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Introduction

I met Joachim Höflich many years ago, after he looked me up by phone. After his first visit to Udine, he proposed to come to Pordenone, the seat of the University of Udine where I teach, with his most willing students, and to organise an Erasmus workshop with our respective students. Since that first workshop, many have followed, and over time the workshop on digital communication with Erfurt-Pordenone students has become a pleasant and important academic event. I have always admired Joachim for his courage and resourcefulness; it is not easy to make long study trips with many students. Celebrating colleagues like Joachim, who have arrived at the end of their career, is challenging. There is the risk of remembering only some of their merits, which are the ones we encountered when we dealt with them. Even when we read their work, we often focus on the ones that pertain to our own research. Obviously there are also language barriers, so that we come to know only the works they have published in English. I am not an exception, and thus here I will refer only to Joachim's very important English-language contributions to the field of social robotics. As I often repeat to my students, to study social robots from a social-sciences point of view, it is necessary to begin with the thoughts of Joachim Höflich. His thoughts have largely inspired my latest reflections on social robotics, and I am very grateful to him for this.

Theoretical Perspective and Models in Human-Robot Interaction and Communication

First of all, Höflich has invited us to reflect on the quality of human-robot interaction. In this interaction, the robot is not seen in its physical essence of sensomotoric or autonomous machine, but, I would say, in its capacity as a communication agent, as a second interlocutor or quasi-interlocutor. Social robots propose themselves as a medium with which humans can communicate, because, as Höflich writes, they 'talk back' (2003, p. 90). In this regard, Zhao argues: Humanoid social robots differ from CMC technologies in that they are not a medium through which humans interact, but rather a medium with which humans interact. Acting as human surrogates, humanoid social robots extend the domain of human expression, discourse and communication into the computerized world. (2006, p. 402)

They can present themselves as quasi-interlocutors because they simulate having a mind (Gray, Gray, & Wegner, 2007) and a kind of 'communicative intelligence' or communicative skills (Baron, 2015). Their more or less acceptable simulation of behaving as if they were persons makes us treat them as such. The theory of media equation can help us to grasp this attitude. We argue with Höflich (2013) that this theory, which proposes that users treat media as if they were real people (Reeves & Nass, 1996), also works with robots. In fact, there is considerable evidence that users already treat social robots as if they were persons (Kanda et al., 2004).

This attitude and behaviour of treating social robots as persons has been enhanced by the improvements that have occurred in the field of social robotics and that have encompassed many areas, including linguistics. We can conceive of social robots as quasi-communication agents because recent advances in Artificial Intelligence have made it possible to develop their linguistic capabilities to the point of making them sufficiently credible as a 'quasi-second interlocutor'.

These improvements have also inspired some recent juridical elaborations, as they have generated a necessity to somehow regulate the social status of robots, especially of social robots (Delvaux, 2016).

In 2016, a resolution of the European Parliament (A8-0005/2017) established that it is necessary to create a specific legal status for robots in the long run, so that at least the most sophisticated autonomous robots could be established as having the status of electronic persons responsible for making good any damage they may cause, and possibly applying electronic personality to cases where robots make autonomous decisions or otherwise interact with third parties independently. (2015/2103 (INL), European Parliament 2014–2019, p. 18, our emphasis).

A year later, on October 25, 2017, at the Future Investment Summit in Riyadh, the gynoid Sophia was granted Saudi Arabian citizenship. Although this fact has caused a large debate and many controversies in the media (Gittleson, 2017; Maza, 2017), it is worth considering the importance of this decision as a further step towards considering social robots as true persons even on the legal level, and in strengthening the notion that social robots are increasingly treated as people. Discussing the quality of human-robot interaction and drawing on Max Weber, Höflich (2013) argues that human-robot interaction is different from human-human interaction because the latter is based on 'reciprocal meaningful behaviour', while the former is based on an unequal relation. More precisely, the human-robot interaction may be understood as incorporating and expressing a quasi-interpersonal and quasi-social relationship or, Krotz suggests (2007), a pseudosocial relationship. In fact, it is based on behaviour that cannot be reciprocally meaningful, because the reciprocity of behaviour presupposes the parity of the two interlocutors concerning decision-making autonomy and responsibility. However, social robots, although they are recognised as 'electronic personae', are not yet able to be as autonomous and responsible as humans are.

