Social Robots and Emotion: Transcending the Boundary Between Humans and ICTs

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The notion of social robots often evokes the idea of 'humanoid social robots' which are "human-made autonomous entities that interact with humans in a humanlike way" (Zhao, 2006, p. 405). These humanoid social robots, and also zoomorphic social robots, are becoming a part of our everyday communicative interactions. They have been introduced to us as relational artefacts such as Tamagotchis, Furbies, and Aibos, asking the question of who we are becoming as we develop intimate and emotional relationships with machines (Picard 1997; Turkle, 2007, 2012). These relationships between humans and machines have been discussed not only in terms of intelligent machines, such as humanoid social robots incorporated into our social domains, but also in terms of the hybridization of the human body and machines (Haraway 1991; Fortunati, 2003a, 2003b; Katz, 2003; Fortunati, Katz, & Riccini, 2003). At the surface level, humanoid social robots and artificial intelligence might create an impression that the questions about the relationship between humans and technologies are still far removed from our everyday experiences and saved for the research laboratories and the world of science fiction. However, information and communication technologies (ICTs) have been slowly but steadily 'approaching' the human body, calling for a reconsideration of the notion of social robots.

        Some international collaborative research on the topic has been conducted in Italy and the UK (e.g., Fortunati, Katz, & Riccini, 2003; Vincent & Fortunati, 2009), and in the U.S. (Katz, 2003) exploring the relationship between humans and machines, especially with regard to the body, intimacy and emotion. These research efforts have brought about work such as the *Machines That Become Us* perspective, which implies that "the technologies 'become' extensions and representative of the communicator," "technologies become physically integrated with the user's clothing and even body," and technologies are "becoming to the wearer" (Katz, 2003, p. 1). Katz conceives of media technology to include telephone wires, computer networks and mobile phones, "second skin," fashion, accessories, and decorations that we wear on our body (Katz, 2003, p.18). As McLuhan (1964/1994) stated, "all media are fragments of ourselves, extended into the public domain" (p. 266). Not only does the technology extend human body and sensory systems into the public domain, but it is also being *incorporated* into the human body and becoming part of a means of expressing identity and emotions (Katz, 2003). This need many people have for always on connectivity has engendered a close attachment to their ICT devices, emphasized by the mass adoption of mobile phones and tablet devices. Fortunati and Vincent (2009) argue this emotional attachment provokes electronic emotions - "emotions lived, re-lived or discovered through machines" (p. 13).

        These past research efforts underline two essential points that allow us to reconsider the notion of social robots. First, as the distance between ICTs and the human body shrinks, ICTs are going through the process of *anthropomorphization*, which suggests the imitation and simulation of human beings both cognitively and affectively (Fortunati & Vincent, 2009, p. 2). Second, as ICTs are increasingly incorporated into the human body, humans are turning into "*homo technologicus*" (Longo, 2003), rendering the human body as a place where the natural and the artificial merge (Fortunati, 2003a, 2003b).[1] This line of research suggests that social robots do not only imply the humanized intelligent artefact but also refer to the *technologized* human body. Haraway (1991/2003) suggests that the blurring boundaries between humans and machines result in heightening our sense of connection to our tools, claiming that "we find ourselves to be cyborgs, hybrids, mosaics, chimeras" (p. 443). As ICTs blur the boundaries of the human body, we become more conscious and feel more connected to our body, which is "the first and most immediate technological tool" (Fortunati,

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[1] In considering the *Machines That Become Us* perspective, Fortunati (2003a) argues that the human body "is represented as the emblem of naturalness" within a historically determined concept of naturalness, yet it is indeed "artifice to the maximum degree" (p. 72).

2003b, p. 62). Fortunati (2003a) points out that the recent technological advancement and its effects on the body make the body "retreat from the intermingling and confusion of the natural and artificial" (p. 74), but simultaneously, promote their reunification (p. 81). This unsettling phenomenon of blurring boundaries between ICTs and the body (Fortunati, 2003a; Sugiyama, 2010) highlights the binary tension between the natural and the artificial, as humans and technologies share agency (Lásen, 2010).

