The robot as other: a postphenomenological perspective[1]

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Abstract: In this paper, the author considers the robot from a philosophical point of view, particularly the question of the *robot as other.* First, he introduces a philosophical framework to view technology and a new configuration caused by the development of robotics. Then, he uses several case studies to describe the state of current robotics. Finally, the author examines how to deal with this new reality, raising several issues.

Keywords: philosophy of technology; postphenomenology; intersubjectivity; robots.

1. *Relations between humans and technology*

Phenomenological investigations, especially postphenomenological investigations, provide plentiful insights into the influence of technology on our world. Don Ihde famously argues that technology mediates our lives, pointing out that it plays a crucial role in the relation between human beings and their world. He created the following classification of four human-technology relations (Ihde 1990: 72-121).

Firstly, technology can be *embodied* by its users. This is what Ihde calls embodiment relations. When I view the world through a pair of glasses, they change the way I perceive the world, although they are not themselves noticed. Technology can thus be "incorporated" into human beings.

Secondly, Ihde highlights hermeneutic relations in which the technology provides a representation of reality. For example, a thermometer does not represent reality itself but provides a value for the temperature, which needs to be *read* or *interpreted*.

Thirdly, technology can interact with human beings like an *other.* When we withdraw money from ATM, we interact with the device as if it were an "other" bank teller. Ihde classifies this as alterity relations.

Finally, technology plays a role in the background of our experience. Exam-

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ples of such background relations are lighting and heating system in the room or the buzz of a refrigerator. Often we are not aware of the existence of these technologies, but they form the *context* within which we experience reality.

Peter-Paul Verbeek extends this inquiry, acknowledging that Ihde's framework has been of considerable value to the contemporary philosophy of technology, while pointing out that technological developments have eclipsed it: "The central focus of Ihde's schema is technology which gets *used*: glasses, telescopes, hammers, and hearing aids. However, the newest technologies are increasingly responsible for man-machine relationships that can no longer be characterized as 'use' configurations" (Verbeek 2009).

Verbeek indicates an immersion or a merging that emerges as the new configurations. For instance, the development of intelligent environments, in which technology such as ICT (information and communications technologies) and AI (Ambient Intelligence) are seamlessly used to enhance ordinary activity, leading to a configuration of "immersion" in which "people are immersed in an environment that reacts intelligently to their presence and activities." This goes beyond the Ihde's "background relations," because they engage in interaction with us and therefore serve as more than just a "context" (Verbeek 2009).

Another example is neural implants such as deep brain stimulation, namely the technologies that redesign human beings at the physical level. These are technologies not of the exterior, but of the interior environment, operating within the human body. This relationship goes beyond that of "incorporation" and might be said to represent a "merging," because it is difficult to draw a distinction between the technology and the human being (Verbeek 2009).

2. *Technology as other*

In fact, the newest technology to mediate our lives more deeply forces us to rethink the relations between human beings, technology, and the world. In this section, the author discusses alterity relations and a new configuration arising with the development of robotics. Because of the progression of the technology of intelligent robots, the technological object is increasingly being experienced as an "other" or "quasi-other."

In alterity relations, human beings relate to the technology, not the world. The role of technology in this relation can be characterized as that of a "quasi-other" (Fig. 1).

For example, some people care for an automobile very much, and here, the automobile elicits certain feelings for them (Fig. 2).

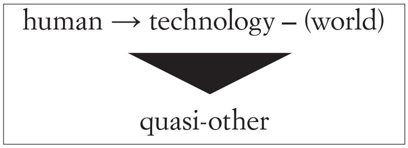

Fig. 1. Model of Alterity Relations

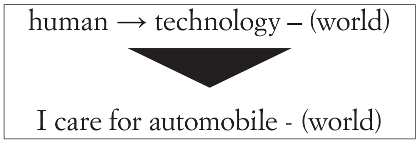

Fig. 2. Example of Alterity Relations

Of course, the technology can never be a genuine other. As Verbeek explains, an automobile "is far less of an other even than a horse, which can also be used to travel but which does not always obey and can even be startled or rear if a rabbit happens to cross its path" (Verbeek 2005: 127). The automobile is certainly a quasi-other.