I use the terms quasi-communication agent and quasi-interlocutor to underscore the asymmetry of power in the interaction between humans and robots. There is clearly a power difference in the relation between a human and a robot. A robot usually has less advanced communication abilities than a human being, both inbound (e. g. less comprehension ability) and outbound (e. g. less language competence and lack of non-verbal language). From a communication point of view, the power relationship between humans and robots is disproportionately in favour of the human—in the research by Fortunati, Cavallo, and Sarrica (2018), a robot is seen by children as a child younger than them or as disabled. However, as in any relationship characterised by a power imbalance, this difference is not always for the benefit of humans. The one who has less power (the robot) nevertheless expresses some form of power over humans, as it obliges them to reconfigure their expectations, language and behaviour in the interaction. To make the relation work, the human must adapt to the less advanced communication skills of the robot and act accordingly (Höflich, 2013). As Krotz (2007, p. 160) points out, communication between a human and a robot (as with any other medium) is effective only when humans are disposed to adjust their communication practices to the inadequacies of the medium. From this dynamic, a twofold process derives: the robotization of humans and the humanization of robots.

Secondly, Höflich has proposed that we reflect on the communicative model of human-robot interaction by inviting us to expand the dyadic model, which is generally the most used in studies of human-robot interaction. Specifically, he proposed a triadic model, which interprets social robots as mediators 'between two persons or between a person and his or her environment' (Höflich, 2013, p. 36). Behind this model, there is a long psychological and sociological tradition on which Höflich draws on, especially Simmel's (1995) contribution.

For Simmel, Höflich recalls, the third person makes alliance possible, by demonstrating a capacity to join two people and separate them from the third. Besides producing alliances and disruptions in social interactions, the third person can play three different roles: the impartial mediator, the smiling third (tertius gaudens) and the dominating third who exploits the mechanism of the alliance to 'divide et impera' (Simmel,1995, p. 125ff.). On this basis, Höflich invites us to consider the social robot as a real, imagined or socially constructed 'other' (Höflich & El Bayed, 2015), and thus, as a mediator.

I would also add that this role of mediator can sometimes also be integrated into another role, that of the smiling third, as in the case of Joy Robot[1].

The triadic model Höflich proposes attributes to social robots the ability to affect humans' perception of other human beings or themselves, including the environment. In effect, this model enables us to better grasp the role that social robots may have in our societies and it is more convincing than the early model proposed by Fong, Nourbakhsh and Dautenbaun (2003, p. 144). These authors define social robots as 'embodied agents that are part of a heterogeneous group: a society of robots or humans' (p. 144, emphasis ours), but Höflich's analysis indicates that the opposite is probably happening. The more human societies incorporate social robots, the more robots become social and societies become hybrid.

Fortunati, Cavallo and Sarrica (2018) accepted the challenge to reflect on the communication model which forms the basis of human-robot communication, and propose a further expansion of Höflich's triadic model. They argue that social robots in the public sphere play multiple roles at the communication level. While a few studies have explored the use of robots in the public space by concentrating especially on their use in museums or shopping malls (e. g., Jensen et al., 2005; Niemelä, Heikkilä, & Lammi, 2017; Salvini, 2017; Sone, 2016), Fortunati, Cavallo, and Sarrica have explored three communicative uses of robots in public contexts not studied before. In their study, they analyse the European Researchers' Night in Pisa and the inauguration of the University of Udine's 39th academic year.

