Reduction and Participation

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> Three years ago, researchers at the secretive Google X lab in Mountain View, California, extracted some 10 million still images from YouTube videos and fed them into Google Brain—a network of 1,000 computers programmed to soak up the world much as a human toddler does. After three days looking for recurring patterns, Google Brain decided, all on its own, that there were certain repeating categories it could identify: human faces, human bodies and … cats. (Jones 2014: 146)

1. Deep Learning

By this point, talk of the omnipotence of algorithms is everywhere. This discourse proceeds without interruption and is seemingly impossible to stop—not least because algorithms operate quietly and inconspicuously in the background (cf. Bunz 2012; Seyfert/Roberge 2017). Many of the discussions about their influence concern the status of their opacity and, by concentrating on the refusal of firms to make them transparent, bring arguments into play that seem like relics from another era. Whereas then the focus of critics rested on the activities of a discredited culture industry, today it is the economization of hitherto unimaginable volumes of data that is considered a violation. The economic valence of data has become the object of a media critique that lost one of its favorite subjects from the previous century: the critical and autonomous media user (or that which was once regarded as such). The algorithms of large corporations such as Google, Amazon, or Facebook rightly seem to have subsumed the latter subject's potential for action, autonomy, resistance, and subversion (cf. Sudmann 2017). This process has been so successful that it has even led to counter-movements that do not casually lament the end of the private sphere as collateral damage of digitalization but have rather adopted agendas that enthusiastically promote its undoing (cf. Rieger 2018). For the internet exhibitionists of the so-called *Post-Privacy Spackeria*, data protection is nothing more than a historically datable remnant, a vestige from the last millennium: "The private sphere is so 1980s." (Reißmann 2019, n. pag.)

The areas of application for the use of algorithms, which, for their part, have been the object of a brief evolution and whose optimization has been oriented not least

toward meeting the specifications of nature, are ubiquitous and so varied that they cannot be surveyed in full:[1] whether recognizing faces in everyday life for reasons of delayed surveillance or future-oriented forensics, identifying sequences of behavior or engaging in biopolitics, clarifying the authorship of images and texts (cf. Rodriguez et al. 2019; Rehman et al. 2019), classifying works of art according to the style of a given epoch or comparing signatures supposedly written by the same hand, intervening in the business of science and confronting apparently non-computable objects of knowledge with big data and algorithmization (cf. Rieger 2019), affecting the self-perception and self-assessment of certain disciplines over the course of the "computational turn" and "humanities computing," associating the latter disciplines with different forms of reflection and thereby contributing fundamental changes within the humanities itself (cf. Hall 2013), or otherwise intervening in the order of things—such activity typically draws upon processes of artificial intelligence, artificial neural networks, and deep learning. Their manner of dealing with large volumes of data has become a knowledge-promoting game and has even opened up new possibilities for Foucauldian discourse analysis, which is seldom applicable to technological developments (cf. Engemann/Sudmann 2018). The possibilities of artificial intelligence play right into the hands of Foucault's basic intuition that "empirical knowledge, at a given time and in a given culture, *did* possess a well-defined regularity" and that "the history of non-formal knowledge had itself a system." (Foucault 2002 [1966]: x) Over the course of his book *The Order of Things*, Foucault sought to reveal an epistemologically stringent (but, in technical terms, hardly realizable) *positive unconscious of knowledge* and thus to give expression to the supposition that there is a "well-defined regularity"—a formal code behind non-formal knowledge as well. It would therefore be possible to process the science of this knowledge in a different way: it could become the object of an algorithmic discourse analysis and remain removed from individual understanding and comprehension. In the modes of access employed by cultural analytics, such a positive unconscious of knowledge is brought up to technical speed and made visible in the form of regularities and repetitions. Data mining and text mining make patterns and thus forms of knowledge visible that are not necessarily exhausted in intentional questions. Here, everything that human intelligence, in its scientific narcissism, regards as its genuine field of activity—ordering and classifying things, identifying similarities, and creating genealogies—is relegated to algorithms. In this case, the business of science is therefore not at the mercy of chance in its efforts to produce knowledge; rather, identities and differences are processed automatically—with algorithmic and not anthropogenic support.