As discussed, past research suggests that the notion of social robots can be conceived of as a concept that implies ICTs turning into a human-like entity as well as humans turning into ICTs. Once one accepts that the commonly used ICTs such as mobile phones can be conceived of as social robots, and also, such ICTs are potentially turning humans into social robots, one realizes that it is time to give significant scientific efforts to examine the social impact of social robots including the ambivalent relationship between ICTs and the human body.

One of the approaches that we can take to examine the notion of social robots is to focus on emotion. As people "manage emotions" (Hochschild, 1983/2003) using ICTs, the miniature mobile technology becomes monstrous in presence (Sugiyama, 2009). The embodied ICTs evoke electronic emotions (Fortunati & Vincent, 2009, p. 13), and as the ICTs make our life convenient and complicated simultaneously (Aakhus, 2003) these electronic emotions need to be managed with great care. Aforementioned past research suggests the critical role of emotion in examining the technologized human body as well as the embodied ICTs. If ICTs serve as "creators and diffusers of emotion" as well as "repositories of electronic and mediated emotions" (Fortunati & Vincent, 2009, p. 15), how will technologized humans and *anthropomorphed* technologies create, diffuse, and store emotions? Longo (2003) states that "it is always the human-computer unity that thinks" (p. 27). Is it the humans who feel in response to the machines? Or is it the *human–machine unity that feels*? Almost a decade ago, Fortunati (2003) claimed that society has reached the point where "ICTs saturate the body and bodily senses" (p. 71), and this phenomenon is presumably even more pronounced in recent years as ICTs become 'smarter.' Then, we are prompted to ask questions about where we currently stand in terms of the relationship between humans and ICTs, and also, how people experience social robots, broadly defined, in everyday life.

In order to begin answering these questions, the mobile communication studies are pivotal because the mobile media can be considered as the ICTs that are closest to the human body and central to human emotional experiences at the moment. As a systematic step for synthesizing relevant work on mobile communication and emotions, and also, for starting to make a bridge between the work and the major research on humanoid social robots, a two-day workshop was convened in the summer of 2011 at Franklin College Switzerland supported by the Swiss National Science Foundation, Franklin College Switzerland, and the Green Leaves Fund. The workshop aimed to share our exploratory research and ideas to facilitate the future collaborative research. This inauguration volume of *intervalla: platform for intellectual exchange* presents a peer-reviewed selection of papers discussed during the workshop.

The first paper by Baron proffers questions that frame much of the debate explored in this volume and in particular the authenticity with regard to artificial intelligence (AI) and our use of ICTs. How accurate and authentic is the original item and how much does this matter to those who see or use it? The focus of her discussion is whether humans seek social robots that simulate human (or animal) emotion and how this might manifest. Baron shows that authenticity is not necessarily always demanded and might indeed be avoided in order to maintain anonymity. She takes us on a journey of exploration beginning with an evocative experience in Venice, through the arts, the presentation of the emotional self and the development of AI illustrated with many examples to explore her questions. Baron's essay provides a link between the studies of human and humanoid

interaction that involve mobile phones, ICTs and especially designed social robots like the baby seal Paro.

We turn now to the remaining seven studies in this volume, the first three of which examine research that proffers a greater understanding of the developing human response to robots, as well as to the role of emotion and affect in this area of growing interaction. In their paper Halpern and Katz have shown through analysis using the social information processing model that humans' engagement and attitudes towards robots has been influenced by their earlier experiences online, and that, as a result, they tend to attribute robots with human-like characteristics. They argue that a stronger acceptance of robots has been led by the lack of formal cues available when interacting electronically in the socially charged electronic environments they explored. Furthermore there is an attribution and recognition of human like characteristics in these robots. This may have implications towards the greater social acceptability of robots in various human domains.

Whereas Halpern and Katz find emotion is an outcome of being in a socially dynamic electronic and digital environment, Höflich begins his analysis by showing how a person can start an emotional relationship with a technical, interactive artefact. Following Turkle (2007), Höflich explores whether people have perhaps always thought like a machine rather than developing ways to get machines to think like people. He takes us into the uncanny, when we wonder what is happening; a situation prompted by the relationship between man and social robot and one felt particularly acutely if the robot is made too humanlike. Drawing on Simmel (1995), Höflich further examines the role of the robot as a third person, or thing, one that is both constructive and deconstructive in relationship building, and how it plays an interventional role in the intersubjectivities of ego and alter in a relationship. The role of the robot as a machine with no emotion that is reacted to and interpreted as social is the focus of Höflich's discourse.