These two events represent, respectively, a scientific exhibition in a public square and a ceremony in an institutional building. Both of these events have made use of the same social robot, which is called DORO. At the first event, DORO was programmed to perform two simple actions: take a bottle of water and hand it to bystanders, and manage some dialogue with those who tried to talk to it. At the second event, DORO was programmed to interact with the vice-chancellor of the University of Udine, Prof. Alberto de Toni, bringing him the text of his inaugural lecture and then having a short dialogue with him in front of a large audience. As a third element of comparison, Fortunati, Cavallo and Sarrica (2018) examine the opinions, attitudes and emotions of a restricted audience towards the official video of the ceremony in Udine by exploring a situation in which people were separated from the robot by a screen, thus equating them to the television public.

The first two scenarios represent stages of different typologies of interaction, which also serve to study the political and psychosocial components of public spheres and have different spatial features. The first is an open encounter between scientists and citizens in Pisa, whereas the second represents a ritualised ceremony involving authorities and cultural elites in Udine. These scenarios have been chosen on the basis of the fact that they embody a human-robot interaction which involves three different models of communication. The first represents a one-to-one communication model; the second, a one-to-many communication model in presence; and the third, the classical one-to-many communication model that is mediated through a television screen.

While the first model — one-to-one — has been studied intensively, the second and the third communication model have attracted far less attention from scholars, although several examples of human-robot interaction based on these communication models are available. There are robots, like RoboThespian in Spillikin, who can perform as actors in a theatrical piece; others, like the robot iCUB, can participate in a television programme, such as the episode of Italia's Got Talent that aired on April 27, 2016. In both cases, they may address large audiences who attend the play in a theatre or who watch the show on television.

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[1] https://www.instructables.com/id/Joy-Robot-Rob%C3%B4-Da-Alegria-Open-Source-3D-Printed-A/ (last accessed 6 June 2019).

This model of communication in human-robot interaction is very reminiscent of the classical mass media communication model.

Accepting Höflich's challenge has allowed us to better understand the various roles that social robots can play in public spaces. In fact, the results of this study indicate that analysis of human-robot interaction from a communicative perspective can incorporate various communication models in which social robots are involved in the public arena. In the first of these models, the social robot acts as a quasi-interlocutor, while in the other two — one-to-many in presence and one-to-many through a television screen — the social robot plays the role of a medium which is at the same time capable of becoming part of a mass media system.

Moreover, this study shows that patterns of human behaviour towards robots in a public space replicate those of encounters between humans in the one-to-one model, and those of the audience in public events towards human characters in the one-to-many models. These results represent a further confirmation of the media equation theory.

The Social Robots as the Next New Medium

Another important part of the conceptual legacy of Joachim Höflich (2013) is the development of the notion of robots as media. According to him, robots mediate between the environment and other people, and within this mediation, as we have discussed in the previous section, they can connect humans to the environment and to other humans, but they can also divide them. He builds his contribution on the work of Zhao (2006) and Krotz (2007). Zhao (2006) is the first to describe interaction with robots as an interaction with media.

But social robots are a particular kind of medium because, as we have seen, they also enable their interlocutors to communicate directly with them. The novelty represented by social robots in this concern is the richness of communication roles that they can play. As we have described, they mediate interpersonal communication between individuals and social groups as well as between individuals and the environment. Moreover, they qualify themselves as a special type of interactive medium because of their ability to talk back (Krotz, 2007, p. 155).

Finally, whether they have a material body or not (such as virtual communication agents), they become protagonists in media programs, concerts (Fortunati et al., 2018) or theatrical pieces. But they are more than that. In fact, their physical bodies can also include mass media like television and radio, as well as information and communication technologies. Often the body of social robots is equipped with a smartphone, as in the case of Joy Robot, or a tablet with which people using the robot can follow a TV program, listen to a radio or connect to the Internet, as in the case of DORO. Social robots are becoming a field of media convergence for antonomasia, and thus of media hybridisation.

In light of these considerations, social robots can enable the use of mass media as well as the use of communication and information technologies used at a mass level. Consequently, all of the artificial, communication models that exist can find application with social robots. Höflich (2013) points out that, from time to time, depending on the ways social robots are used, their meaning is established as well as the relative, distinctive relationship is shaped in one way or another.