Yet this concerns not only the sciences, with their broad subject areas and the claim to complexity associated with them. The activity of algorithms even extends to

1 The keywords in question would be evolutionary algorithms, evolutionary or genetic programming.

the lower senses, which, for long stretches, received hardly any attention in cultural history but have since come into the spotlight thanks to the efforts of various naturalization movements (cf. Kortum 2008). Like almost everything else, the detection of smells can also be delegated to algorithms—with the effect that, where olfactory data can be processed automatically in large quantities and at high speeds (*in real time*, to use one of the favorite terms of several protagonists), a familiar danger looms. In the case of smells, this danger has been called "odorveillance." In addition to seeing everything, Jeremy Bentham's panopticon can now smell everything as well (cf. Stark et al. 2018a). The consensus over this seems to be that such a regime of odors should be regarded as an outgrowth of other biometric activities and should accordingly be opposed. Of course, the following is just a rhetorical question: Is this sort of odorveillance really what we want? (Stark et al. 2018b: 18) And there also seems to be a consensus over the fact that automated activities of this sort should be the object of fundamental reflection concerning the nature of "veillance" in all of its varieties (the latter now include "sousveillance" and "metaveillance") (cf. Kammerer/Waitz 2015). Indeed, this idea has even been spelled out in a programmatic way—in works with titles such as "Declaration of Veillance (Surveillance is a Half-Truth)" (Mann 2015).

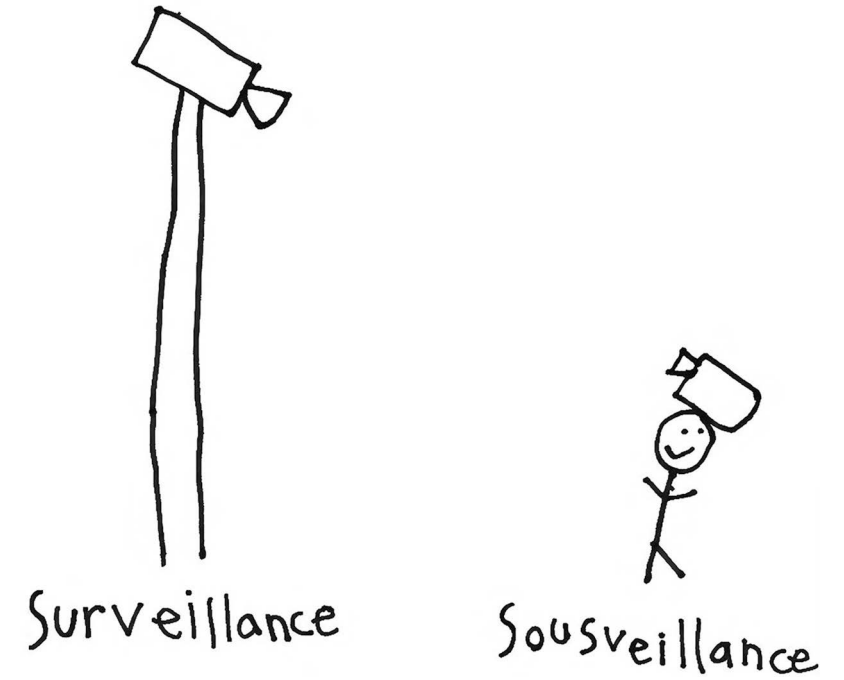

Fig. 1: Surveillance versus Sousveillance (https://en.wikipedia.org/wiki/File:SurSousVeillanceByStephanieMannAge6.png, accessed June 4, 2019)

