing the Behavior of Interactive Objects," in *Proceedings of the TEI '16: Tenth International Conference on Tangible, Embedded, and Embodied Interaction* (TEI '16). New York, NY, USA, 70-77. DOI: https://doi.org/10.1145/2839462.2839502

Wiener, N. (1954). "Cybernetics and History," in Wiener, N. *The human use of human beings: Cybernetics and society*. New York: Da capo press, 15-27.