Finally in this section Linke's paper explores aspects of social relation through analysis of human technology and human-humanoid interaction. Her paper develops the mediatization approach to understanding the interaction between humans and social robots, as well as drawing on ritualization theory. She argues that useful insights for a conceptualization of the human-social robot relation can be achieved by exploring mediatized and ritualized relational practices. Linke asserts that in order to fully explore the possibilities for social interaction with social robots the topic should be considered in the context of a broad portfolio of information technologies and not just on specific ICTs, thereby enabling a greater understanding of the shaping of technologies and everyday lives.

The next two papers develop the idea of the social robot being a symbiotic relationship between device and user. Vincent's paper explores the emotional relationship between user and their phone – one that is engendered and developed by how and for what their mobile phone is used. This includes the relationships they enable and how the user's emotional identity is impacted by the electronic emotions created and lived via the mobile phone. She suggests that this intimate and constant interaction between user and device has changed the mobile phone into a personalized social robot when associated with its user. Contrasting the mobile phone with social robots that are especially constructed to interact with chosen emotions, Vincent argues that because the mobile phone has not been designed in this way it can be a much more personal and unique social robot device - one that only the user can relate with. Sugiyama also explores this increasingly close relationship between mobile phones and humans through the notion of the mobile device turning into a quasi-social robot. She questions the boundary between mobile device and humans in the context of her research about Japanese young people arguing that the mobile device has gone through a process of anthropomorphization to the extent that some even experience the device as part of their body. This transcending boundary between humans and the mobile communication device highlights the changing emotions that are also being experienced when the mobile phone is

being used. This is exemplified by the electronic emotions engendered as a consequence of interaction with this ICT machine itself.

The final two papers by Lásen and Barile explore the ICT environment in which social robots are being developed. Lásen's study of intimacy provides us with an understanding of the human behaviors involved in using mobile devices by exploring issues of affect and emotion such as they appear in the context of artificial intelligence and in contemporary use of ICTs. The social practices of humans and their interaction with technologies, emotion in couples' relationships, in the everyday leisure activities of life and in the working day, are all examined in this discourse. Lásen explores the affective turn in emotion research that particularly highlights the non-dualist approach now appropriate to examining emotion in relation to human interaction with artefacts. Changing social practices, such as loss of embarrassment, that lead to the public display of affect and emotion are also explored and in sum this paper provides a review of emotion that highlights the affective turn not only in emotion studies but in contemporary use of ICTs too. In Barile's paper we have a discourse on emotion, on the complexities of the new technological environment and a discussion of the dilemma of what is real. Positioning his discourse within the consuming culture of the past three decades, Barile develops his argument through his concept of 'ontobranding' and illustrates it with case studies. This reflects the transformation of a mass dimension in which the established human and machine interaction is moving towards a softer, emotional and immaterial distillation of everyday life. The discussion is not limited to the context of users of devices but extends to the metaphysical, to notions that places become media and emotion becomes content. The changing global dimensions of virtual and real of the late capitalism and aspects of the dynamic relationship between consumption and production provide a perspective of the complex technological world in which humans now interact with each other and with machines.

The volume concludes with an Afterword by Fortunati that links the journal papers through discussion of the transversal topic of the forms of social robots. Fortunati's exploration of the development of social robots from ancient automata to contemporary advanced robotic technologies examines the legacy of both the emotional and social relationships that humans have had with these machines. This paper shows just how influential automata and robots have been: since time immemorial and into the present; in the development of new technologies; in the advancement of the arts; in new scientific ideas; in innovations and in the changing social contract. Fortunati focuses her discussion on the changes in robotics particularly within the domestic sphere and the diverging paths of robotics that serve the material part of housework and immaterial part of reproduction work. These changes are explored through the new concept of 'ubiquitous social roboting,' which articulates the dematerialization process brought about by social robots. Fortunati asserts that the social meaning, and the impact on society of social robots is still unclear; the place they have in the domestic sphere is already significant and it would appear that social robots will increasingly be used in ways that people have yet to fully understand and accept.