Protagonists such as Steve Mann (2016) or José van Dijck (2014) should be mentioned here, the former for introducing concepts of veillance beyond surveillance, the latter for his concept of datafication, which describes the normalization of data politics and its ambit as a new sort of currency. With datafication and its basic suspicion concerning the opaque modus operandi of such data processing, the media-critical impetus of earlier days seems to have survived and not to have capitulated to the demands for a total relinquishment of the private sphere. In his book *Post-Privacy: Prima leben ohne Privatsphäre*, for instance, the internet activist Christian Heller comes to appreciate the latter, even though there are arguments in favor of its complete abandonment. He cites an example of algorithms being able to determine the sexual orientation of individuals from their social behavior—without any regard, of course, for the safety of the people in question:

> His sexual orientation is private, and so it should remain. However, he created his account without considering the inventors at the Massachusetts Institute of Technology (MIT). There a process was developed for identifying, with a high probability, the homosexuality of men on the basis of their Facebook profile, even if they posted no photos or listed no preferences of any sort. All that is needed is to analyze their social environment on Facebook, which is used above all to stay in touch with friends, relatives, and acquaintances. Often enough, profiles include a list of friends that is visible to anyone in the whole world (it is possible to make this information private, but few bother to do so). The researchers at MIT discovered that it is possible to make approximate predictions about whether a male student is gay on the basis of the portion of men among his Facebook friends who have outed themselves as gay on their own profiles (Heller 2011: 12).

2. Strategies of Participation

Artificial intelligence is at work everywhere, regardless of whether we know it, whether we can know it, or whether we even want to know it. The concerns of surveillance studies or critical code studies aside, moreover, everyday user behavior is often defined by a fundamental and reckless indifference to the activities of algorithms and issues of security. As is clear not only from people's access codes and passwords (the use of easily decipherable sequences of numbers, birthdays, the nicknames relatives and pets) but also from their willingness to disclose their consumer preferences and other habits, this behavior exemplifies flippant and careless negligence. Yet there is another aspect that defines what is going on and increasingly determines how we engage with artificial intelligence, one that is perhaps less visible and at first glance far removed from concrete political action. Whereas algorithms are monopolizing autonomy everywhere, whereas they operate in a self-determined or partly self-determined way, whereas they are exe-

cuting the grand scheme of automated knowledge with greater and greater efficiency and on hardware that is ever increasing in capacity, and whereas—as one repeatedly reads—they conduct their business without notice and in the mode of operative latency, a peculiar counter-movement is taking place on the level of use and participation, social engagement, and the campaign for acceptance. This process is peculiar because it seemingly overturns the order of the grand narrative that surrounds technology in general and digitalization in particular. The grand narrative about the technology around us and the associated politics of the internet is typically bound to a principle of quantitative growth. This can be narrated in the form of large numbers and is written as the history of progress of an utterly relentless triumph of increasing complexity.

It is thus all the more striking to see tendencies in dealing with technical (or perhaps it would be better to say socio-technical) infrastructures that move in a different direction and are based on the opposite of growth—that is, on what will be discussed here under the title "Reduction and Participation." This interruption of the customary success story and the intentional reduction of technically possible complexity are noteworthy—and in various ways they revolve around aspects of internet politics, democratization, and the question of who should have access at all (and in what way). What is especially remarkable is a fundamental expansion of that which is considered fit for participating on the internet and thus for being addressed. Over the course of this expansion, as will be shown, different and additional agents have been put in position to participate—agents who are situated outside of the dominant concerns of human-computer interaction (HCI) and who endorse the argument for reduction or at least provide some indication of the gestures associated with it. Those who have somewhat systematically become part of the plan include users who, with their specific profiles, veritably embody the issue of reduction. These particular users are phenotypically diverse and thus, not least, children and people with challenges have attracted increasing attention as extreme cases of those with special user profiles: "Alterations of HCI methods is common when interaction design is planned for 'extreme' human users." (Hirskyj-Douglas et al. 2016, n. pag.)