When we experience a type of technology as a quasi-other, it needs to have a kind of independence and an interaction with humans (Verbeek 2005: 127). For example, a music box is fascinating because it has some kind of (apparent) autonomy, and some automata have such autonomy that they (apparently) interact with humans. Ihde suggests the robot as a more appropriate contemporary example:

> In my earlier work, I used the examples of toys, objects that seem animated and with which one can play. Today, I probably would use *robotic* examples. In Japan I once encountered a robot in a department store who would answer questions about what to find where. Here I relate *to* an artifact - although it is likely that the robot becomes simply an amusing way to be referenced to something other than itself, and thus it reverts to a hermeneutic function. (Ihde 2009: 43)

In fact, some Japanese research institutes have been engaged from the early 2000's in a project to develop useful services using robots. For example, a research project of the ATR Intelligent Robotics and Communication Laboratories in 2004-2009 developed a network robotic system to provide information and guide people by coordinating a team of robots as well as Internet agents with other embedded devices such as cameras, electronic tags, and wearable sensors.[2] Further, although the previous project focused on only a single area,

[2] See http://www.irc.atr.jp/en/research-projects/project_archive/net_robo_tec/, last accessed 28 February 2017.

the current project of this research institute extends the system to multiple areas such as homes, hospitals, and shopping malls, and has developed a common infrastructure for robotic services to support our daily lives.[3]

These days, we can meet ahumanoid robot dressed in a kimono and smiling at a Japanese department store (Fig. 3). This humanoid robot developed by TOSHIBA has human-like features and blinks; it can also be programmed to speak in other languages, such as Chinese and Japanese sign language.

Fig. 3. Aiko Chihara (from Reuters).[4]

3. *Technologically mediated intersubjectivity*

As robots become more autonomous and interactive, we seem to be approaching the point of experiencing technology not only as a "quasi-other" but also as a real other. To face such a situation, the author will introduce a new

[3] See http://www.irc.atr.jp/en/research-projects/unr/, last accessed 28 February 2017.

[4] *Technology News*, Reuters (20 April 2015), reports that "Aiko Chihira greets shoppers at the entrance of Tokyo's Mitsukoshi department store. But Chihira is no regular employee – she is a humanoid robot". See http://www.reuters.com/article/us-japan-robot-store-idUSKBN0NB1OZ20150420, last accessed 28 February 2017.

concept of "another-other." Namely, he will introduce a distinction between technologies such as cars and robots by considering cars as the quasi-other and robots as the another-other.

The quasi-other is independent and interactive. As mentioned above, some automata have such autonomy that they apparently interact with humans; we experience such automata as the quasi-other.

The another-other needs one more element of "influence" in addition to independence and interaction. It is true that robots only have apparent independence and interaction. However, the fact is that they do influence humans, as we will see in this section. Some robots, in addition to eliciting human feelings, can also actually influence human behavior. This is the difference between the quasi-other (cars) and the another-other (robots).

Nevertheless, some people may say that cars also influence humans. For example, when the fuel tank is almost empty, the fuel gauge flashes red and calls for a precise action. Namely, the car influences the driver to go to a gas station.[5]

However, this is not influence in our sense. To have an influence, it must be possible for technologies to transform human actions, not solely influence humans to perform some actions. The car in the above example certainly calls for the human to perform some action, but this is expected and, moreover, desirable. This is not the case with the another-other. The another-other does not necessarily behave as expected, and it becomes an element of the intersubjectivity underlying our society. In this section, the author describes what is really happening in current robotics using concrete examples.

First, let us consider social robot, which "are able to interact and communicate among themselves, with humans, and with the environment, within the social and cultural structure attached to its role" (Ge *et al.* 2009: 1). A famous social robot is Kaspar, developed by the Adaptive Systems Research Group at the University of Hertfordshire, UK (Fig. 4). Kaspar is a child-sized humanoid robot designed for social interactions in order to improve the lives of children with autism spectrum disorder (ASD). It can simulate body movements or gestures using its hands, arms, torso, and head, as well as displaying facial expressions; additionally, it can utter (pre-programmed) words or sounds (Huijnen *et al.* 2016: 446). Children with ASD can learn responses from Kaspar though games and interactive play. Presently, besides the robot, a Kaspar program that runs on a laptop or a PC is available, which can be used to create new Kaspar scenarios (*ibid.*).