As a whole, the volume explores the intricately changing boundary between humans and ICTs and the role emotions play in the dynamics. Furthermore, it explores the gap between the research on social robotics and that on ICTs with a special emphasis on mobile communication. As will be seen, these papers begin developing an understanding of the very notion of social robots that transcend the boundary between humans and ICTs, hoping to raise critical questions that require future investigations.

RERERENCES

Aakhus, M. (2003). Understanding information and communication technology and infrastructure in everyday life: Struggling with communication-at-a-distance. In J. E. Katz (Ed.), *Machines that become us: The social context of personal communication technology* (pp. 27-42). New Brunswick, NJ: Transaction.

Fortunati, L. (2003a). The human body: Natural and artificial technology. In J. E. Katz (Ed.), *Machines that become us: The social context of personal communication technology* (pp. 71-87). New Brunswick, NJ: Transaction.

Fortunati, L. (2003b). Real people, artificial bodies. In L. Fortunati, J. E. Katz, & R. Riccini (Eds.), *Mediating the human body: Technology, communication, and fashion* (pp. 61-71). Mahwah, NJ: Lawrence Erlbaum.

Fortunati, L., Katz, J. E., & Riccini, R. (Eds.). (2003). *Mediating the human body: Technology, communication, and fashion*. Mahwah, NJ: Lawrence Erlbaum.

Fortunati, L., & Vincent, J. (2009). Introduction. In J. Vincent, & L. Fortunati (Eds.), *Electronic emotion: The mediation of emotion via information and communication technologies* (pp. 1-31). Oxford: Peter Lang.

Haraway, D. (2003). A cyborg manifesto: Science, technology, and socialist-feminism in the late twentieth century. In R. C. Scharff, & V. Dusek (Eds.), *Philosophy of technology: The technological condition: An anthology* (pp. 429-450). Malden, MA: Blackwell.

Hochschild, A. R. (2003). *The managed heart: Commercialization of human feeling* (20th Anniversary edition with Afterword). Berkeley, CA: University of California Press.

Katz, J. E. (Ed.). (2003). *Machines that become us: The social context of personal communication technology*. New Brunswick, NJ: Transaction.

Lásen, A. (2010). Mobile culture and subjectivities: An example of the shared agency between people and technology. In L. Fortunati, J. Vincent, J. Gebhardt, A. Petrovcic, & O. Vershinskaya (Eds.), *Interacting with broadband society* (pp. 109-123). Frankfurt: Peter Lang.

Longo, G. O. (2003). Body and technology: Continuity or discontinuity. In L. Fortunati, J. E. Katz, & R. Riccini (Eds.), *Mediating the human body: Technology, communication, and fashion* (pp. 23-29). Mahwah, NJ: Lawrence Erlbaum.

McLuhan, M. (1994). *Understanding media: The extensions of man*. Cambridge, MA: MIT Press.

Picard, R. (1997). *Affective computing*. Cambridge, MA: MIT.

Simmel, G. (1995). *Soziologie. Untersuchungen ueber die Formen der Vergesellschaftung (2nd ed.)*. Frankfurt am Main: Suhrkamp

Sugiyama, S. (2010). Seeking equilibrium: A study of how college students experience their 'away from home' everyday life with a mobile phone. *Encyclopaideia: Journal of Phenomenology and Education (Special issue: Between the subject's agency and the strength of things. A phenomenological approach to mobile communication in everyday life), 27*(2), 133-154.

Sugiyama, S. (2009). The decorated mobile phone and emotional attachment for Japanese youths. In J. Vincent, & L. Fortunati (Eds.), *Electronic emotion, the mediation of emotion via information and communication technologies* (pp. 85-103). Oxford: Peter Lang.

Turkle, S. (2011). *Alone together: Why we expect more from technology and less from each other*. New York: Basic Books.

Turkle, S. (2007). Authenticity in the age of digital companions. *Interaction Studies, 8*(3), 501-517.

Zhao, S. (2006). Humanoid social robots as a medium of communication. *New Media and Society, 8*(3), 401-419.