Yet this is not just a matter of differentiating human beings according to their stages of development (children) or according to their particular challenges (deaf, blind, autistic, elderly people; people with cognitive or other challenges). Beyond human beings, the aspired reduction of complexity also brings new agents into play. Noteworthy in this regard are such things as "animal-computer interaction" (ACI). Clara Mancini, one of the leaders of this movement, is quick to point out that there is more than just casuistry behind such approaches and that there is more to them than mere anecdotes about Skyping dogs and chatting cats (cf. Ritvo/Allison 2014; Pongrácz et al. 2016; Golbeck/Neustaedter 2012). Rather, Mancini's program stands for a system that is fundamentally related to the field of altered social

forms ("interspecies communities") and is dedicated to promoting "multi-species awareness" (cf. Mankoff et al. 2005). She combines her endeavor with the promise of an overarching systematic approach and with the self-confidence of a newly emerging discipline, as is impressively clear from her manifesto and its positive reception (cf. Mancini 2011; Hirskyj-Douglas et al. 2018).

Not least, this obligation is a matter of social responsibility. As with overstepping the boundaries between species, this is due to more expansive ideas of participation (cf. Kelty 2016; Stahl 2014). This attentiveness is accompanied by a deeper consideration for the particular features of semiotic systems and by reconsiderations of one's own ethical positions (cf. Mancini 2011, 2017). By encouraging the intermingling of species and a political awakening, approaches such as ACI are part of a larger intellectual movement known as transhumanism or posthumanism. The latter is defined by figures that programmatically renounce differentiation. This renunciation is exemplified in Donna Haraway's book *Staying with the Trouble: Making Kin in the Chthulucene*—especially in her use of the word *critter*, which stands at the center of her thinking. As she notes, this term serves as a placeholder for a peculiarly broad range of beings (and machines): "In this book, 'critters' refers promiscuously to microbes, plants, animals, humans and non-humans, and sometimes even to machines." (Haraway 2016: 169n1) A similar argument has been put forth by the philosopher Rosi Braidotti (2013), who considers all species to be equally vulnerable to the threats of anthropogenic climate change and thus urges interspecies collaboration, which, as she vigorously pleads, should be part of the political agenda.[2] It is high time, according to Braidotti, for humans to create new social bonds—not only with other species but also with the techno-others that we tend to keep at a distance and reduce to their operational functionality. Only in such a way does she think it will be possible to ensure our common survival as a community facing the same threat.[3] What Braidotti proposes is a fundamental dedifferentiation of the social, which is comparable to the dedifferentiation of the ontological in Haraway's definition (or non-definition) of critters.

Such figures of dedifferentiation, which are central to the theoretical position of post- and transhumanism and thus seek to avoid the habitual accusation of anthropocentrism, are necessarily associated with intuitive gestures—a finding that unites the numerous movements in favor of openness and expansion against the dominance of human-computer interaction. After long phases of political abstinence, this expansion was joined on the agenda by categories such as respon-

2 This collaboration should not, moreover, be dictated by a logic of precariousness (cf. Bennke et al. 2018).

3 Such an attitude toward the techno-other is being fostered by a number of anthropophilic gestures being made on the part of machines (cf. Seaman 2011).

sibility, ethics, and participation. The tone of all this is demanding, immodest, and programmatic; as Braidotti herself concedes, it is impatient and hardly free of pathos. The way in which the concerns of individual participation offensives interrelate with those of certain theoretical formulations can be seen, for instance, in the work of Fredrik Aspling. The Swedish sociologist is a committed critic of anthropocentrism and considers himself a close ally of post- and transhumanism:

> The increased involvement of nonhuman species in interactive contexts supported by digital technology, which could be framed as multispecies-computer interaction, leads to new possibilities and forms of interactions, and consequently, a need to reconsider what this is and can be in terms of interaction. (Aspling 2015: 1)

Multispecies interaction thus becomes the operational basis for a new concept of interaction. On this basis, Aspling places a concept of inclusion on the agenda and encourages people to consider the particular needs and features of different species:

> The addition of nonhuman species challenges conventional interaction approaches and theoretical frameworks in HCI. There is a need to think beyond the human and confront the challenges associated with the inclusion of other species with dissimilar cognitions, experiences, senses, abilities, timescales, wants and needs. For further advancement we need appropriate approaches and theoretical foundations to better understand the emerging dynamics of these new forms of interactions. The attention given to nonhuman species in HCI (e.g., animal as legitimate users to design for and with) is in analogy with posthumanism and its critique of anthropocentrism. (Ibid; Aspling et al. 2018)

The issue of going beyond human-computer interaction and integrating new agents and processes is part of what is being negotiated by way of concepts such as post- and transhumanism and by way of new epochal designations such as the Anthropocene or the Chthulucene (cf. Haraway 2016). Alongside gestures of ontological opening, which feature prominently in Haraway's work, there are thus also gestures of opening up social interaction. The development of ACI (animal-computer interaction), PCI (plant-computer interaction), CCI (child-computer interaction) or RCI (robot-computer interaction) stand for this. The logic of subdividing forms of interaction into appropriate departments is just as striking as the aspect of promoting all sorts of interspecies collaboration. Interactive relationships prevail between the knowledge about various individual user groups. These relationships make it possible for such groups to learn and profit from one another: "The aim is to strengthen connected thinking whilst highlighting the exchangeable connecting methods from both ACI and HCI and their subfields in-

cluding Child Computer Interaction (CCI) and Human Robot Interaction (HRI)." (Hirskyj-Douglas et al. 2016: n. pag.; cf. Hourcade/Bullock-Rest 2011; Hourcade et al. 2018) These interactive relationships and this act of learning from one another ("discussing what these fields learn from each other with their similarities and differences mapped") lead to common design criteria. And the latter criteria keep the special or extreme user in mind—as children, as people with cognitive or sensory limitations, as autistic people, and so on (cf. Gennari et al. 2017; Eisapour et al. 2018; Lindsay et al. 2012; Satterfield et al. 2016).

Several of the maxims expressed by proponents "participatory design" are syntactical peculiarities. Now it is common to encounter expressions with dual prepositions; in order to include special users in advance, for instance, programmers are now encouraged to work *for* and *with* them. This double use of prepositions is important to the movement and therefore often seen. Noteworthy, too, is the unusual use of the preposition *with*. In this context, it is often attached to the word *becoming*, which was one of post-structuralism's objects of fascination. This mode of "becoming-with" (with animals, plants, stones), which concerns both the molecular as well as the technical and artificial, is believed to be a key element in the struggle for global survival ("the necessity to become-with animals and techno-objects as a matter of survival" (Davis 2016: 210).

Cats and children—but also people with challenges, disabilities, or highly individual needs—have become the respected target groups of special interfaces made particularly for them (cf. Maaß/Buchmüller 2018; Westerlaken/Gualeni 2016). Their participation takes place via the reduction of complexity—and this, as I have already remarked, in a field that is otherwise defined by gestures of increasing complexity. Not least, it is defined by a further gesture that involves the systematic integration of playfulness; in fact, the impression left is that playfulness is the order of the day and that play itself has a central role in eliminating the barriers between species (cf. Nijholt 2015).[4] Such measures almost make it seem as though the professionalization of algorithms is being accompanied by an infantilization movement—as a sort of counter-movement. This is tied to gestures of reduction or can at least be understood under that formula. The programmatic nature of the formula owes itself to the discovery that wherever there is talk of technology, another narrative is being expressed as well. For such an argument in favor of reduction, which is conceived in functional terms and not meant disrespectfully, one should look toward venues that break up and diversify the primacy of HCI. The recent concentration on children and the efforts—referred to by Aspling—to blend child-computer interactions with those of ACI are therefore more than mere symptoms: They modulate a praxis of their own. Atypical allianc-