Looking at social robots from a media perspective, these technological artefacts contribute substantially to the pluralisation of social interaction forms (Scholtz, 2008) and to the multiplication of communicative practices in the context of media usage. In this regard, the contribution of scientists interested in human-robot interaction (HRI) is particularly precious as they are engaged 'to understand and shape the interactions between one or more humans and one or more robots' (Goodrich & Schulz, 2007, p. 15).

Taipale and Fortunati (2018) further develop this concept by proposing that social robots will be the next new media, thus theorising a process of diffusion and appropriation of this technology at mass level. Their hypothesis emerges from an empirical exploration of the premises from which robots may be considered as such. In their vision, the most important premises in social robot diffusion are the overall positive interest in new scientific discoveries and the recent spread and appropriation of information and communication technologies (ICT). As to the first factor, on the basis of a series of statistical analysis conducted on a Eurobarometer survey (2012), they have demonstrated that the overall positive interest in new scientific discoveries among EU citizens is a good predictor for a positive attitude towards social robots.

As to the second factor, they have demonstrated as well that the adoption of various personal ICTs relates to a direct experience of using robots. Taipale and Fortunati (2018) have interpreted this result by arguing that ICTs have, on the one hand, created the premise of the diffusion and adoption of social robots by generating a smart environment based on the continuous stimulation of people's minds through innovations, and, on the other hand, made people imagine and contribute to the co-construction of newer and more advanced technological artefacts (Rheingold, 2000).

Based on these analyses, Taipale and Fortunati (2018) conclude that robots have the necessary prerogatives to become the next new media aimed at a mass market. Of course, to make successful artefacts, it is necessary to design social robots able to effectively assist people with domestic chores, as well as with communication and information needs. Moreover, to be successful as the next new media, social robots first need to be tailored in different ways according to the social and cultural needs of various groups in different countries. Secondly, social robots, in order to get people to interact with them, should be designed by taking advantage of people's previous knowledge of digital technology and their appreciation of technological innovations (Fortunati & Manganelli, 2008).

This works not only for people and the dimension of use, but also for producers and the dimension of the production of social robots. We can observe, in fact, that robotic industries tend not to start from the experience accumulated by media, and more generally by ICT groups, over the last decades, but to start from their own, internal history and tradition, without paying due attention to adjacent sectors, such as those of media and ICT. As a future new medium at mass level, Taipale and Fortunati (2018) continue, the social robot, like smartphones, tablets and laptops, can become a new status symbol that assumes a peculiar prestige for its owner since. When compared to diverse personal technologies, it offers new dimensions, such as verbal and non-verbal communication and higher social presence (de Graaf, 2016) as well as those we have illustrated in this chapter.

Finally, at least one main lesson can be drawn from this vision of social robots as the next new media. This lesson regards social robot shapes, which is a very important issue, since from this issue many secondary issues derive. Taipale and Fortunati (2018) posit a relation between frequent use of ICTs, including mass media, and the positive perception of future robots. On the basis of the outcomes of their study they imagine that, on the short term, focusing on ICT-like, rather than human-like robots, would be more rewarding both in research and marketing activities.

These authors are convinced, like Vincent (2013) and Sugiyama (2013), that for social robots to become the next new media, they must be designed drawing inspiration from the entire, current network of personal communication technologies. If so, this would facilitate the effectiveness of robot-human interaction, as the communication practices in use with smartphone virtual assistants such as Siri demonstrate (Guzman, 2019). Human-like features, Taipale and Fortunati (2018) continue, may be strengthened in robots in a second moment, after users have adopted and appropriated robotic media at a cultural level (Fortunati et al., 2018; Katz, Halpern, & Crocker, 2015), and their attitudes and emotional reactions could stabilise (de Graaf et al., 2017; Fortunati, 2008; Taipale et al., 2015a; Taipale et al., 2015b).

Conclusion

I hope that this revisiting of Höflich's contribution to the field of human-robot communications has served to highlight the centrality of his thoughts to this new field of studies. The path I have travelled is far from being exhaustive; however, space reasons necessitate stopping here.

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