[5] This is a comment by a reviewer. I wish to thank the reviewer for his/her insightful comments.

Fig. 4. Kaspar (from http://www.herts.ac.uk/kaspar)

Another example is a therapeutic robot, such as PARO (Fig. 5). PARO is an advanced interactive robot developed by the National Institute of Advanced Industrial Science and Technology (AIST) in Japan, boasting five kinds of sensors – tactile, light, auditory, temperature, and posture – with which it can perceive people and the surrounding environment. PARO can learn to behave in a way that stimulates the user, and can respond to its own name. Interacting with people, PARO reacts as if it is a living being, which has been shown to have a psychological effect on patients, improving their relaxation and motivation. It is used in the care of dementia patients, for example. In fact, PARO was certified as the world's most therapeutic robot by the Guinness World Records.[6]

Lastly, let us take "developmental cybernetics" proposed by Shoji Itakura as an example of a further research method or idea. Developmental cybernetics is the "study of interaction and integration between children and robot[s]" (Itakura *et al.* 2008: 520). Its aim is to investigate the development of social cognition or awareness in infants by employing nonhuman agents, such as robots that are suitable for an infant environment (Itakura *et al.* (2013) treat children and robots in this study). Tellingly, developmental cybernetics regards children and robots as having the same status, meaning robots, the inanimate objects, are viewed the same as the animate beings.

[6] See http://www.parorobots.com/index.asp, last accessed 28 February 2017. We can add numerous other examples. For example, Osaka University and Advanced Telecommunications Research Institute International (ATR) have collaboratively developed a new, portable, tele-operated, android robot, Telenoid™ R1, which can effectively simulate peoples' presence. This robot was designed to appear and to behave as a minimalistic human, and comes in both male and female models, old and young. By this minimal design, the Telenoid™ allows people to feel as if an acquaintance in the distance is next to us. Moreover, this robot was designed to have soft and pleasant skin texture and small, child-like body size to enjoy hugging and communicating with it easily. See http://www.geminoid.jp/projects/kibans/Telenoid-overview.html, last accessed 28 February 2017.

Fig. 5. PARO (from http://www.parorobots.com/photogallery.asp)

Thus, in the progression of technological development of intelligent robots the technological object is increasingly experienced as a quasi-other or other. Therefore, we may say that intersubjectivity includes both human others and technologies in our time, which, in this paper, we call "technologically mediated intersubjectivity" (Fig. 6).

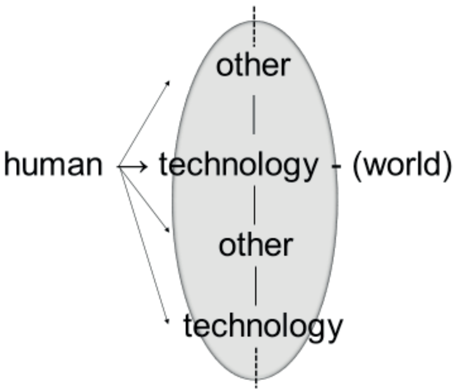

Fig. 6. Technologically Mediated Intersubjectivity

4. *Technology accompaniment*

Confronting such a reality, a philosopher investigates the feelings of the roboticist and psychologist. Minao Kukita, a Japanese philosopher, pursued the question of the social function of robots, which had been raised by Michio Okada, a roboticist, and Koutarou Matsumoto, a psychologist. Kukita pointed to their book *Sorrow of the Robot: Ecology of Human-Robot Communication* in which they write (Kukita 2014):

> I was walking in the park. Then an elderly woman who stood alone caught my attention. Wondering if she was watching cherry blossoms, I got closer to her, when I found a tiny robot in her arms that resembled a stuffed toy. She was watching cherry blossoms with the robot in her arms. "Beautiful…," said she gently to the robot. "Look, beautiful, aren't they?"

You will often see an elderly person walking in a park with a dog or a cat in her or his arms. In this case, the dog or the cat was replaced by a robot. So I could have passed her by, thinking that the times are changing. However, at that sight, I had a complicated feeling that I could not express easily.

A vague question arose: "What? Isn't anything wrong?" In addition, I felt something painful, and uncomfortable at that sight. (Osada *et al.* 2014: i-ii. Translated by Kukita)

Kukita emphasizes the painful and uncomfortable feelings aroused. While some people may find such feelings to be naive, he thinks that such affective responses are important if we are to take seriously the coexistence of humans and machines. As Kukita reasons, "[a] moral action is not relevant only to the agents or patients involved, but to the community or society around them as well" (Kukita 2014).