4 This applies not only to the design of interfaces but also to the design of data and the practices associated with it (cf. Anderson et al. 2017).

es are now becoming visible and possible, as is evident from the following title of an article about ACI: "Of Kittens and Kiddies: Reflections on Participatory Design with Small Animals and Small Humans." (Chisik/Mancini 2017) This organized focus on children *and* cats as representatives of a desired form of intuition exemplifies some of the concerns of participatory design. The goal is to produce a user-friendly interface design that does not have to be laboriously explained but is rather intuitive, self-explanatory, and based on tacit knowledge. Participatory design is negotiated both with as well as between humans, animals, and machines. With its focus on small animals and people, it makes reduction tangible. What is more, it makes reduction the keystone of participation.

3. Asymmetries

The naturalization of designs meant for interaction, collaboration, or communication requires the use of surfaces and has operative dimensions (cf. Norman 2010). Thus it is not exhausted by gestures of dedifferentiation but rather goes hand in hand with strategic considerations. One of these is the discovery of the multisensory—or, as Caon et al. (2018) have called it, "multisensory storming." Storming the senses has been able to take place, first of all, through the increasing discovery of the tactile and the haptic—a discovery over whose course the manners of speaking about computers and algorithms have themselves been changing. Gestures of naturalization, which have been described as well as criticized within the discussion about interfaces, concern not only the problems of dealing with hardware but also manners of programming (cf. Bruns 1993; Hornecker 2008). Not only does the computer require massive strategies for accommodating the senses; the activity of programming is also under pressure to recreate itself in a new image. It has to abandon its cognitive solipsism and, beyond merely working with symbols, become a tactile undertaking. Thus, yet again, the body will become the natural guarantee of a form of comprehensive participation that can or should be able to take place without effort, intuitively, and in the transparent mode of self-evidence.

The issue is not only computer use and literacy but also a life world that allows technology to exist in any given ambient form. By now there are abundant examples of this and, on a systematic level, they tend to have certain features in common, most notably the development of new channels, the integration of different senses, and the emergence of new forms of communication. The latter free up scenes of asymmetrical communication—scenes that invalidate the common conceptions of communication theory. The abundance of examples extends from applications for remotely caring for pets to interacting with plants, which are often grown in artificial environments (cf. Lee et al. 2006; Kuribayashi et al. 2007).

They alter forms of sociality. One of the most theoretically ambitious protagonists in this field is the Japanese researcher Hill Hiroki Kobayashi.[5] His goal is to transcend a paradigm of communication and interaction that is measured solely on the basis of human beings (in full possession of their mental faculties) and a particular form of linguistic communication. Kobayashi's notion of "human-computer-biosphere interaction" (HCBI) has a virtually unlimited field of operation. It not only changes the sphere of actors but also, and necessarily, the ways in which communication takes place: "HCBI extends the subject of Human Computer Interaction (HCI) from countable people, objects, pets, and plants into an auditory biosphere that is uncountable, complex, and non-linguistic." (Kobayashi 2010: n. pag.) This abandonment of the anthropocentric standpoint is as much a program as it is a collaboration with agents that elude the principle of countability (cf. Kobayashi 2014). In this way, possible forms of expression beyond articulated speech are assigned a central role. Regarding the use of wearables that are meant to bring people closer to nature ("Wearable Forest-Feeling of Belonging to Nature" is the title of his article), Kobayashi writes: "Thus, wearable computer systems have become an inter-medium to express the telepresence of various species in the biosphere in such a way that their non-linguistic expression is perceived and understood by each participant, which violates all the rules of linguistic science." (Kobayashi 2008: 1133)

The locus for such applications is thus close to life and by no means limited to art installations. An indication of how lifelike they can be is provided by a device called LumiTouch. At first glance, LumiTouch looks like a regular pair of picture frames. One inconspicuous frame is connected to an equivalent through the internet, and it is able to trigger signals that correspond to someone's mere touch. Depending on the type of touch (its intensity, frequency, duration), various light patterns and color constellations are released that can be associated with an individualized code. According to its designers, the latter is suitable for implementing a special form of expression and thus encourages the development of a private emotional language (cf. Kaye/Goulding 2004). LumiTouch changes the simplified (because idealized) models of communication theory, and the act of touching the picture frame has useful advantages for people with impairments. What its designers envision are forms of asymmetrical exchange for which one of the communication partners does not need to be in full command of his or her cognitive or physical abilities: "People who are unable to actively communicate for long periods of time (e.g. sick or elderly) might be able to use the passive transmission of LumiTouch." (Chang et al. 2001: 314) The potential of overtaxing motor skills or cognitive faculties in certain situations, such as when someone is bed-ridden, can be counteracted with communicative systems that are less demanding: "Similar-

5 See his homepage at http://hhkobayashi.com (accessed June 2, 2019) and Nijholt 2015.

ly users who lack the required dexterity or concentration for pushing numerous buttons might appreciate this system due to its small number of simple grasping inputs." (Ibid.)

Fig. 2: LumiTouch (Chang et al. 2001: 314)

Another system that is based on reduction is a product called Tsunagari-kan' Communication, which is devoted to the goal of ensuring communication between distant family members (cf. Miyajima et al. 2005). Here, too, what is favored is a non-linguistic form of intimate communication (""Tsunagari' communication aims to foster a feeling of connection between people living apart by exchanging and sharing the cue information via network everyday." (Itoh et al. 2002: 810) Expanding upon LumiTouch's model, it also allows communication to take place in the mode of the unconscious and passive. Using a so called "Family Planter" as a communicative tool, it is meant to enable firm social bonds to form through exchanges of "cue information" (ibid.: 811). By means of infrared and ultrasound sensors, Tsunagari's interconnected terminals react to a person's presence and movement. This information is transmitted and converted on the receiving end into a non-linguistic signal:

> Optical fibers at the top of the terminal will gleam to indicate the remote human presence and will rotate to indicate the remote human motion. This is intended to exchange presence and movement information implicitly (without explicit intervention from users) and constantly. (Ibid.)

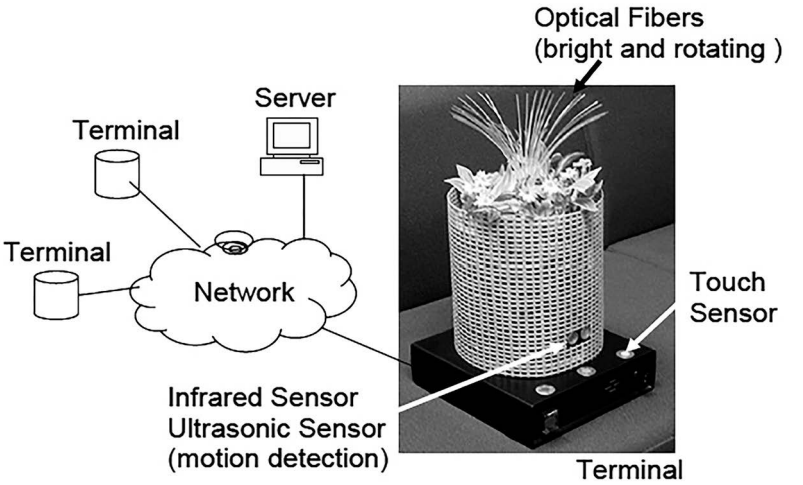

Fig. 3: Family Planter (Itoh et al. 2002: 810)