What does this statement mean for the rest of us? To consider the issue, Verbeek's mediation theory is crucial. According to Verbeek, technological artifacts take part in human action and decision-making by mediating human perception and praxis. "Designers should focus not only on the functionality of technologies but also on their mediating roles. The fact that technologies always mediate human actions charges designers with the responsibility to anticipate these mediating roles" (Verbeek 2006: 377-378).

From the perspective of mediation theory, design should be regarded as a form of "materializing morality" (Verbeek 2006). Verbeek's recent work talks about the way of "moralizing technology" as follows:

> Rather than working from an external standpoint vis-à-vis technology, aiming only to either reject or accept a new technology, the ethics of technology then aims to accompany technological developments […], experimenting with mediations and

looking for ways to discuss and assess how these mediations could fit with the way humans live (Verbeek 2011: 95).

Of course, this also applies to robotics. We cannot discuss the development of robotics or the changes to society caused by it from an external standpoint; rather, we should discuss the way to accompany its development. Verbeek indicates its concrete task here: "Its primary task is to equip users and engineers with adequate frameworks to understand, anticipate, and assess the quality of the social and cultural impacts of technologies" (Verbeek 2011: 165).

From this perspective, let us consider the relation between humans and robots or the "robot as other" in a different frame, namely regarding the concept of the "weak" robot, taking the sociable trash box robot (STB) (Fig. 7) as an example. STB cannot collect trash by itself, but succeeds in conveying its intention to collect it to the children. "The main purpose of this study is to investigate the effective social cues, behaviors, and other essential factors to facilitate children in their anticipation of the behavior of a sociable trash box robot (intentional stance). The STB engages using interactive social cues and vocal interactions to build a social coupling with children in order to induce their assistance in collecting trash".[7]

Fig. 7. Sociable Trash Box Robot

[7] Quotation and Fig. 7 from https://www.icd.cs.tut.ac.jp/projects/stb_en.html, last accessed 27 February 2017

The concept of the weak robot suggests a relationship to others, recognizing our weakness. We, as human beings, cannot do everything by ourselves and must ask for assistance at times. This means that we must interact with others with awareness of our weaknesses. This study tried to realize robot as a weak other, instead of an almighty machine. Specifically, it sought to develop a "generative relation that constructs new values with each other" between humans and robots (Osada *et al*. 2014: 36).

What kinds of mediations will be generated in our society by introducing these kinds of robots? As Verbeek notes, it is important to equip users and designers with adequate frameworks to understand, anticipate, and assess the quality of the social and cultural impacts of technology. In fact, mediation theory provides plentiful vocabularies to describe new technologies (Verbeek 2005, 2006). We need to describe the art of technology simultaneously with its development, and mediation theory plays a crucial role in providing an adequate framework for that.

5. *Conclusion*

Postphenomenological investigations provide plentiful insights into the influence of technology in our lives. Ihde argues that technology mediates our world, classifying four types of human-technology relations: embodied, hermeneutic, alterity, and background relations. Verbeek extends this kind of inquiry positing a new type of relation, immersion or merging, acknowledging how technology penetrates our lives more deeply nowadays.

In fact, the newest technologies mediate our lives more thoroughly, and require us to rethink the growing relations between human beings, technology, and the world. Along with the development of robotics, we need to reconsider the alterity relations of Ihde. Indeed, the technological advancement of intelligent robots increasingly leads to the technological object being experienced as an other or quasi-other. As numerous examples in this paper have indicated, the increasing autonomy and interactivity of robots allows us to experience the technology as "another-other", not simply as quasi-other. Therefore, we may say that intersubjectivity in our time is a technologically mediated intersubjectivity.

The existence of the robot as other changes a community or society. To consider this new reality, Verbeek's mediation theory is seminal. We cannot discuss the development of robotics or societal change from an external position. Instead, we must consider how to accompany its development. Mediation theory provides plentiful vocabularies for this. We must advance our understanding of the art of technology along with its development, and mediation theory suggests frameworks to understand, anticipate, and assess the social and cultural impacts of our technological future.

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