The design of this planter-based sensory device contains several important aspects that also happen to be central to interspecies communication and interaction. In the mode of implicit and thus unconscious participation, the system allows people to partake in the everyday lives of remote family members seamlessly and in a way that is not felt as an imposition or disruption: "These exchanges are designed to blend into the everyday life of a user." (Ibid.) By means of three sensors, it can transmit various audio signals, and thus the system can also be used to convey explicit messages. More important than this explicit mode, however, is the implicit nature of its use, which, with its unobtrusive participation, submits to the logic of media and the way in which they increasingly blend inconspicuously into our environments. They now do so seamlessly, unobtrusively, quietly, smoothly, and ubiquitously, and these qualities are redefining the ways that theorists should think about media in general. This would be a media theory that, freed from the paradigmatic idea that media are extensions or organic projections of humans, could instead be described with adjectives such as *ubiquitous*, *seamless*, and *calm* (cf. Weiser/Brown 1996). It would be a media theory that directs its focus toward the issues involved with making communication more intimate and embraces its own intimately charged objects. This trend toward developing things that can be laden with affect is only growing. It is driven by an identifiable agenda and not

by casuistry (cf. Choi et al. 2014; Kaye/Goulding 2004). Its basis—reduction—has become a program whose results will become a part of everyday life.

Fig. 4: Lamp (Angelini/Caon. 2015: n.p.)

4. Finis (hominis)

Children and cats aside, what all of this brings to light are the needs and venues of a sort of communication and collaboration that is designed to be asymmetrical and yet non-discriminatory. The applications presented above do not aim to optimize ways of dealing with technical environments but rather hope to provide alternative and less complex ways of using them (cf. Rieger 2019). Thus the view has also shifted away from the previous stubborn orientation toward a particular type of user (cf. Satchell/Dourish 2009). Two things remain to be said in closing: First, the children and cats, which I have introduced here as representatives of a broader phenomenon, are being put to functional use. What this comes down to is not an offer of minimization, such as that which defines rampant cat content, but rather the functional equivalent of a strategically pursued reduction of complexity. Among these pursuits are campaigns for acceptance that include special users and shift the focus of designs toward all possible forms of participation. One of the latter is the gesture of naturalization (cf. Andreas et al. 2018).

The second point concerns the question of who rules the network. To this question there is, at first glance, a simple answer, and it has nothing to do with the power of inconspicuous algorithms but rather with online content. It was none other than the deep-learning processes of Google Brain that brought to light the fact that it is cats that have, in quantitative terms, been dominating what is going on there (cf. Guerin/Vasconcelos 2008). Much to the amusement of those working on the project, their algorithms revealed that, indeed, the cat is the lord of the internet—a supposition that Alexander Pschera (2016) also plays with, though somewhat less jokingly, in an article devoted to the "internet of animals." For some time now, the internet has not belonged to people alone. This situation is now even reflected in puns that, as silly as they may be, nevertheless support the ethical arguments of participatory design: "Our work focuses on canine companions, and includes, *paw*ticipatory design, *lab*radory tests, and *canid* camera monitoring." (Mankoff et al. 2005: 253; cf. Trindade et al. 2015) Or, regarding cats in particular: "In the modern era of digital media, it is hard to deny that cats have clawed their way into the zeitgeist of the Internet." (Myrick 2015: 175)

The title that I have chosen for this essay—"Reduction and Participation"—takes the demands for including other species and forms of existence at their word. The aim of such demands is to expand the circle of those with agency and epistemic relevance. Multispecies communities will be home to new actors, new forms of communication and collaboration, new types of design and participation, new responsibilities and social forms: between humans and animals, plants and stones, artefacts and biofacts, machines and media, the living and the non-living, the real and the virtual, the augmented and un-augmented, the simulated and the modelled, the increased and the reduced (cf. Leistert 2017). It is therefore only consistent that, in this sphere of actors, algorithms might not find their peace but will certainly find their place.

Translated by Valentine A. Pakis

Images

Fig. 1: Surveillance versus Sousveillance (https://en.wikipedia.org/wiki/File:Sur SousVeillanceByStephanieMannAge6.png, accessed June 4, 2019)
Fig. 2: LumiTouch (Chang et al. 2001: 314)
Fig. 3: Family Planter (Itoh et al. 2002: 810)
Fig. 4: Lamp (Angelini/Caon. 2015: n.p.)

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